International Code Council

ICC 500-2023 edition

Committee Action Report on the Public Input Agenda based on input received on 2020 edition of the ICC 500 Standard

6-15-2023

For February, 2023 Meeting – Teleconference

Matrix for ICC 500 proposals

Matrix for ICC 500 proposals

Revisions to the text are in legislative format – strikeout of what is to be removed, and underlined for new. Revised text in the proposals in red is to highlight the changes in a proposal where it was difficult to find the revision quickly.

Staff notes located in this document after a proponents reason are provided to indicate proposals that may require coordination; technical information; or terminology that is not good code language (e.g. "may" or "guarantee", the use of "when" where the use is not a function of time). Staff notes are provided to assist the committee or proponent for possible modification. It is not intended to provide an opinion.

Proposal #	Section Number	Date of meeting proposal considered	Committee Action	Notes
Chapter 1 APPLICATION AND ADMINISTRATION				
IS-STM 01-01-23	104.1	2-23-2023	AM 11-0-0	
IS-STM 01-02-23	106.1	2-23-2023	AS 11-0-0	
IS-STM 01-03-23	106.2, 106.2.1, 106.2.2, 106.2.3, 106.2.4, 106.2,5, 106.2.6	2-23-2023	AM 10-0-0	
IS-STM 01-04-23	106.2.1	5-30-2023	AM 11-0-0	2-23-2023 Work Group 1
IS-STM 01-05-23	106.2.3	2-23-2023	AS 10-0-0	
IS-STM 01-06-23	106.2.5, 106.2.6	5-30-2023	AS 11-0-0	2-23-2023 Work Group 1
IS-STM 01-07-23	107.1, 107.2, 107.3	3-6-2023	AS 11-0-0	
IS-STM 01-08-23	107.3, 108, 109, 110, 111, 112, 114	3-6-2023	AS 11-0-0	
IS-STM 01-09-23	108.3(New), 113.2, 113.3.3(New), 113.4	5-30-2023	AM 9-1-0	3-6-2023 Work Group 1
IS-STM 01-10-23	109.1	3-6-2023	AS 11-0-0	
IS-STM 01-11-23	112, 112.1, 112.1.1	3-6-2023	AS 11-0-1	
Chapter 2 DEFINITIONS				
IS-STM 02-01-23	202	3-6-2023	AS 12-0-0	Approved agency, base flood elevation, listed, special inspection
IS-STM 02-02-23	202	6-15-2023	AS 10-0-1	3-6-2023 Work Group 7 Critical support system, storm shelter
IS-STM 02-03-23	202	3-6-2023	D 12-0-0	Host building
IS-STM 02-04-23	202	3-6-2023	D 11-0-0	Labe, Labeled, Listed
IS-STM 02-05-23	202	6-15-2023	D 9-0-0	3-6-2023 Work Group 7 Occupied storm shelter areas

2020 ICC 500-Standard Revision Proposals

Proposal #	Section Number	Date of meeting proposal considered	Committee Action	Notes
IS-STM 02-06-23	202	3-23-2023	AS 11-0-0	Protected occupant area
IS-STM 02-07-23	202	3-23-2023	AS 11-0-0	Storm shelter
Chapter 3 STRUCTURAL DESIGN CRITERIA				
IS-STM 03-01-23	302.2, 302.3	5-4-2023	AS 11-0-0	
IS-STM 03-02-23	203, 301.4(New), 302.5(New), 304, Table 305.1.1, Chapter 9	5-4-2023 6-15-2023	Split 10-0-0 Part A AM 10-0-0 Part B AM 9-0-0 Reconsideration AM 11-0-0	ASCE 7
IS-STM 03-03-23	304.9	5-18-2023	AM 10-0-1	
IS-STM 03-04-23	305.2.2	4-06-2023	AS 10-0-0	
IS-STM 03-05-23	306.4, 306.4.1.1, 306.4.1.2, 306.4.1.3, 306.4.1.4, 306.4.2, 306.5, 306.6	4-06-2023	AM 8-0-0	
IS-STM 03-06-23	306.4.1, 306.4.1.3	4-06-2023	AM 8-0-0	
IS-STM 03-07-23	306.4.1.1	5-18-2023	D 11-0-0	
IS-STM 03-08-23	306.4.1.1, 306.5	5-18-2023	AM 7-4-0	
IS-STM 03-09-23	306.4.1.2	5-4-2023	AM 8-0-0	
IS-STM 03-10-23	306.4.1.5(New)	5-4-2023	AM 7-1-0	
IS-STM 03-11-23	306.5, 306.5.1(New), 306.5.2(New), 306.5.2.1(New), 306.5.2.2(New)	6-6-2023	AM 8-0-0	
Chapter 4 SITING				
Chapter 5 OCCUPANCY, MEANS OF EGRESS, ACCESS AND ACCESSIBILITY				
IS-STM 05-01-23	502	3-23-2023	AS 11-0-0	
IS-STM 05-02-23	502.2.1, 502.2.2, 502.3, 503.2	3-23-2023 5-30-2023	AS 11-0-0 AM 11-0-0	5-30-2023 Reconsideration for coordination between 05-02 and 05-03
IS-STM 05-03-23	502.3, 502.3.1(New), 502.3.2(New)	3-23-2023 5-30-2023	AS 11-0-0 AM 11-0-0	5-30-2023 Reconsideration for coordination between 05-02 and 05-03
IS-STM 05-04-23	502.3	4-06-2023	AM 8-0-0	3-23-2023 Work Group 5
IS-STM 05-05-23	502.5	4-06-2023	AM 8-0-0	3-23-2023 Work Group 5
IS-STM 05-06-23	504.1, 504.3, 504.4, 504.5, 505.2, 505.3, 505.3.1, 506.1, 506.3, 506.3.1, 506.5	4-20-2023	Item 1 – AM 10-0-0 Item 2 - AM 10-0-0 Item 3 – AM 10-0-0	Split into 5 modifications that will be combined.

Proposal #	Section Number	Date of meeting proposal considered	Committee Action	Notes
			Item 4 – AM 9-0-0 Item 5 – AM 10-0-0	
IS-STM 05-07-23	504.6	4-20-2023	AM 8-1-0	
IS-STM 05-08-23	504.6	4-20-2023	AM 8-0-1	
IS-STM 05-09-23	504.6	4-20-2023 5-30-2023	AM 8-1-0 AM 10-1-0	5-30-2023 - Add 'vertical' in first sentence
IS-STM 05-10-23	507.1(New)	3-23-2023	AM 11-0-0	
IS-STM 05-11-23	507.3	3-23-2023	AM 10-0-0	
IS-STM 05-12-23	507.4(New)	3-23-2023	AM 10-0-0	
IS-STM 05-13-23	507.5(New)	4-06-2023	AM 8-0-1	3-23-2023 Work Group 5
IS-STM 05-14-23	508.1	4-06-2023	AM 9-0-0	
IS-STM 05-15-23	508.1		Withdrawn	
IS-STM 05-16-23	508.2	3-23-2023	AS 10-0-0	
IS-STM 05-17-23	508.3, 508.3.3(New), 508.4, 508.5	4-06-2023	AM 9-0-0	
IS-STM 05-18-23	508.6	3-23-2023	AS 10-0-0	
Chapter 6 FIRE SAFETY				
IS-STM 06-01-23	603.1	4-20-2023	AM 9-0-0	
IS-STM 06-02-23	603.1	4-20-2023	AS 9-0-0	
IS-STM 06-03-23	603.1	6-15-2023	D 7-1-0	4-20-2023 Work Group 6
IS-STM 06-04-23	603.1	4-20-2023	AS 9-0-0	
IS-STM 06-05-23	603.1, Chapter 9	4-20-2023	D 9-0-0	NFPA 101
IS-STM 06-06-23	603.1.1	4-20-2023	D 9-0-0	
IS-STM 06-07-23	603.1.1	4-20-2023	AS 9-0-0	
IS-STM 06-08-23	604.1, 604.2, Chapter 9	4-20-2023	AM 9-0-0	NFPA 10
IS-STM 06-09-23	604.2	4-20-2023	AS 9-0-0	
Chapter 7 SHELTER ESSENTIAL FEATURES AND ACCESSORIES				
IS-STM 07-01-23	Chapter 7 Title	5-18-2023	AS 11-0-0	
IS-STM 07-02-23	701.2 (twice), 702.1, 703.1	6-15-2023	AS 9-1-1	
IS-STM 07-03-23	703.2, Table 703.2, 703.2.1, 703.2, Table 703.2, 703.2.1	5-18-2023	AS 11-0-0	
IS-STM 07-04-23	702.4	5-18-2023	D 11-0-0	
IS-STM 07-05-23	702.4.2	5-18-2023	AM 12-0-0	
IS-STM 07-06-23	702.5, 702.5.1, 702.5.2, 702.5.3, 703.7, 703.7.1, 703.7.2, 703.7.3, 703.7.4. 703.7.5	5-18-2023	AS 12-0-0	
IS-STM 07-07-23	703.3.4.1	5-18-2023	AS 12-0-0	
IS-STM 07-08-23	703.3.4.1, 703.4	5-18-2023	D 11-0-0	

Proposal #	Section Number	Date of meeting proposal considered	Committee Action	Notes
IS-STM 07-09-23	703.6	5-18-2023	AS 12-0-0	
IS-STM 07-10-23	703.6	5-18-2023	D 8-2-2	
IS-STM 07-11-23	703.3.4.1, Table 703.4.1(New)	5-18-2023	D 12-0-0	
IS-STM 07-12-23	703.7.3	6-15-2023	AM 10-0-1	
Chapter 8 TEST METHODS FOR IMPACT AND PRESSURE TESTING				
IS-STM 08-01-23	802.5	5-18-2023 5-30-2023	AM 12-0-0 AM 10-0-1	5-30-2023 Staff question on consistent terms
IS-STM 08-02-23	803.9	5-30-2023	AS 11-0-0	
IS-STM 08-03-23	803.9.1	5-30-2023	AS 11-0-0	
IS-STM 08-04-23	Figure 803.9.3(2)	5-30-2023	AS 11-0-0	
IS-STM 08-05-23	803.9.4.3, Figure 803.9.4.3	5-30-2023	AS 11-0-0	
IS-STM 08-06-23	202, 803.9.5	5-30-2023	AM 12-0-0	
IS-STM 08-07-23	202, 803.9.5, 803.9.5.1(New), 803.9.5.2(New), 803.9.5.3(New), Figure 803.9.5.3(1)(New), Figure 803.9.5.3(2)(New)	6-15-2023	D 8-0-0	
IS-STM 08-08-23	803.9.6(New)	6-15-2023	D 8-0-0	
IS-STM 08-09-23	803.9.6	6-15-2023	D 10-0-0	
IS-STM 08-10-23	803.9.6	6-15-2023	AM 10-0-0	
IS-STM 08-11-23	803.9.7	5-30-2023	AS 12-0-0	
IS-STM 08-12-23	803.9.7.3	5-30-2023	AS 12-0-0	
IS-STM 08-13-23	803.10.1, 803.10.4	6-15-2023	D 7-1-0	
IS-STM 08-14-23	803.11(New)	6-6-23	AM 8-0-0	
IS-STM 08-15-23	805.3.2	5-30-2023	AS 12-0-0	
IS-STM 08-16-23	805.4(New), 805.4.1(New), 805.4.2(New), 805.4.3(New)	6-6-23	AM 11-0-0	w/ electronic vote
IS-STM 08-17-23	805.5(New)	6-6-23	AM 11-0-0	w/ electronic vote
Chapter 9 REFERENCED STANDARDS				
IS-STM 09-01-23	Chapter 9	6-1-2023	AS 8-0-0	ASCE 7; ASTM E330; FM 4474; IBC; ICC A117.1; IPC; IRC; NFPA 10; TMS 602; UL1897
IS-STM 09-02-23	Chapter 9	6-15-2023	AM 8-0-0	ASCE 7
APPENDIX STORM SHELTER PREPAREDNESS AND EMERGENCY OPERATIONS PLAN (SSPEOP)				
IS-STM A-01-23	A104.4.1	5-30-2023	AS 12-0-0	
IS-STM A-02-23	A105.1, A105.2, A105.2.1, A105.2.2	5-30-2023	AM 12-0-0	
IS-STM A-03-23	A105.3	5-30-2023	AM 12-0-0	

Chapter 1
APPLICATION AND ADMINISTRATION

IS-STM 01-01-23
104.1

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 104
CONSTRUCTION AND OCCUPANCY

104.1 Occupied for other purposes ~~Storm shelters within host buildings~~. ~~Where a designated storm~~ ~~shelters~~ ~~is constructed as a room or space within a host building~~ Storm shelters that will normally be occupied for other purposes shall comply with the requirements of the applicable code for the occupancy of the building, or the individual rooms or spaces thereof, ~~shall apply~~ unless otherwise required by ICC 500.

Reason: It doesn't matter if within or adjacent to or stand alone - this paragraph is not about the host building, its about occupancy classification and use. Does designated mean solely a storm shelter or just that this space is also used as the shelter? This is not consistent with use of phrase "designated occupancy" twice in 104.2.

Committee Action: Approval as modified (Vote: 11-0-0)
Modification (if any):

Further modify as follows:

~~104.2~~ 104.1 Dedicated ~~facilities~~ storm shelters
~~104.1~~ 104.2 Storm shelters Occupied for other purposes

Committee Reason: This is a clarification of the current text. Reordering of 104.1 and 104.2 and title will help separate criteria – since this is title only, this was considered and editorial amendment.

Report for *01-01– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): Further modify as follows: **~~104.2~~ 104.1 Dedicated ~~facilities~~ storm shelters** **~~104.1~~ 104.2 Storm shelters Occupied for other purposes**		
Committee Reason: This is a clarification of the current text. Reordering of 104.1 and 104.2 and title will help separate criteria – since this is title only, this was considered and editorial amendment.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		

Report for *01-01– 23*		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-02-23

106.1

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 106
SUBMITTAL DOCUMENTS

106.1 General. Submittal documents consisting of construction documents and other documentation shall be prepared and submitted to the authority having jurisdiction with each permit application. Such documents shall contain information as required by the applicable code and this standard. Storm shelter construction documents~~, including the design information listed in Section 106.2.1,~~ shall be prepared and sealed by a registered design professional.

Reason: Why is the design information highlighted, but not 106.2.3 - 106.2.6? All submittal documents listed under section 106 shall be prepared and sealed by a RDP.

Committee Action: Approval as submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: All submittal documents listed under section 106 shall be prepared and sealed by a RDP.

Report for *01-02– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: All submittal documents listed under section 106 shall be prepared and sealed by a RDP.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-03-23

106.2, 106.2.1, 106.2.2, 106.2.3, 106.2.4, 106.2.5, 106.2.6

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 106
SUBMITTAL DOCUMENTS

106.2 Design Information ~~required~~. The following information applicable to the design, construction, and operation of the storm shelter shall be ~~supplied as part of the construction documents~~ referenced on a single sheet within the construction documents.

~~106.2.1 Design information.~~ ~~For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents:~~

1. Type of *storm shelter*: Residential or community and tornado, hurricane or a combination of both.
2. Use of *community storm shelter*: use by the general public, building occupants or a combination of both.
3. A statement that the design conforms to the provisions of the ICC 500 *Standard for the Design and Construction of Storm Shelters*, with the edition year specified.
4. The *storm shelter* design wind speed, V_T, V_H, or both, mph (m/s).
5. The wind exposure category (indicate all where more than one is used).
6. The internal pressure coefficient, GC_{pi}.
7. The topographic factor, K_{zt}.
8. The directionality factor, K_d.
9. *Design wind pressures* and their applicable zones with dimensions needed for the specification of the components and cladding of the *storm shelter envelope*, psf (kN/m^2).
10. Where the *storm shelter* is subject to the requirements of Section 402.1, a statement that the *storm shelter* has or has not been constructed in accordance with Chapter 4.
11. Where the *storm shelter* is subject to the requirements of Section 402.1, the minimum elevation of the lowest floor required by the *authority having jurisdiction* for the location where the *storm shelter* is installed; the *base flood elevation, 500-year flood elevation* and *storm surge flood elevation* where applicable; and the *storm shelter* floor elevation. Where the National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) or other approved source is

utilized for data, the construction documents shall indicate the version, date and the source of the maps.

12. Documentation showing that components of the *storm shelter envelope* will meet the static and cyclic pressure and impact test requirements identified in Chapters 3 and 8.
13. A floor plan drawing or image indicating location of the *storm shelter* on a site or within a building or facility; including a drawing or image indicating the entire facility.
14. A *storm shelter* section or elevation indicating the height of the *storm shelter* relative to the finished grade, finished floor and the *host building*, where applicable.
15. The lowest *storm shelter* floor elevation and corresponding datum, except for *residential tornado shelters* outside of special *flood hazard areas*.
16. The *design occupant capacity.*
17. Calculations for the *usable floor area,* in square feet (m^2).
18. Calculations for the venting area provided and the locations in the *storm shelter*.
19. Calculations for the number of sanitation facilities for *community storm shelters.*
20. Minimum foundation capacity requirements including foundation thickness, steel reinforcement and concrete cover.
21. *Storm shelter* installation requirements, including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.
22. For *hurricane shelters*, the rainfall rate of the roof primary drainage system.
23. For *hurricane shelters*, the rainfall rate of the roof secondary (overflow) drainage system where required.
24. For *hurricane shelters*, the rainwater drainage design rainfall rate for facilities subject to rainwater impoundment.

~~**106.2.2 Design information documentation.** Design information listed in Section 106.2.1 and instructions listed in Section 106.2.6 shall be documented or explicitly referenced on a single sheet within the construction documents~~

106.3 ~~**106.2.3**~~ **Enclosure.** *(no change to text)*

106.4 ~~**106.2.4**~~ **Signage.** *(no change to text)*

106.5 ~~**106.2.5**~~ **Storm shelter details.** *(no change to text)*

106.6 ~~**106.2.6**~~ **Storm shelter instructions.** *(no change to text)*

Reason: The list under 106.2.1 would become part of 106.2. Consider reorganizing the 24 items in the list in a more logical order, perhaps by discipline and where they'd show up in a plan set (e.g. architectural, structural, MEP). Sections 106.1, 106.2, 106.2.1, and 106.2.2 all say "within the construction documents", which this should not need to unnecessarily be repeated.

Committee Action: Approval as modified (Vote: 10-0-0)
Modification (if any):

Further modify as follows:

106.2 Design Information. The following information applicable to the design, construction, and operation of the storm shelter shall be documented or explicitly referenced on a single sheet within the construction documents.

Committee Reason: The modification is to require a specific rather than a general reference for the shelter requirements. This proposal is a consolidation and simplification in requirements.

Report for *01-03– 23*		
Committee decision: AM	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further modify as follows:** **106.2 Design Information.** The following information applicable to the design, construction, and operation of the storm shelter shall be documented or explicitly referenced on a single sheet within the construction documents.		
Committee Reason: The modification is to require a specific rather than a general reference for the shelter requirements. This proposal is a consolidation and simplification in requirements.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-04-23
106.2.1

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 106
SUBMITTAL DOCUMENTS

106.2.1 Design information. For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents:

1. Type of *storm shelter*: Residential or community and tornado, hurricane or a combination of both.
2. Use of *community storm shelter*: use by the general public, building occupants or a combination of both.
3. A statement that the design conforms to the provisions of the ICC 500 *Standard for the Design and Construction of Storm Shelters*, with the edition year specified.
4. The *storm shelter* design wind speed, V_T, V_H, or both, mph (m/s).
5. The wind exposure category (indicate all where more than one is used).
6. The internal pressure coefficient, GC_{pi}.
7. The topographic factor, K_{zt}.
8. The directionality factor, K_d.
9. *Design wind pressures* and their applicable zones with dimensions needed for the specification of the components and cladding of the *storm shelter envelope*, psf (kN/m^2).
10. Where the *storm shelter* is subject to the requirements of Section 402.1, a statement that the *storm shelter* has or has not been constructed in accordance with Chapter 4.
11. Where the *storm shelter* is subject to the requirements of Section 402.1, the minimum elevation of the lowest floor required by the *authority having jurisdiction* for the location where the *storm shelter* is installed; the *base flood elevation, 500-year flood elevation* and *storm surge flood elevation* where applicable; and the *storm shelter* floor elevation. Where the National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) or other approved source is utilized for data, the construction documents shall indicate the version, date and the source of the maps.
12. Documentation showing that components of the *storm shelter envelope* will meet the static and cyclic pressure and impact test requirements identified in Chapters 3 and 8.

13. A floor plan drawing or image indicating location of the *storm shelter* on a site or within a building or facility; including a drawing or image indicating the entire facility.
14. A *storm shelter* section or elevation indicating the height of the *storm shelter* relative to the finished grade, finished floor and the *host building*, where applicable.
15. The lowest *storm shelter* floor elevation and corresponding datum, except for *residential tornado shelters* outside of special *flood hazard areas*.
16. The *design occupant capacity.*
17. Calculations for the *usable floor area,* in square feet (m^2).
18. Calculations for the venting area provided and the locations in the *storm shelter*.
19. Calculations for the number of sanitation facilities for *community storm shelters.*
20. Minimum foundation capacity requirements including foundation thickness, steel reinforcement and concrete cover.
21. *Storm shelter* and storm shelter component installation requirements, including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.
22. For *hurricane shelters*, the rainfall rate of the roof primary drainage system.
23. For *hurricane shelters*, the rainfall rate of the roof secondary (overflow) drainage system where required.
24. For *hurricane shelters*, the rainwater drainage design rainfall rate for facilities subject to rainwater impoundment.

Reason: As written, requirement doesn't necessarily apply to components where post-installed anchors are typically utilized.

IS-STM 01-04-23 Replacement A

106.2.1

Proponent: ICC Work Group 1

Replace and further revise as follows:

106.2.1 Design information. For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents:

21. Site-specific anchorage requirements for prefabricated ~~*Storm*~~ *storm shelter* components and prefabricated *impact-protective systems* ~~installation requirements, including~~ such as anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.

(Portions not shown remain unchanged)

Reason: Work group 1 discussed the original intent of Item #21 was to address FEMA observations of questionable anchorage of prefabricated residential shelters. There was support for including anchorage of impact-protective systems, but concerns "storm shelter components" was too broad. The change from "installation requirements" to "anchorage requirements" and focusing on prefabricated storm shelter components helps address some of the concerns. In general, there was support for refocusing the item around prefabricated storm shelters and prefabricated storm shelter components, though questions were raised about the possibility of a site-constructed impact-protective system. Further input from the full committee was desired.

IS-STM 01-04-23 Replacement B

106.2.1

Proponent: ICC Work Group 1

Replace and further revise as follows:

106.2.1 Design information. For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents:

21. Installation requirements for prefabricated *storm shelters,* ~~*Storm shelter*~~ *storm shelter* structural components, and *impact protective systems* ~~installation requirements~~, including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.

(Portions not shown remain unchanged)

Reason: The original intent of Item #21 was to address FEMA observations of questionable anchorage of prefabricated residential shelters. FEMA proposed expanding the requirement to include "storm shelter components" but concerns were raised that was too broad and could include non-structural components inside the shelter that may still be anchored to something. In further WG 1 discussions anchorage of impact protective systems was noted as a concern, particularly of shelter doors that peer reviews have identified get treated as standard doors. After discussion Item #21 was revised to apply to prefabricated storm shelters, structural components of storm shelters (such as precast wall panels assembled on site) and impact-protective systems. Moving "installation requirements" to the beginning of the sentence improves the grammar.

Notes 3-6-2023 – Work Group 1
Returned from work group 5-3-2023

Committee Action: Approval as Modified (Replacement B) (Vote:11-0-0)

Modification (if any):
Replace and further revise as follows:

106.2.1 Design information. For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents:

21. Installation requirements for prefabricated *storm shelters,* ~~*Storm shelter*~~ *storm shelter* structural components, and *impact protective systems* ~~installation requirements~~, including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.

Committee Reason: Item #21 is revised to apply to prefabricated storm shelters, structural components of storm shelters (such as precast wall panels assembled on site) and impact-protective systems. Moving “installation requirements” to the beginning of the sentence improves the grammar.

Report for *01-04– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): Replace and further revise as follows: **106.2.1 Design information.** For the areas of a building designed for occupancy as a storm shelter, the following information shall be provided within the construction documents: 21. Installation requirements for prefabricated *storm shelters,* ~~*Storm shelter*~~ *storm shelter* structural components, and *impact protective systems* ~~installation requirements~~, including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.		
Committee Reason: Item #21 is revised to apply to prefabricated storm shelters, structural components of storm shelters (such as precast wall panels assembled on site) and impact-protective systems. Moving “installation requirements” to the beginning of the sentence improves the grammar.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-05-23

106.2.3

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 106
SUBMITTAL DOCUMENTS

106.2.3 Storm shelter envelope ~~Enclosure~~. ~~Where a storm shelter is to be constructed as a portion of a host building, the~~ The roofs, walls, and floors comprising ~~enclosing~~ the storm shelter envelope shall be clearly indicated in the construction documents ~~on the drawings~~.

Reason: The storm shelter perimeter (storm shelter envelope) shall be clearly indicated (roofs, walls, floors) in any scenario regardless if freestanding, adjacent to, partially within, or fully within a host building.

Committee Action: Approval as submitted (Vote: 10-0-0)

Modification (if any):

Committee Reason: This is a simplification of the language.

Report for *01-05– 23*		
Committee decision: AS	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This is a simplification of the language.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-06-23
106.2.5, 106.2.6

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 106
SUBMITTAL DOCUMENTS

106.2.5 Storm shelter details. The submittal ~~construction~~ documents shall ~~provide or~~ include any manufacturer's details or installation instructions for systems or equipment designed for the protection and operation of the storm shelter.

106.2.6 Storm shelter instructions. The submittal ~~construction~~ documents shall ~~provide or~~ include any details or instructions required for the functional operation of the storm shelter, such as:

1. Type and location of equipment and amenities required within the *storm shelter*, including water supply, sanitary facilities, fire extinguishers, batteries, flashlights, special emergency lighting equipment or any other equipment required to be installed in the *storm shelter*.
2. Specifications for any alarm system to be installed.
3. Instructions for the installation or deployment of any *impact-protective systems* such as shutters, screens, doors or windows.
4. Instructions for the installation, activation or deployment of any mechanical, electrical and plumbing equipment.

Reason: Submittal documents includes everything that needs to be submitted for the permit. Construction documents are what the contractor needs on the site. See where else terms are used. The proposed reorganization above takes these out of the section listing items that need to be on the construction documents.

Manufacturer's installation instructions or functional operation instructions should be included in the submittal documents more generally. Say provide or include, not both.

Notes 3-6-2023: On hold till 3-27-2023 for additional input from Work Group 1.
Returned from work group 5-3-2023

Committee Action: Approval as submitted (Vote:11-0-0)
Modification (if any):
Committee Reason: Submittal documents includes everything that needs to be submitted for the permit. Construction documents are what the contractor needs on the site. See where else terms are used. The proposed reorganization above takes these out of the section listing items that need to be on the construction documents.

Manufacturer's installation instructions or functional operation instructions should be included in the submittal documents more generally. Say provide or include, not both.

Report for *01-06– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Submittal documents includes everything that needs to be submitted for the permit. Construction documents are what the contractor needs on the site. See where else terms are used. The proposed reorganization above takes these out of the section listing items that need to be on the construction documents. Manufacturer's installation instructions or functional operation instructions should be included in the submittal documents more generally. Say provide or include, not both.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-07-23
107.1, 107.2, 107.3

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 107
QUALITY ASSURANCE PLAN

107.1 Quality assurance plan. The construction documents for community storm shelters shall contain a quality assurance plan prepared by a registered design professional ~~in accordance with Sections 107.2 through 107.4.~~ and shall identify the following:

~~**107.2 Detailed requirements.** A quality assurance plan shall be provided for the following:~~

1. Roof cladding, soffits and roof framing connections.
2. Wall connections to roof and floor diaphragms and framing.
3. Roof and floor diaphragm systems, including con- nectors, drag struts and boundary elements.
4. Main windforce-resisting systems, including braced frames, moment frames and shear walls.
5. Main windforce-resisting system connections to the foundation.
6. Fabrication and installation of components and assemblies that are part of wall assemblies, roof assemblies or *impact-protective systems* of the *storm shelter envelope* required to meet impact or static or cyclic pressure test requirements of Chap- ter 3, such as, window assembly, door assembly, shutter assembly or louver.
7. Wall cladding and wall cladding connections.
8. Corrosion resistance or protection of exposed metal connectors providing load path continuity.
9. *Storm shelter critical support systems* and connec- tions and impact protection of the components and connections.
10. Foundation design.
11. Prefabricated *storm shelter* installation require- ments, including anchor location and minimum required capacity for each type of anchor.
12. Prefabricated *storm shelter* minimum foundation capacity requirements.

~~**107.3 Quality assurance plan preparation.** A quality assurance plan prepared by a registered design professional shall be provided for each main windforce-resisting system and wind-resisting components and cladding.~~

~~The quality assurance plan shall identify the following:~~

~~1. The main windforce-resisting systems and wind- resisting components and~~

~~cladding.~~

~~2. The *special inspections* and testing to be required in accordance with Section 110.1.~~

~~3.~~13. The type and frequency of testing required.

~~4.~~14. The type and frequency of *special inspections* required in accordance with Section 110.

~~5.~~15. The structural observations to be performed in accordance with Section ~~111.1~~ 111.

~~6.~~16. The required distribution, type and frequency of reports of test, inspections and structural observations.

Reason: Not sure why we need 2 lists between 107.2 and 107.3 as several items repeat. Propose delete section 107.3 and add remaining items to end of 107.2. Another alternative would be to make section 107.3 just about tests, inspections, observations, and reports.
107.3: Item 1 is already identified in 107.2. Item 2 is the same as 3 and 4. Delete lines 1 and 2, and in line 4 add "in accordance with Section 110" at end of sentence.

Committee Action: Approval as Submitted (Vote: 11-0-0)

Modification (if any):

Committee Reason: Removes redundant text and consolidates the list.

Report for *01-07– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Removes redundant text and consolidates the list.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-08-23

107.3, 108, 109, 110, 111, 112, 114

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 107 QUALITY ASSURANCE PLAN
SECTION ~~109~~ 108 PEER REVIEW
SECTION ~~108~~ 109 OWNER'S RESPONSIBILITY

SECTION 110
CONTRACTOR'S STATEMENT OF RESPONSIBILITY

~~107.4~~ 110.1 Contractor's statement of responsibility. Each con- tractor responsible for the construction, fabrication or installation of a main windforce-resisting system, *impact- protective system* or any component listed in the quality assurance plan shall submit a written statement of responsibility to the *authority having jurisdiction*, the responsible design professional and the owner or the owner's authorized agent prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain:

1. Acknowledgement of awareness of the special requirements contained in the quality assurance plan.
2. Acknowledgement that control will be exercised to obtain compliance with the construction documents.
3. Procedures for exercising control within the con- tractor's organization, the method and frequency of reporting and the distribution of reports.
4. Identification and qualifications of the person exercising such control and their position in the organization.

Exception: A written statement of responsibility shall not be required for the fabrication of *storm shelter* com- ponents that have been inspected and *labeled* by an *approved agency* as meeting the requirements of the *applicable code* and this standard.

SECTION ~~110~~ 111 SPECIAL INSPECTIONS
SECTION ~~111~~ 112 STRUCTURAL OBSERVATIONS
SECTION ~~112~~ 113 LISTING AND LABELING.
SECTION ~~113~~ 114 EVALUATION, MAINTENANCE AND REPAIRS

Reason: Proposed re-organization of Chapter 1 to better follow sequence of design and construction. Contractor's statement should be it's own section. The intent is also that the clear distinction of responsibility is outlined for design professionals, peer reviewers, owners, and contractors.

Staff Note: Section 112 Listing and Labeling proposed to be relocated in 01-09-23.

Committee Action: Approval as Submitted (Vote: 11-0-0)

Modification (if any):

Committee Reason: The intent is that the clear distinction of responsibility is outlined for design professionals, peer reviewers, owners, and contractors.

Report for *01-08– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The intent is that the clear distinction of responsibility is outlined for design professionals, peer reviewers, owners, and contractors.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-09-23

108.3(New), 113.2, 113.3.3(New), 113.4

Proponent: Marc Levitan, representing ICC Work Group 1

Revise as follows:

SECTION 108
OWNER'S RESPONSIBILITY

108.1 Owner's statement of responsibility. For each *com- munity storm shelter,* the owner shall submit to the *authority having jurisdiction* a written statement of responsibility acknowledging the owner's responsibilities regarding shelter operation and maintenance with the application for a construction permit.

108.2 Preparedness and e**mergency operations plan.** For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written preparedness and emergency operations plan for the *storm shelter* prior to approval of the certificate of occupancy.

108.3 Testing and maintenance plan. For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written testing and maintenance plan for *impact protective systems* and *critical support systems* for the *storm shelter* prior to approval of the certificate of occupancy. Testing and maintenance schedules and procedures shall be in accordance with the manufacturers requirements.

SECTION 113
EVALUATION, MAINTENANCE AND REPAIRS

113.1 General. Community shelters shall be evaluated and maintained in accordance with Sections 113.2 through 113.4.

113.2 Evaluation. The owner or owner's authorized agent shall evaluate the *storm shelter* annually and when requested by the *authority having jurisdiction*. The evaluation of the storm shelter shall include the following:

1. The *storm shelter envelope* shall be evaluated through visual observation to assess whether the walls and roofs are intact and undamaged.
2. *Impact-protective systems* shall be evaluated for compliance with the manufacturer's operational and maintenance requirements.
3. *Critical support systems* testing, maintenance, and repair records shall be reviewed for compliance with Section 113.3.3.

113.3 Maintenance and repairs. *Storm shelters* shall be maintained in an operable condition at all times. All structural and operational elements shall be repaired or replaced where damaged or found to be inoperable.

113.3.1 Damaged or missing components. *Storm shelters* shall be maintained so that walls and roofs are intact and undamaged. Any damage to the *storm shelter* or its *impact-protective systems* that impair its functionality shall be repaired or replaced. Damaged or missing components shall be replaced with components that are specified within the tested or listed assembly.

113.3.2 Replacement assemblies and systems. Where it is necessary to replace certified or listed *impact-protective systems*, replacements shall comply with applicable ICC 500 requirements, and shall be tested and installed as required by this standard for new installations or construction.

113.3.3 Critical support systems. *Critical support systems* shall be tested and maintained and repaired in compliance with manufacturers requirements and Section 108.3. Stored supplies such as generator fuel and water supply shall be maintained at appropriate levels in accordance with Section 108.3.

1113.4 Recordkeeping. A record of the evaluations shall be maintained by the owner or owner's authorized agent. A record of the evaluations, and any other tests, repairs or replacements, and other operations and maintenance shall be kept on the premises or other *approved* location. ~~and consist of all~~ All changes to the original *storm shelter envelope* or *impact-protective systems* or *critical support systems* shall be recorded. Records shall include the date and person conducting the evaluations and maintenance or repairs.

Reason: Generator, batteries, mechanical systems and other critical support systems need periodic testing and maintenance, and when not operating correctly, repairs. If they are important enough that we require these systems to be included with the shelter when constructed, they need be tested, maintained and repaired so that they will be in working order when the shelter is needed, otherwise, why bother to require them in the first place?

To simplify application of the requirements for scheduling and evaluation of maintenance and testing, a testing and maintenance plan is added to Section 108, which would include compilation of manufacturers requirements and things like minimum generator fuel and potable water levels.

IS-STM 01-09-23 Modification

108.3(New), 113.2, 113.3.3(New), 113.4

Proponent: ICC Work Group 1

Further revise as follows:

SECTION 108
OWNER'S RESPONSIBILITY

108.1 Owner's statement of responsibility. For each *com- munity storm shelter,* the owner shall submit to the *authority having jurisdiction* a written statement of responsibility acknowledging the owner's responsibilities regarding shelter operation

and maintenance with the application for a construction permit.

108.2 Preparedness and emergency operations plan. For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written preparedness and emergency operations plan for the *storm shelter* prior to approval of the certificate of occupancy.

108.3 Evaluation ~~Testing~~ and maintenance plan. For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written evaluation ~~testing~~ and maintenance plan ~~for *impact protective systems* and *critical support systems* for the *storm shelter* prior to approval of the certificate of occupancy. Testing and maintenance schedules and procedures shall be in accordance with the manufacturers requirements~~.

SECTION 113
EVALUATION, MAINTENANCE AND REPAIRS

113.1 General. Community shelters shall be evaluated and maintained in accordance with Sections 113.2 through 113.4.

113.2 Evaluation. The owner or owner's authorized agent shall evaluate the *storm shelter* annually and when requested by the *authority having jurisdiction*. The evaluation of the storm shelter shall include the following:

1. The *storm shelter envelope* shall be evaluated through visual observation to assess whether the walls and roofs are intact and undamaged.
2. *Impact-protective systems* shall be evaluated for compliance with the manufacturer's operational and maintenance requirements.
3. *Critical support systems* evaluation ~~testing~~, maintenance, and repair records shall be reviewed for compliance with Section 113.3.3.

113.3 Maintenance and repairs. *Storm shelters* shall be maintained in an operational ~~operable~~ condition at all times. All structural ~~and operational~~ elements, *impact-protective systems* and *critical support systems* shall be repaired or replaced where damaged or found to be inoperable.

113.3.1 Damaged or missing components. *Storm shelters* shall be maintained so that walls and roofs are intact and undamaged. Any damage to the *storm shelter* or its *impact-protective systems* that impair its functionality shall be repaired or replaced. Damaged or missing components shall be replaced with components that are specified within the tested or listed assembly.

113.3.2 Replacement assemblies and systems. Where it is necessary to replace assemblies ~~certified~~ or listed *impact-protective systems*, replacements shall comply with applicable ICC 500 requirements, and shall be ~~tested and~~ installed as required by this standard for new installations or construction.

1113.3.3 Critical support systems. *Critical support systems* shall be ~~tested and~~ maintained and repaired in compliance with manufacturers requirements and Section 108.3. Stored supplies such as generator fuel and water supply shall be maintained at appropriate levels in accordance with Section 108.3.

1113.4 Recordkeeping. A record of the evaluations shall be maintained by the owner or owner's authorized agent. A record of the evaluations, and any other tests, repairs or replacements, and other operations and maintenance shall be kept on the premises or other *approved* location. All changes to the original *storm shelter envelope* or *impact-protective systems* or *critical support systems* shall be recorded. Records shall include the date and person conducting the evaluations and maintenance or repairs.

Reason: Work Group 1 generally concurred with extending evaluation and maintenance requirements to storm shelter critical support systems but had concerns about the proposed language. Not all the storm shelter elements or systems included require testing as part of maintenance, it was noted particularly impact-protective system manufacturers do not specify in-service testing or maintenance procedures. It was felt "evaluation" was the proper term to use, and the reference to testing and maintenance procedures in 108.3 was also recommended for deletion. In 113.3 it was felt "operational" was the correct term when referring to the state of the entire storm shelter. Individual elements or components (such as a shutter) can be "operable", but the entire shelter is operational (that is, functional).

Notes 3-6-2023: On hold till 3-27-2023 for additional input from Work Group 1.
5-3-2023 returned from Work Group

Committee Action: Approval as Modified (Vote: 9-1-0)

Modification (if any):

Further revise as follows:

SECTION 108
OWNER'S RESPONSIBILITY

108.3 Evaluation ~~Testing~~ and maintenance plan. For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written evaluation ~~testing~~ and maintenance plan ~~for *impact protective systems* and *critical support systems* for the *storm shelter* prior to approval of the certificate of occupancy. Testing and maintenance schedules and procedures shall be in accordance with the manufacturers requirements~~.

SECTION 113
EVALUATION, MAINTENANCE AND REPAIRS

113.2 Evaluation. The owner or owner's authorized agent shall evaluate the *storm shelter* annually and when requested by the *authority having jurisdiction*. The evaluation of the storm shelter shall include the following:

1. The *storm shelter envelope* shall be evaluated through visual observation to assess

whether the walls and roofs are intact and undamaged.

2. *Impact-protective systems* shall be evaluated for compliance with the manufacturer's operational and maintenance requirements.
3. *Critical support systems* evaluation ~~testing~~, maintenance, and repair records shall be reviewed for compliance with Section 113.3.3.

113.3 Maintenance and repairs. *Storm shelters* shall be maintained in an operational ~~operable~~ condition at all times. All structural ~~and operational~~ elements, *impact-protective systems* and *critical support systems* shall be repaired or replaced where damaged or found to be inoperable.

113.3.2 Replacement assemblies and systems. Where it is necessary to replace assemblies ~~certified~~ or listed *impact-protective systems*, replacements shall comply with applicable ICC 500 requirements, and shall be ~~tested and~~ installed as required by this standard for new installations or construction.

1113.3.3 Critical support systems. *Critical support systems* shall be ~~tested and~~ maintained and repaired in compliance with manufacturers requirements and Section 108.3. Stored supplies such as generator fuel and water supply shall be maintained at appropriate levels in accordance with Section 108.3.

Committee Reason: The modifications were as follows:

Not all the storm shelter elements or systems included require testing as part of maintenance, it was noted particularly impact-protective system manufacturers do not specify in-service testing or maintenance procedures. It was felt "evaluation" was the proper term to use, and the reference to testing and maintenance procedures in 108.3 was also recommended for deletion. In 113.3 it was felt "operational" was the correct term when referring to the state of the entire storm shelter. Individual elements or components (such as a shutter) can be "operable", but the entire shelter is operational (that is, functional).

In general, generator, batteries, mechanical systems and other critical support systems need periodic testing and maintenance, and when not operating correctly, repairs.

There was a discussion about the definition for critical support systems that is currently being reviewed by work group 7. This may need coordination later.

Report for *01-09– 23*		
Committee decision: AM	***Committee Vote at Meeting: 9-1-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Further revise as follows:

SECTION 108
OWNER'S RESPONSIBILITY

108.3 Evaluation ~~Testing~~ and maintenance plan. For each *community storm shelter,* the owner or the owner's authorized agent shall submit to the *authority having jurisdiction* a written evaluation ~~testing~~ and maintenance plan ~~for *impact protective systems* and *critical support systems* for the *storm shelter* prior to approval of the certificate of occupancy. Testing and maintenance schedules and procedures shall be in accordance with the manufacturers requirements~~.

Report for *01-09– 23*

SECTION 113
EVALUATION, MAINTENANCE AND REPAIRS

113.2 Evaluation. The owner or owner's authorized agent shall evaluate the *storm shelter* annually and when requested by the *authority having jurisdiction*. The evaluation of the storm shelter shall include the following:

4. The *storm shelter envelope* shall be evaluated through visual observation to assess whether the walls and roofs are intact andundamaged.
5. *Impact-protective systems* shall be evaluated for compliance with the manufacturer's operational and maintenance requirements.
6. *Critical support systems* evaluation ~~testing~~, maintenance, and repair records shall be reviewed for compliance with Section 113.3.3.

113.3 Maintenance and repairs. *Storm shelters* shall be maintained in an operational ~~operable~~ condition at all times. All structural ~~and operational~~ elements, *impact-protective systems* and *critical support systems* shall be repaired or replaced where damaged or found to be inoperable.

113.3.2 Replacement assemblies and systems. Where it is necessary to replace assemblies ~~certified~~ or listed *impact-protective systems*, replacements shall comply with applicable ICC 500 requirements, and shall be ~~tested and~~ installed as required by this standard for new installations or construction.

1113.3.3 Critical support systems. *Critical support systems* shall be ~~tested and~~ maintained and repaired in compliance with manufacturers requirements and Section 108.3. Stored supplies such as generator fuel and water supply shall be maintained at appropriate levels in accordance with Section 108.3.

Committee Reason: The modifications were as follows:

Not all the storm shelter elements or systems included require testing as part of maintenance, it was noted particularly impact-protective system manufacturers do not specify in-service testing or maintenance procedures. It was felt "evaluation" was the proper term to use, and the reference to testing and maintenance procedures in 108.3 was also recommended for deletion. In 113.3 it was felt "operational" was the correct term when referring to the state of the entire storm shelter. Individual elements or components (such as a shutter) can be "operable", but the entire shelter is operational (that is, functional).

In general, generator, batteries, mechanical systems and other critical support systems need periodic testing and maintenance, and when not operating correctly, repairs.

There was a discussion about the definition for critical support systems that is currently being reviewed by work group 7. This may need coordination later.

PUBLIC COMMENT- FIRST DRAFT:

Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

REPORT OF HEARING – FIRST DRAFT

Modification (if any):

Committee Reason:

PUBLIC COMMENT- SECOND DRAFT:

Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

FINAL ACTION:

Modification (if any):

Committee Reason:

IS-STM 01-10-23

109.1

Proponent: ICC 500 Work Group 1

Revise as follows:

SECTION 109
PEER REVIEW

109.1 Storm shelters requiring peer review. A peer review shall be conducted for the following community storm shelter types:

1. ~~Community storm~~ Storm shelters with a design occupant capacity of 50 or greater.
2. Storm shelters in elementary schools, secondary schools and day care facilities with a design occupant capacity greater than 16.
3. Storm shelters for buildings and structures assigned to Risk Category IV (essential facilities) as defined in Table 1604.5 in the International Building Code.

Reason: Fact of the matter is all 3 categories listed are Community Storm Shelters since anything over 16 occupants is designed as such; therefore, the clarity in item 1 is not necessary if it's not lost in item 2 and 3.

Committee Action: Approval as Submitted (Vote: 11-0-0)

Modification (if any):

Committee Reason: Community shelter is in the main paragraph, so it is not needed in Item 1. The three items all apply to community shelters.

Report for *01-10– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Community shelter is in the main paragraph, so it is not needed in Item 1. The three items all apply to community shelters.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 01-11-23

112, 112.1, 112.1.1

Proponent: ICC 500 Work Group 1

Revise as follows:

~~**SECTION 112**~~
~~**LISTING AND LABELING**~~

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.7 ~~**112.1**~~ **Listing and labeling.** *Impact-protective systems* shall be *listed* and *labeled* denoting compliance with this standard.

306.7.1 ~~**112.1.1**~~ **Marking.** The following function and performance characteristics shall be provided on the *label* for each *impact-protective system* tested:

1. Manufacturer's identification reference or listing number for the assembly.
2. Type of *impact-protective system,* such as window assembly, door assembly, shutter assembly or louver.
3. Hazard: hurricane, tornado or both.
4. Missile weight and speed.
5. *Design wind pressure*.
6. Edition of ICC 500.

Reason: Section 112 Listing and Labeling is no longer administrative since it is specifically related to design and testing of impactive-protective systems and would be better included in 306.
The definitions for Listed and Labeled should be correlated with the 2024 IBC.

Staff note: The correlation for Listed in in 02-01-23. Label and Labeled are the same in IBC and ICC 500.

Committee Action: Approval as Modified (Vote: 11-0-1)

Modification (if any):

Replace and modify as follows:

306.4.1.1 ~~**112.1**~~ **Listing and labeling.** *Impact-protective systems* shall be *listed* and *labeled* denoting compliance with this standard.

306.4.1.1.1 ~~**112.1.1**~~ **Marking.** The following function and performance characteristics shall be provided on the *label* for each *impact-protective system* tested:

1. Manufacturer's identification reference or listing number for the assembly.
2. Type of *impact-protective system,* such as window assembly, door assembly, shutter assembly or louver.
3. Hazard: hurricane, tornado or both.
4. Missile weight and speed.

5. *Design wind pressure*.
6. Edition of ICC 500.

Committee Reason: Section 112 Listing and Labeling is no longer administrative since it is specifically related to design and testing of impactive-protective systems and would be better included in 306. Work group 3 is working or reorganization of Section 306, so this should be included in that proposal.

Report for *01-11– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and modify as follows:** **306.4.1.1 ~~112.1~~ Listing and labeling.** *Impact-protective systems* shall be *listed* and *labeled* denoting compliance with this standard. **306.4.1.1.1 ~~112.1.1~~ Marking.** The following function and performance characteristics shall be provided on the *label* for each *impact-protective system* tested: 1. Manufacturer's identification reference or listing number for the assembly. 2. Type of *impact-protective system,* such as window assembly, door assembly, shutter assembly or louver. 3. Hazard: hurricane, tornado or both. 4. Missile weight and speed. 5. *Design wind pressure*. 6. Edition of ICC 500.		
Committee Reason: Section 112 Listing and Labeling is no longer administrative since it is specifically related to design and testing of impactive-protective systems and would be better included in 306. Work group 3 is working or reorganization of Section 306, so this should be included in that proposal.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 2
DEFINITIONS

IS-STM 02-01-23
202

Proponent: ICC 500 committee

Revise as follows:

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such ~~agency~~ organization has been *approved*.

[BS] BASE FLOOD ELEVATION. The elevation of the *base flood*, including wave height, relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the *Flood Insurance Rate Map* (FIRM).

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *building official* and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products, or materials include “listed”, “certified”, “classified” or other terms as determined appropriate by the listing organization.

SPECIAL INSPECTION. Inspection of construction requiring the expertise of ~~a~~ an *approved special inspector* in order to ensure compliance with this standard and the *approved* construction documents.

Reason: Staff reviewed the definitions in the I-codes that were used in the ICC 500 for consistency. This proposal identifies the differences.

- Approved agency – ADM13-22 AM
- Base flood elevation – existing in 2021
- Listed – ADM1-22 Part 1 AS
- Special Inspection – existing in 2021

Please note that the 2020 ICC 500 changed the definition for Community Storm Shelter, but we did not submit a code change proposal to change to IBC or IEBC to include that change.

Committee Action: Approval as Submitted (Vote:12-0-0)

Modification (if any):

Committee Reason: Consistency with IBC definitions.

Report for *02-01– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Consistency with IBC definitions.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-02-23
202

Proponent: ICC 500 Work Group 3

Revise as follows:

CRITICAL SUPPORT SYSTEMS, STORM SHELTER. Systems and components required by Chapter 7 to ensure the health, safety, and well-being of shelter occupants. Critical support systems include~~,~~ water closets, lavatories, sanitation support systems, roof drainage systems, ventilation systems, ~~potable water and waste water systems, emergency and~~ standby power system, ~~and~~ emergency power systems, and lighting systems~~, and ventilation systems~~.

Reason: The definition should be revised to coordinate with the terminology used in Chapter 7. 'Potable' is no longer used. The list includes systems required in hurricane shelters in the order listed.

Staff Note: This term is used in Chapter 1 and 7.

Notes 3-9-23: Send to Work Group 7

Committee Action: Approved as submitted (Vote: 10-0-1)
Modification (if any):

Committee Reason: The definition should be revised to coordinate with the terminology used in Chapter 7. 'Potable' is no longer used. The list includes systems required in hurricane shelters in the order listed. This is coordinated with the committee action on 07-02-23

Report for *02-02– 23*		
Committee decision: AS	***Committee Vote at Meeting: 10-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The definition should be revised to coordinate with the terminology used in Chapter 7. 'Potable' is no longer used. The list includes systems required in hurricane shelters in the order listed. This is coordinated with the committee action on 07-02-23		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-03-23

202

Proponent: Brian Rayner, Kirpatrick Forest Curtic PC, representing self

Revise as follows:

HOST BUILDING. A building or element that is not designed or constructed as a *storm shelter* that totally or partially encloses, or is connected to, a *storm shelter*.

Reason: On stand alone shelters where there is not a host building, over framing or other architectural elements currently do not require designing to the provisions of section 304.9. Changing the definition of host building to include any element connected to the shelter that is not part of the shelter envelope ensures the maximum force that could be transmitted to the shelter is considered in the structural design. Refer attached page 41 excerpt from NIST SP 1164 “Preliminary Reconnaissance of the May 20, 2013 Newcastle-Moore Tornado in Oklahoma” showing light-framed elements of the Moore Medical Center not designed for tornadic forces remaining in place and potentially transferring load to the primary structure.

Committee Action: Disapproval (Vote:12-0-0)

Modification (if any):

Committee Reason: The issue expressed in the reason statement about connections to the storm shelter should be addressed in Chapter 3. A change to the definition for host building will not fix the concern.

Report for *02-03– 23*		
Committee decision: D	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The issue expressed in the reason statement about connections to the storm shelter should be addressed in Chapter 3. A change to the definition for host building will not fix the concern.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-04-23

202

Proponent: Dan Dain, representing NSSA DPC

Revise as follows:

LABEL. An identification affixed to an assembly or device applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an *approved* agency and that indicates that the representative sample of the product or material has been tested and evaluated by an *approved agency*, a nationally recognized testing laboratory, approved agency or other organization that provides listing services.

LABELED. Equipment, materials or products to which has been affixed a *label*, seal, symbol or other identifying mark of a nationally recognized testing laboratory, *approved agency* or other organization concerned with product evaluation that maintains periodic inspection of the production of the above- labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose. An assembly or device to which a label has been affixed.

LISTED. An assembly or device, Equipment, materials, products or services included in a list published by an *approved* organization and concerned with evaluation of an assembly, device, products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the assembly, device, equipment, material, or product ~~or service~~ meets identified standards or has been tested and found suit- able for a specified purpose.

Reason: We know some definitions are straight from IBC (in which case why repeat here), but Label, Labeled, and Listed could be clarified.

Staff note: The current ICC 500 definitions for 'label' and 'labeled' are consistent with the 2024 IBC. The revision for 'listed' approved for the 2024 IBC is indicated in 02-01-23.

Committee Action: Disapproval (Vote:11-0-0)

Modification (if any):

Committee Reason: The standard should be consistent with the IBC. If there is an issue with label, labeled or listed should be addressed in the requirements and the commentary for additional information. This can be confusing for jurisdictions where there is no code official.

Report for *02-04– 23*		
Committee decision: D	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason:: The standard should be consistent with the IBC. If there is an issue with label, labeled or listed should be addressed in the requirements and the commentary for additional information. This can be confusing for jurisdictions where there is no code official.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		

Report for *02-04– 23*		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-05-23

202

Proponent: Dan Dain, representing NSSA

Revise as follows:

OCCUPIED STORM SHELTER AREAS. ~~The designated storm shelter area within the storm shelter envelope.~~ The occupied areas within the storm shelter envelope.

Reason: Can't use the term in the definition, circular. We would have to further define what a "storm shelter area" is. Designated as in 104.1 or 104.2? "Occupied shelter area" occurs 9 times in the existing standard text.

Staff Note: This term is used in Chapter 4 and 7.

Notes 3-9-2023: Sent to Work Group 7.

Committee Action: Disapproval (Vote:9-0-0)

Modification (if any):

Committee Reason: There was concern that the deletion of the first sentence would add questions about spaces like storage closets or support spaces with only the last sentence and 'occupied'. This needs some additional study for how it is used in Chapter 7. May need to also look at protected occupant area as it is used in Chapter 8.

Report for *02-05– 23*		
Committee decision: D	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: There was concern that the deletion of the first sentence would add questions about spaces like storage closets or support spaces with only the last sentence and 'occupied'. This needs some additional study for how it is used in Chapter 7. May need to also look at protected occupant area as it is used in Chapter 8.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-06-23
202

Proponent: ICC 500 Work Group 1

Revise as follows:

PROTECTED OCCUPANT AREA. The portions of the storm shelter area that are protected from intrusion of ~~storm~~ wind-borne debris.

Reason: For consistency of terms. Previous occurrences of "storm debris" were deleted from the 2014 standard. The 2020 has 4 occurrences of "wind-borne debris".

Committee Action: Approval as submitted (Vote: 11-0-0)
Modification (if any):
Committee Reason: Clarification that this applies to impacts at joints and baffled entries, so this is just the wind-born debris. Coordination with the rest of the standard in terminology.

Notes 3-9-2023: Tabled till 3/23/2023.

Report for *02-06– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Clarification that this applies to impacts at joints and baffled entries, so this is just the wind-born debris. Coordination with the rest of the standard in terminology.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 02-07-23

Section 202

Proponent: ICC 500 Work Group 1

Revise as follows:

STORM SHELTER. A building, structure or portion thereof, constructed in accordance with this standard, ~~designated for use~~ ~~during~~ for protection from tornadoes, hurricanes and other severe windstorms.

Community Storm Shelter. Any *storm shelter* not defined as a *residential storm shelter*. This includes *storm shelters* intended for use by the general public, by building occupants or a combination of both.

Residential Storm Shelter. A *storm shelter* serving occupants of dwelling units and having a *design occupant capacity* not exceeding 16 persons.

Reason: Consistency with 101.1 and 101.2 and definition of storm shelter envelope.

Committee Action: Approval as submitted (Vote: 11-0-0)

Modification (if any):

Committee Reason: Consistency with 101.1 and 101.2 and definition of storm shelter envelope.

Note 3-23-2023 – check definitions in codes

Report for *02-07– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Consistency with 101.1 and 101.2 and definition of storm shelter envelope.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 3
STRUCTURAL DESIGN CRITERIA

IS-STM 03-01- 23
302.2, 302.3

Proponent: ICC 300 Work Group 3

Revise as follows:

SECTION 302
LOAD COMBINATIONS

302.1 General. The *storm shelter* shall be designed to resist the load combinations specified in Section 302.2 or 302.3. *Storm shelters* that are designed as combination tornado and *hurricane shelters* shall comply with requirements for both sets of load combinations using either Section 302.2 or 302.3.

302.2 Strength design. Where strength design or load and resistance factor design (LRFD) is used, *storm shelters* and portions thereof shall be designed to resist the most critical effects resulting from the following combinations of factored loads. Each load combination shall also be investigated with one or more of the variable loads set to zero.

For *tornado shelters*:

~~1.4D (Equation 3-1)~~
1.2D + 1.6L_T + 0.5L_{rT} **(Equation 3-2)**
1.2D + 1.6L_{rT} + (L_T or 0.5W_T) **(Equation 3-3)**
1.2D + 1.0W_T + L_T + 0.5L_{rT} **(Equation 3-4)**
0.9D + 1.0W_T **(Equation 3-5)**

For *hurricane shelters*:

~~1.4D (Equation 3-6)~~
1.2D + 1.6L + (0.5~~(L_{rH}~~ or 1.0R_H) **(Equation 3-7)**
1.2D + (1.6~~(L_{rH}~~ or 1.0R_H) + (L or 0.5W_H) **(Equation 3-8)**
1.2D + 1.0W_H + L + (0.5~~(L_{rH}~~ or 1.0R_H) **(Equation 3-9)**
0.9D + 1.0W_H **(Equation 3-10)**

In addition, for Hurricane Shelters subject to the requirements of Section 402.1 and located in:

Coastal high-hazard areas or a *Coastal A Zone:*

1.2D + 1.0W_H + 2.0F_{aH} + L + 0.5(L_{rH} or R_H) (Equation 3-11)
0.9D + 1.0W_H + 2.0F_{aH} (Equation 3-12)

All other locations:

$1.2D + 0.5W_H + 1.0F_{aH} + L + 0.5(L_{rH}$ or $R_H)$ (Equation 3-13)
$0.9D + 0.5W_H + 1.0F_{aH}$ (Equation 3-14)

302.3 Allowable stress design. Where allowable stress design (ASD, working stress design) is used, storm shelters and portions thereof shall be designed to resist the most critical effects resulting from the following combinations of loads. Each load combination shall also be investigated with one or more of the variable loads set to zero.

For Tornado Shelters:

$D + L_T$ (Equation 3-15)
$D + L_{rT}$ (Equation 3-16)
$D + 0.75L_T + 0.75L_{rT}$ (Equation 3-17)
$D + 0.6W_T$ (Equation 3-18)
$D + 0.75L_T + 0.75(0.6W_T) + 0.75L_{rT}$ (Equation 3-19)
$0.6D + 0.6W_T$ (Equation 3-20)

For Hurricane Shelters:

~~$D + L$~~ ~~(Equation 3-21)~~
$D + (L_{rH}$ or $0.7R_H)$ (Equation 3-22)
$D + 0.75L + (0.75($~~$($~~L_{rH} or $0.7R_H)$ (Equation 3-23)
$D + 0.6W_H$ (Equation 3-24)
$D + 0.75L + 0.75(0.6W_H) + (0.75($~~$($~~$L_{rH}$ or $0.7R_H)$ (Equation 3-25)
$0.6D + 0.6W_H$ (Equation 3-26)

In addition, for Hurricane Shelters subject to the requirements of Section 402.1 and located in:

Coastal high-hazard areas or a *Coastal A Zone:*

$D + 0.6W_H + 1.5F_{aH}$ (Equation 3-27)
$D + 0.75L + 0.75(0.6W_H) + 0.75L_{rH} + 1.5F_{aH}$ (Equation 3-28)
$0.6D + 0.6W_H + 1.5F_{aH}$ (Equation 3-29)

All other locations:

$D + 0.75L + 0.75(0.6W_H) + 0.75(L_{rH}$ or $R_H) + 0.75F_{aH}$ (Equation 3-30)
$0.6D + 0.6W_H + 0.75F_{aH}$ (Equation 3-31)

Reason:
The intent of this proposal is to update load combinations to remove inadvertent, overly conservative load factors on Rain loads.
This proposal reduces load factors for Rain loads where we have inadvertently been overly conservative, since currently we are in essence using 'ultimate' loads for R but treating them as service loads in the load combination equations.

Part I Strength Design
Similar to how the load factor on Wind was reduced from 1.6 to 1.0 for Strength Design combinations where wind was the principal load, because the ICC 500 standard uses an ultimate wind speed, the 1.6 load factor on Rain for strength design should also be changed to 1.0 for combinations where they are the principal loads (equations 3-7, 3-8, 3-9), because we are using 'ultimate' loads instead of service loads for rain for hurricane shelters. The 1.6 factor on these loads that remains in ASCE 7 is because they are still

service level loads in ASCE 7, not ultimate loads. In ASCE 7-22, where the snow load provisions were updated to yield ultimate loads, the Strength Design load factor was reduced from 1.6 to 1.0.

Given the greater spatiotemporal correlation between these hazards and live loads for storm shelters, compared to the general population of buildings represented in ASCE 7, no change is proposed for cases where Rain loads are NOT the Principal Load but rather the arbitrary point in time loads (eqns3-7, and 3-9). Therefore the load factor would remain as 0.5, similar to how wind load is treated in eqns 3-3 and 3-8 where wind is not the Principal Load

1.4D (equations 3-1 & 3-6) are deleted because they do not contain tornado or hurricane loads and addressed in the *applicable code.*

Part II ASD
Similar to how the ASD load factor on Snow was reduced from 1.0 to 0.7 in ASCE 7-22, when snow loads were changed from service loads to ultimate loads, it is proposed to reduce the Rain Load by 0.7 in equations 3-22, 3-23, and 3-25.

Committee Action: Approval as submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: Removal of the dead load combination eliminates redundancy because this is only load provisions related to the storm shelter design. Changes to the load factor on rain loads are ultimate loads, not service level loads.

Report for *03-01– 23*		
Committee decision: AS	***Committee Vote at Meeting:11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Removal of the dead load combination eliminates redundancy because this is only load provisions related to the storm shelter design. Changes to the load factor on rain loads are ultimate loads, not service level loads.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-02- 23

203, 301.4(New), 302.5(New), 304, Table 305.1.1, Chapter 9

Proponent: ICC 500 Work Group 3

Revise as follows:

SECTION 203
SYMBOLS AND NOMENCLATURE

K_d – directionality factor for wind loads
K_{dT} – directionality factor for tornado loads
~~K_{zt} – topographic factor~~
W_T – loads due to tornado ~~winds~~ loads

SECTION 301
GENERAL

301.4 Performance based design for tornado loads. Where tornado loads are determined using a performance-based procedures, the tornado loads shall be in accordance with ASCE 7 Section 32.1.3, providing loads are not lesser in magnitude than required by this chapter.

301.5 Performance based design for wind loads. Where wind loads are determined using a performance-based procedures, the wind loads shall be in accordance with ASCE 7 Section 26.1.3, providing loads are not lesser in magnitude than required by this chapter.

SECTION 304
TORNADO LOADS AND WIND LOADS

304.1 General. ~~Wind loads from hurricanes, W_H, and tornadoes~~ Tornado loads, W_T, wind loads for hurricanes, W_H, and wind loads for storms in Alaska, W_H, shall be determined in accordance with ASCE 7, Chapters 26 through ~~31~~ 32, except as modified by this section. For tornado loads the procedures from ASCE 7 Section 32.1.2 shall be applicable.

304.2 Design tornado ~~wind~~ speed. For *tornado shelters*, the design ~~wind~~ tornado speed, V_T, shall be in accordance with Figure 304.2(1). Alternatively, V_T shall be permitted to be determined in accordance with ASCE 7 Figures G.2-3A through G.2-3H, where the effective plan area shall be the area of the smallest convex polygon enclosing the storm shelter and any associated external critical support systems not meeting the soil protection requirements of Section 305.2.2.

304.3 Design wind speed. For *hurricane shelters*, the design wind speed, V_H, shall be

in accordance with Figure 304.2(2). For *storm shelters* in Alaska, the design wind speed, V_H, shall be in accordance with Figure 304.2(3).

304.4 ~~304.3~~ Tornado and wind ~~Wind~~ directionality ~~factor~~ factors. The directionality factors for tornado loads, K_{dT} and the directionality factors for wind loads, K_d, shall be taken as ~~K_d =~~ 1.0.

304.5 ~~304.4~~ Exposure category. ~~For *tornado shelters*, wind loads shall be based on Exposure Category C.~~ For *hurricane shelters*, ~~use of~~ that are located in Exposure Category B ~~is not permitted~~ in accordance with ASCE 7 Section 26.7, Exposure C shall be used

Exception: ~~For *hurricane shelters*, wind~~ Wind loads for the main wind force-resisting system (MWFRS) only shall be permitted to be based on Exposure Category B, where Exposure Category B exists for all wind directions and is likely to remain Exposure Category B after a hurricane with design wind speeds as determined from Section 304.3 ~~304.2~~.

~~**304.5 Topographic effects.** For *tornado shelters*, the topo- graphic factor, K_{zt}, need not exceed 1.0.~~

304.6 Enclosure classifications. Enclosure classifications for *storm shelters* shall be determined in accordance with ASCE 7, Chapter 26. For determining the enclosure classification for *community storm shelters*, the largest opening protected by an *impact-protective system* on a wall that receives positive external pressure shall be considered as an opening.

304.7 Tornado Internal Pressure Coefficient for Enclosed Buildings ~~Atmospheric Pressure Change (APC)~~. For *tornado shelters* classified as enclosed buildings, the ~~additional internal pressures caused by atmospheric pressure change shall be included in the design. The~~ internal pressure coefficient, GC_{piT}, shall be taken as ±0.18 where atmospheric pressure change (APC) venting area of 1 square foot (0.0929 m^2) per 1,000 cubic feet (28.3 m^3) of interior *storm shelter* volume is provided. APC venting shall consist of openings in the *storm shelter* roof having a pitch 10 degrees or less from the horizontal or openings divided equally (within 10 percent of one another) on opposite walls. A combination of APC venting meeting the above requirements is permitted.

Exception: ~~Calculation of venting area to relieve APC is not required for *tornado shelters* classified as partially enclosed buildings.~~ An internal pressure coefficient of GC_{piT} = ±0.55 shall be used for *tornado shelters* where APC venting meeting the requirements of Section 304.7 is not provided~~, or where APC venting area requirements are not calculated~~.

SECTION 305
DEBRIS HAZARDS

305.1.1 Missile criteria for tornado shelters. The missile testing for all components of the *storm shelter envelope* of *tornado shelters* shall be a 15-pound (6.8 kg) sawn lumber 2 by 4 traveling at the speeds shown in Table 305.1.1.

TABLE 305.1.1
MISSILE SPEED FOR TORNADO SHELTERS

DESIGN ~~WIND~~ TORNADO SPEED	MISSILE SPEED AND IMPACT SURFACE
≤ 130 mph	80 mph Vertical Surfaces 53 mph Horizontal Surfaces
>130 to ≤ 160 mph	84 mph Vertical Surfaces 56 mph Horizontal Surfaces
>160 to ≤ 200 mph	90 mph Vertical Surfaces 60 mph Horizontal Surfaces
~~250~~ > 200 mph	100 mph Vertical Surfaces 67 mph Horizontal Surfaces

For SI: 1 mile per hour = 0.447 m/s.

CHAPTER 9
REFERENCED STANDARDS

ASCE
7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No. 1.

Reason: This proposal is to update the reference edition of ASCE 7 to ASCE 7-22. The changes to the wind load provisions from 7-16 to 7-22 were fairly modest, with the exception of the addition of a new Chapter 32 with tornado load requirements. The tornado load procedures are similar to the wind load procedures, although most of the parameters and equations have at least some slight differences. It should be noted that ASCE 7-22 tornado loads have been approved for incorporation into the 2024 IBC.

The two ASCE 7-22 tornado load provisions that will have an impact on the tornadic wind loads for storm shelters are described below.

1. ASCE 7 does not define an exposure or topographic factor for tornadoes; the velocity pressure exposure coefficient is a uniform value of 1.0 between the ground and 200 ft, and decreases slightly above that. Currently, our Section 304.4 says to use Exposure C for tornadoes. A comparison of the K_z factor for Exposure C and K_{zTor} is shown below (from ASCE 7 commentary). K_{zTor} exceeds K_z for exposure C at heights below 33 ft, and is less than Kz for heights above 33 ft. The tornado velocity pressure profile was developed from analysis of mobile radar data tornado velocity profiles.

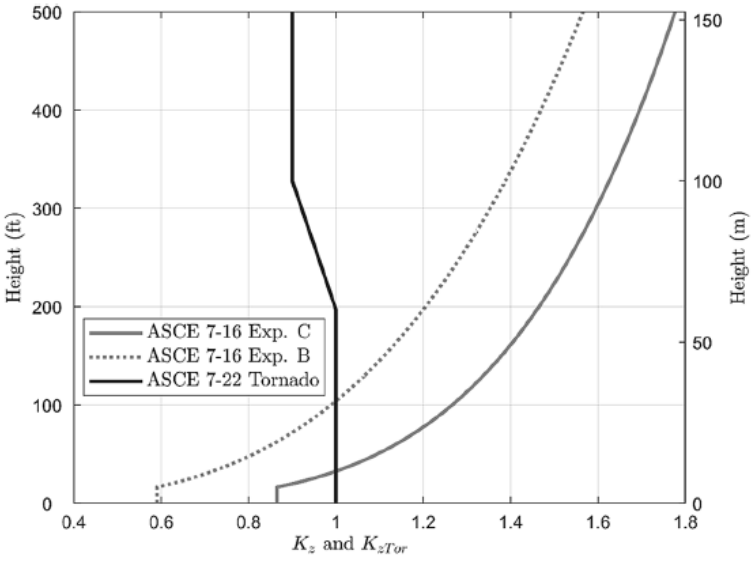

Figure C32.10-2. Vertical profiles of tornado velocity pressure (K_{zTor}) versus that of Exposure B and Exposure C for nontornadic winds (K_z) in Chapter 26 for the lowest 500 ft (152.4 m).

2. Tornado loads include a new parameter to adjust pressure coefficients to account for increased uplift on the roof due to the vertical updrafts in tornadoes. Pressure coefficients for the design of the MWFRS (i.e., C_p) and for design of the C&C (i.e., (GC_p)) are multiplied by the new Tornado Pressure Coefficient Adjustment Factor for Vertical Winds, K_{vT}. Values for this new coefficient are provided in the table below. $K_{vT} > 1$ for roof uplift, and $K_{vT} = 1$ for all other cases. The values for K_{vT} were developed through specialized wind tunnel testing.

Table 32.14-1. Tornado Pressure Coefficient Adjustment Factor for Vertical Winds, K_{vT}.

STRUCTURE TYPE	K_{vT}
Buildings	
Negative (Uplift) Pressures on Roofs	
Main Wind Force Resisting System	1.1
Components and Cladding	
Roof slope ≤ 7 degrees	
Zone 1	1.2
Zone 2	1.05
Zone 3	1.05
Roof slope > 7 degrees	
Zone 1	1.2
Zone 2	1.2
Zone 3	1.3
Positive Pressures (Downward Acting) on Roofs	1.0
Wall Pressures	1.0
All Other Cases	1.0
Other Structures	
Negative (Uplift) Pressures on Rooftop Structures and Equipment and Rooftop Solar Panels Parallel to the Roof Surface	
Main Wind Force Resisting System	1.1
Components and Cladding	Use values for building C&C
Negative (Uplift) Pressures on Roofs of Bins, Silos, and Tanks	
Main Wind Force Resisting System	1.1
Components and Cladding	See Section 32.17.5
All Other Cases	1.0

Additional information on specific changes –

The changes to Section 203 for Nomenclature is correlation with this change

Section 301.4 – This is a general allowance for performance design and is consistent with the 2024 changes for the Performance Code in the I-codes

Where tornado loads were added to criteria, the tornado load comes before the wind load (hurricanes) for consistency with the order in other Chapters in the standard where there is different criteria for tornadoes and hurricanes (e.g. Chapter 7).

Existing 304.2 was split into two sections for clarity in the requirements for tornado loads and wind loads.

Existing 304.4 Exposure Category – was made a positive statement for hurricane shelters, instead of a negative. ASCE 7 Tornado Loads do not use exposure category.

Existing 304.6 Topographic effects was deleted because ASCE 7 Tornado Loads do not use topographic effects.

Existing 304.6 Current reference to Chapter 26 is sufficient. No need to point to Chapter 32 Section 32.12 for tornado shelters, since the only parts of that section applicable to shelters point back to Chapter 26 anyway.

Existing 304.7 - Instead of main paragraph and exception, reformatting to simplify as two options, either provide venting or use +/- 0.55. Last phare in exception deleted because This should be deleted regardless of any other ASCE 7 tornado change or not. Simply calculating venting area requirements Table 305.1.1 – providing range in tornado speed

IS-STM 03-02- 23 Replacement Part A

203, 304, Table 305.1.1, Chapter 9

Proponent: ICC 500 Work Group 3

Replace and revise as follows:

SECTION 203
SYMBOLS AND NOMENCLATURE

K_d –directionality factor for wind loads
K_{dT} – directionality factor for tornado loads
~~K_{zt} – topographic factor~~
W_T – loads due to tornado ~~winds~~ loads

SECTION 304
TORNADO LOADS AND WIND LOADS

304.1 General. ~~Wind loads from hurricanes, W_H, and tornadoes~~ Tornado loads, W_T, wind loads for hurricanes, W_H, and wind loads for storms in Alaska, W_H, shall be determined in accordance with ASCE 7, Chapters 26 through ~~31~~ 32, except as modified by this section. For tornado loads the procedures from ASCE 7 Section 32.1.2 shall be applicable.

304.2 Design tornado ~~wind~~ speed. For *tornado shelters*, the design ~~wind~~ tornado speed, V_T, shall be in accordance with Figure 304.2(1).

304.3 Design wind speed. For *hurricane shelters*, the design wind speed, V_H, shall be in accordance with Figure 304.2(2). For *storm shelters* in Alaska, the design wind speed, V_H, shall be in accordance with Figure 304.2(3).

304.4 ~~304.3~~ Tornado and wind ~~Wind~~ directionality ~~factor~~ factors. The directionality factors for tornado loads, K_{dT} and the directionality factors for wind loads, K_d, shall be taken as ~~K_d =~~ 1.0.

304.5 ~~304.4~~ Exposure category. ~~For *tornado shelters*, wind loads shall be based on Exposure Category C.~~ For *hurricane shelters*, ~~use of~~ that are located in Exposure

Category B ~~is not permitted~~ in accordance with ASCE 7 Section 26.7, Exposure C shall be used.

Exception: ~~F~~or *hurricane shelters*, ~~wind~~ Wind loads for the main wind force-resisting system (MWFRS) only shall be permitted to be based on Exposure Category B, where Exposure Category B exists for all wind directions and is likely to remain Exposure Category B after a hurricane with design wind speeds as determined from Section 304.3 ~~304.2~~.

~~**304.5 Topographic effects.** For *tornado shelters*, the topo- graphic factor, K_{zt}, need not exceed 1.0.~~

304.6 Enclosure classifications. Enclosure classifications for *storm shelters* shall be determined in accordance with ASCE 7, Chapter 26. For determining the enclosure classification for *community storm shelters*, the largest opening protected by an *impact-protective system* on a wall that receives positive external pressure shall be considered as an opening.

304.7 Tornado Internal Pressure Coefficient for Enclosed Buildings ~~Atmospheric Pressure Change (APC)~~.For *tornado shelters* classified as enclosed buildings, the ~~additional internal pressures caused by atmospheric pressure change shall be included in the design. The~~ internal pressure coefficient, GC_{piT}, shall be taken as ±0.18 where atmospheric pressure change (APC) venting area of 1 square foot (0.0929 m^2) per 1,000 cubic feet (28.3 m^3) of interior *storm shelter* volume is provided. APC venting shall consist of openings in the *storm shelter* roof having a pitch 10 degrees or less from the horizontal or openings divided equally (within 10 percent of one another) on opposite walls. A combination of APC venting meeting the above requirements is permitted.

Exception: ~~Calculation of venting area to relieve APC is not required for *tornado shelters* classified as partially enclosed buildings.~~ An internal pressure coefficient of GC_{piT} = ±0.55 shall be used for *tornado shelters* where APC venting meeting the requirements of Section 304.7 is not provided~~, or where APC venting area requirements are not calculated~~.

SECTION 305
DEBRIS HAZARDS

305.1.1 Missile criteria for tornado shelters. The missile testing for all components of the *storm shelter envelope* of *tornado shelters* shall be a 15-pound (6.8 kg) sawn lumber 2 by 4 traveling at the speeds shown in Table 305.1.1.

TABLE 305.1.1
MISSILE SPEED FOR TORNADO SHELTERS

DESIGN	MISSILE SPEED AND IMPACT SURFACE

~~**WIND**~~ **TORNADO SPEED**	
130 mph	80 mph Vertical Surfaces 53 mph Horizontal Surfaces
160 mph	84 mph Vertical Surfaces 56 mph Horizontal Surfaces
200 mph	90 mph Vertical Surfaces 60 mph Horizontal Surfaces
250 mph	100 mph Vertical Surfaces 67 mph Horizontal Surfaces

For SI: 1 mile per hour = 0.447 m/s.

CHAPTER 9
REFERENCED STANDARDS

ASCE
7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No. 1.

Reason: This proposal is to update the reference edition of ASCE 7 to ASCE 7-22. The changes to the wind load provisions from 7-16 to 7-22 were fairly modest, with the exception of the addition of a new Chapter 32 with tornado load requirements. The tornado load procedures are similar to the wind load procedures, although most of the parameters and equations have at least some slight differences. It should be noted that ASCE 7-22 tornado loads have been approved for incorporation into the 2024 IBC.

The two ASCE 7-22 tornado load provisions that will have an impact on the tornadic wind loads for storm shelters are described below.

1. ASCE 7 does not define an exposure or topographic factor for tornadoes; the velocity pressure exposure coefficient is a uniform value of 1.0 between the ground and 200 ft, and decreases slightly above that. Currently, our Section 304.4 says to use Exposure C for tornadoes. A comparison of the K_z factor for Exposure C and K_{zTor} is shown below (from ASCE 7 commentary). K_{zTor} exceeds K_z for exposure C at heights below 33 ft, and is less than Kz for heights above 33 ft. The tornado velocity pressure profile was developed from analysis of mobile radar data tornado velocity profiles.

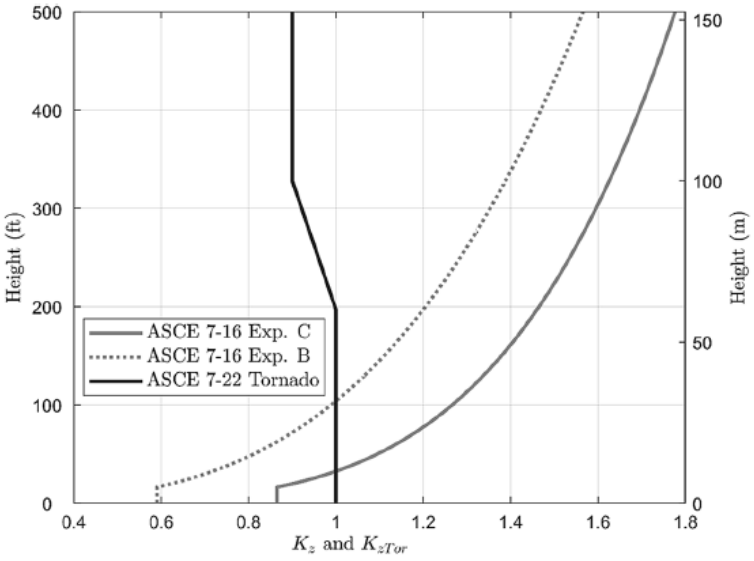

Figure C32.10-2. Vertical profiles of tornado velocity pressure (K_{zTor}) versus that of Exposure B and Exposure C for nontornadic winds (K_z) in Chapter 26 for the lowest 500 ft (152.4 m).

2. Tornado loads include a new parameter to adjust pressure coefficients to account for increased uplift on the roof due to the vertical updrafts in tornadoes. Pressure coefficients for the design of the MWFRS (i.e., C_p) and for design of the C&C (i.e., (GC_p)) are multiplied by the new Tornado Pressure Coefficient Adjustment Factor for Vertical Winds, K_{vT}. Values for this new coefficient are provided in the table below. $K_{vT} > 1$ for roof uplift, and $K_{vT} = 1$ for all other cases. The values for K_{vT} were developed through specialized wind tunnel testing.

Table 32.14-1. Tornado Pressure Coefficient Adjustment Factor for Vertical Winds, K_{vT}.

STRUCTURE TYPE	K_{vT}
Buildings	
Negative (Uplift) Pressures on Roofs	
Main Wind Force Resisting System	1.1
Components and Cladding	
Roof slope ≤ 7 degrees	
Zone 1	1.2
Zone 2	1.05
Zone 3	1.05
Roof slope > 7 degrees	
Zone 1	1.2
Zone 2	1.2
Zone 3	1.3
Positive Pressures (Downward Acting) on Roofs	1.0
Wall Pressures	1.0
All Other Cases	1.0
Other Structures	
Negative (Uplift) Pressures on Rooftop Structures and Equipment and Rooftop Solar Panels Parallel to the Roof Surface	
Main Wind Force Resisting System	1.1
Components and Cladding	Use values for building C&C
Negative (Uplift) Pressures on Roofs of Bins, Silos, and Tanks	
Main Wind Force Resisting System	1.1
Components and Cladding	See Section 32.17.5
All Other Cases	1.0

Additional information on specific changes –

Existing 304.2 was split into two sections for clarity in the requirements for tornado loads and wind loads.

Existing 304.4 Exposure Category – was made a positive statement for hurricane shelters, instead of a negative. ASCE 7 Tornado Loads do not use exposure category.

Existing 304.6 Topographic effects was deleted because ASCE 7 Tornado Loads do not use topographic effects.

Existing 304.6 Current reference to Chapter 26 is sufficient. No need to point to Chapter 32 Section 32.12 for tornado shelters, since the only parts of that section applicable to shelters point back to Chapter 26 anyway.

Existing 304.7 - Instead of main paragraph and exception, reformatting to simplify as two options, either provide venting or use +/- 0.55. Last phare in exception deleted because This should be deleted regardless of any other ASCE 7 tornado change or not. Simply calculating venting area requirements Table 305.1.1 – providing range in tornado speed

IS-STM 03-02- 23 Replacement Part B

301.4(New), 301.5(New), Table 305.1.1

Proponent: ICC 500 Work Group 3

Replace and revise as follows:

SECTION 301
GENERAL

301.4 Performance based design for tornado loads. Where tornado loads are determined using a performance-based procedures, the tornado loads shall be in accordance with ASCE 7 Section 32.1.3, providing loads are not lesser in magnitude than required by this chapter.

301.5 Performance based design for wind loads. Where wind loads are determined using a performance-based procedures, the wind loads shall be in accordance with ASCE 7 Section 26.1.3, providing loads are not lesser in magnitude than required by this chapter.

SECTION 304
TORNADO LOADS AND WIND LOADS

304.2 Design tornado ~~wind~~ speed. For *tornado shelters*, the design ~~wind~~ tornado speed, V_T, shall be in accordance with Figure 304.2(1). Alternatively, V_T shall be permitted to be determined in accordance with ASCE 7 Figures G.2-3A through G.2-3H, where the effective plan area shall be the area of the smallest convex polygon enclosing the storm shelter and any associated external critical support systems not meeting the soil protection requirements of Section 305.2.2.

SECTION 305
DEBRIS HAZARDS

305.1.1 Missile criteria for tornado shelters. The missile testing for all components of the *storm shelter envelope* of *tornado shelters* shall be a 15-pound (6.8 kg) sawn lumber 2 by 4 traveling at the speeds shown in Table 305.1.1.

TABLE 305.1.1
MISSILE SPEED FOR TORNADO SHELTERS

DESIGN ~~WIND~~ TORNADO SPEED	MISSILE SPEED AND IMPACT SURFACE

≤ 130 mph	80 mph Vertical Surfaces 53 mph Horizontal Surfaces
>130 to ≤ 160 mph	84 mph Vertical Surfaces 56 mph Horizontal Surfaces
>160 to ≤ 200 mph	90 mph Vertical Surfaces 60 mph Horizontal Surfaces
~~250~~ > 200 mph	100 mph Vertical Surfaces 67 mph Horizontal Surfaces

For SI: 1 mile per hour = 0.447 m/s.

Reason: This change provides a) clarification of the shelter application of ASCE 7-22 specifically permitted performance-based wind and tornado design procedures, and b) provides for an alternate, probabilistic tornado shelter wind speed using the one million-year return period maps provided in Appendix G of ASCE 7. For reference, the ICC 500 hurricane shelter wind map uses a 10,000-year return period map. Note – Appendix G is written in mandatory language, and therefore are adoptable. This proposal only changes the tornado speed used for tornado shelter design – it is unrelated to requirement for whether shelters are required to be installed or not.

Additional information on specific changes –

Section 301.4 and 301.5 – This is a general allowance for performance design and is consistent with the 2024 changes for the Performance Code in the I-codes

Where tornado loads were added to criteria, the tornado load comes before the wind load (hurricanes) for consistency with the order in other Chapters in the standard where there is different criteria for tornadoes and hurricanes (e.g. Chapter 7).

Committee Action: Approval as Modified – proposal split
Part A (Vote: 10-0-0)
Part B
All of Part B AM – Vote: 0-3-6;
Just 301.4 and 301.5 – Vote: 9-0-0

Modification (if any):

Replace and revise as follows:

SECTION 203
SYMBOLS AND NOMENCLATURE

K_d –directionality factor for wind loads
K_{dT} – directionality factor for tornado loads
~~K_{zt} – topographic factor~~
W_T – loads due to tornado ~~winds~~ loads

SECTION 301
GENERAL

301.4 Performance based design for tornado loads. Where tornado loads are determined using a performance-based procedures, the tornado loads shall be in accordance with ASCE 7 Section 32.1.3, providing loads are not lesser in magnitude than required by this chapter.

301.5 Performance based design for wind loads. Where wind loads are determined using a performance-based procedures, the wind loads shall be in accordance with ASCE 7 Section 26.1.3, providing loads are not lesser in magnitude than required by this chapter.

SECTION 304
TORNADO LOADS AND WIND LOADS

304.1 General. ~~Wind loads from hurricanes, W_H, and tornadoes~~ Tornado loads, W_T, wind loads for hurricanes, W_H, and wind loads for storms in Alaska, W_H, shall be determined in accordance with ASCE 7, Chapters 26 through ~~31~~ 32, except as modified by this section. For tornado loads the procedures from ASCE 7 Section 32.1.2 shall be applicable.

304.2 Design tornado ~~wind~~ speed. For *tornado shelters*, the design ~~wind~~ tornado speed, V_T, shall be in accordance with Figure 304.2(1).

304.3 Design wind speed. For *hurricane shelters*, the design wind speed, V_H, shall be in accordance with Figure 304.2(2). For *storm shelters* in Alaska, the design wind speed, V_H, shall be in accordance with Figure 304.2(3).

304.4 ~~304.3~~ Tornado and wind ~~Wind~~ directionality ~~factor~~ factors. The directionality factors for tornado loads, K_{dT} and the directionality factors for wind loads, K_d, shall be taken as ~~K_d =~~ 1.0.

304.5 ~~304.4~~ Exposure category. ~~For *tornado shelters*, wind loads shall be based on Exposure Category C.~~ For *hurricane shelters*, ~~use of~~ that are located in Exposure Category B ~~is not permitted~~ in accordance with ASCE 7 Section 26.7, Exposure C shall be used.

Exception: ~~For *hurricane shelters*, wind~~ Wind loads for the main wind force-resisting system (MWFRS) only shall be permitted to be based on Exposure Category B, where Exposure Category B exists for all wind directions and is likely to remain Exposure Category B after a hurricane with design wind speeds as determined from Section 304.3 ~~304.2~~.

~~**304.5 Topographic effects.** For *tornado shelters*, the topo- graphic factor, K_{zt}, need not exceed 1.0.~~

304.6 Enclosure classifications. Enclosure classifications for *storm shelters* shall be determined in accordance with ASCE 7, Chapter 26. For determining the enclosure classification for *community storm shelters*, the largest opening protected by an *impact-protective system* on a wall that receives positive external pressure shall be considered as an opening.

304.7 Tornado Internal Pressure Coefficient for Enclosed Buildings ~~Atmospheric Pressure Change (APC)~~.For *tornado shelters* classified as enclosed buildings, the~~ additional internal pressures caused by atmospheric pressure change shall be included in the design. The~~ internal pressure coefficient, GC_{piT}, shall be taken as ±0.18 where atmospheric pressure change (APC) venting area of 1 square foot (0.0929 m^2) per 1,000 cubic feet (28.3 m^3) of interior *storm shelter* volume is provided. APC venting shall consist of openings in the *storm shelter* roof having a pitch 10 degrees or less from the horizontal or openings divided equally (within 10 percent of one another) on opposite walls. A combination of APC venting meeting the above requirements is permitted.

Exception: ~~Calculation of venting area to relieve APC is not required for *tornado shelters* classified as partially enclosed buildings.~~ An internal pressure coefficient of GC_{piT} = ±0.55 shall be used for *tornado shelters* where APC venting meeting the requirements of Section 304.7 is not provided~~, or where APC venting area requirements are not calculated~~.

SECTION 305
DEBRIS HAZARDS

305.1.1 Missile criteria for tornado shelters. The missile testing for all components of the *storm shelter envelope* of *tornado shelters* shall be a 15-pound (6.8 kg) sawn lumber 2 by 4 traveling at the speeds shown in Table 305.1.1.

TABLE 305.1.1
MISSILE SPEED FOR TORNADO SHELTERS

DESIGN ~~WIND~~ TORNADO SPEED	MISSILE SPEED AND IMPACT SURFACE
130 mph	80 mph Vertical Surfaces 53 mph Horizontal Surfaces
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For SI: 1 mile per hour = 0.447 m/s.

CHAPTER 9

REFERENCED STANDARDS

ASCE
7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No. 1.

Committee Reason:
Part A – Update referenced standard to ASCE7 -22 including supplement 1 (which updates referenced standards) and to incorporate the relevant components of the new ASCE 7 tornado loads. Need to coordinate with terminology in other chapters of the standard (e.g. 'wind loads' in chapter 8).

Part B – Approval of 301.4 and 301.5 performance options provides a clarification of the shelter application of ASCE 7-22 specifically permitted performance-based wind and tornado design procedures. The option in Section 304 and 305 was disapproved because this would generally lower wind speeds for tornado shelters.

IS-STM 03-02- 23 Reconsideration

Introduction, 106.2, 202, 203, Figure 304.2(1), 305.1, 306.4.1.1.1, 306.4.1, 306.4.1.2, 307.1.1, 307.1.2, 307.2, 508.2, 602.1, 701.2, 802.1, 803.9.7.1, 803.9.7.2, 803.9.7.3, 805.1, 805.2, 805.3.1

This text is based on the approved proposals so that we can address new text.

Proponent: ICC 500 Work Group 3

Replace and revise as follows:

Further revise as follows:

Introduction
In May of 2002 the International Code Council (ICC) and the National Storm Shelter Association (NSSA) initiated a joint project to write a standard for the design and construction of storm shelters. A standard development committee was created, and the first meeting of that committee was in May of 2003. The scope of the standard is to provide minimum design and construction requirements for storm shelters that provide a safe refuge from storms that produce high winds, hurricanes and tornadoes. Hurricanes and tornadoes generate high winds that produce ~~wind~~ pressures on buildings and structures and that create flying debris at levels and intensities that are higher than those for which most commercial building and residences are designed. The magnitude of the tornado and wind speeds associated with these storms are such that building occupants and residents are required to evacuate the area or seek protection in a shelter designed for

resistance to extraordinary loads and flying debris. This standard provides design requirements for the main wind force resisting structural system and components and cladding of these shelters, and provides basic occupant life safety and health requirements for these shelters, including means of egress, lighting, sanitation, ventilation, fire safety and minimum required floor space for occupants.

CHAPTER 1
APPLICATION AND ADMINISTRATION

SECTION 106
SUBMITTAL DOCUMENTS

IS-STM 01-03-23 AM

106.2 Design Information ~~required~~. The following information applicable to the design, construction, and operation of the storm shelter shall be ~~supplied as part of the construction documents~~ documented or explicitly referenced on a single sheet within the construction documents.

IS-STM 01-03-23 AM; IS-STM 01-04-23 AM

~~**106.2.1 Design information.** For the areas of a building designed for occupancy as a *storm shelter*, the following information shall be provided within the construction documents:~~

1. Type of *storm shelter*: Residential or community and tornado, hurricane or a combination of both.
2. Use of *community storm shelter*: use by the general public, building occupants or a combination of both.
3. A statement that the design conforms to the provisions of the ICC 500 *Standard for the Design and Construction of Storm Shelters*, with the edition year specified.
4. The *storm shelter* tornado speed, V_T or design wind speed, ~~V_T,~~ V_H, or both, mph (m/s).
5. The tornado and wind exposure category (indicate all where more than one is used).
6. The internal pressure coefficient, GC_{pi} and GC_{piT}.
7. The topographic factor, K_{zt}.
8. The directionality factor, K_d and K_{dt}.
9. *Design* tornado and *wind pressures* and their applicable zones with dimensions needed for the specification of the components and cladding of the *storm shelter envelope*, psf (kN/m^2).
10. Where the *storm shelter* is subject to the requirements of Section 402.1, a statement that the *storm shelter* has or has not been constructed in accordance with Chapter 4.
11. Where the *storm shelter* is subject to the requirements of Section 402.1, the minimum elevation of the lowest floor required by the *authority having jurisdiction* for the location where the *storm shelter* is installed; the *base flood elevation, 500-year flood elevation* and *storm surge flood elevation* where applicable; and the

storm shelter floor elevation. Where the National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) or other approved source is utilized for data, the construction documents shall indicate the version, date and the source of the maps.

12. Documentation showing that components of the *storm shelter envelope* will meet the static and cyclic pressure and impact test requirements identified in Chapters 3 and 8.
13. A floor plan drawing or image indicating location of the *storm shelter* on a site or within a building or facility; including a drawing or image indicating the entire facility.
14. A *storm shelter* section or elevation indicating the height of the *storm shelter* relative to the finished grade, finished floor and the *host building*, where applicable.
15. The lowest *storm shelter* floor elevation and corresponding datum, except for *residential tornado shelters* outside of special *flood hazard areas*.
16. The *design occupant capacity.*
17. Calculations for the *usable floor area,* in square feet (m^2).
18. Calculations for the venting area provided and the locations in the *storm shelter*.
19. Calculations for the number of sanitation facilities for *community storm shelters.*
20. Minimum foundation capacity requirements including foundation thickness, steel reinforcement and concrete cover.
21. Installation requirements for prefabricated *storm shelters,* ~~*Storm*~~ *storm shelter* structural components, and *impact protective systems* ~~installation requirements,~~ including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.
22. For *hurricane shelters*, the rainfall rate of the roof primary drainage system.
23. For *hurricane shelters*, the rainfall rate of the roof secondary (overflow) drainage system where required.
24. For *hurricane shelters*, the rainwater drainage design rainfall rate for facilities subject to rainwater impoundment.

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

DESIGN WIND PRESSURE. For hurricane shelters, ~~The~~ the wind pressure on a specific location of the *storm shelter envelope*, as determined in accordance with Section 304, ~~Wind Loads,~~ which controls the design of components and cladding (C & C) of the *storm shelter envelope* or the main wind force resisting system (MWFRS) for the *storm shelter*.

DESIGN TORNADO PRESSURE. For tornado shelters, the tornado pressure on a specific location of the *storm shelter envelope*, as determined in accordance with Section

304, which controls the design of components and cladding (C & C) of the *storm shelter envelope* or the main wind force resisting system (MWFRS) for the *storm shelter*.

HAZARDS.

Coastal. See **"**Coastal high hazard area.**"**

Falling debris. Exterior components, cladding, and appurtenances, such as parapet walls, masonry cladding, or rooftop equipment, that could fall onto the roof of a *storm shelter* from ~~wind~~ windstorm damage to adjacent, taller buildings or taller sections of a *host building*.

Flood. See "500-year flood hazard area" and " Flood hazard area."

Laydown. Adjacent building elements, other structures and natural objects, that could fall onto the roof of a *storm shelter*, such as exterior walls of adjacent single story structures, self-supporting towers, poles or large trees.

Storm surge. See "Storm surge flood hazard area.**"**

WIND PRESSURE. See "Design wind pressure" and "Design tornado pressure."

SECTION 203
SYMBOLS AND NOMENCLATURE

IS-STM 03-02-23 AM

APC = atmospheric pressure change.
D = dead load.
F_{aH} = flood load on *hurricane shelters* in accordance with Section 303.5.
GC_{pi} = internal pressure coefficient.
GC_{piT} = internal tornado pressure coefficient.
L = uniform live load for floors in *hurricane shelters* in accordance with the *applicable code* for the normal use of the space.
L_T = uniform live load for floors in *tornado shelters* in accordance with Section 303.2.
L_{rH} = roof live load for *hurricane shelters* in accordance with Sections 303.3 and 305.3.
L_{rT} = roof live load for *tornado shelters* in accordance with Sections 303.3 and 305.3.
LRFD = load and resistance factor design.
K_d = directionality factor for wind loads.
K_{dT} = directionality factor for tornado loads
~~K_{zt} = topographic factor~~
MWFRS = main wind force resisting system.
R_H = rain load for *hurricane shelters* in accordance with Section 303.1.1.
R = rain load for *tornado shelters* in accordance with the *applicable code*.
V_H = design wind speed for hurricanes.
V_T = design ~~wind~~ tornado speed ~~for tornadoes~~.
W_H = load due to hurricane winds.
W_T = load due to ~~tornadoes winds~~ tornadic winds.

CHAPTER 3
STRUCTURAL DESIGN AND TESTING CRITERIA

Notes:
1. Values are nominal three-second gust wind speeds in miles per hour at 33 feet above ground for Exposure Category C.
2. Multiply miles per hour by 0.477 to obtain meters per second.
3. Location-specific storm shelter design ~~wind~~ tornado speeds shall be permitted to be determined using the ATC Hazards by Location website, https://hazards.atcouncil.org/.

FIGURE 304.2(1)
DESIGN ~~WIND~~ TORNADO SPEEDS, V_T, ~~FOR TORNADOES~~

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.1 Storm shelters meeting tornado impact test requirements. *Storm shelter envelope* components meeting impact test requirements for *tornado shelters* at the 250 mph design ~~wind~~ tornado speed in accordance with Section 305.1.1 shall be considered acceptable for the impact test requirements for *hurricane shelters* provided the components meet the structural design load requirements for *hurricane shelters*.
306.3 Roof and wall assemblies. Roof and wall assemblies shall meet the impact criteria of Section 305.1, and the *design tornado pressure* and *design wind pressure* in accordance with Section 304.

IS-STM 03-06-23 AM
306.4.1 Impact-protective systems. *Impact-protective systems* for use in the *storm shelter envelope* shall be tested, listed and labeled for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to *listed impact-protective systems,* such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.

Exceptions:
1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an *impact-protective system* are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an *impact-protective system* are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the *design tornado pressure* or *design wind pressures* are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.

IS-STM 01-11-23 AM relocated
306.4.1.1.1 ~~112.1.1~~ Marking. The following function and performance characteristics shall be provided on the *label* for each *impact-protective system* tested:
1. Manufacturer's identification reference or listing number for the assembly

2. Type of *impact-protective system,* such as window assembly, door assembly, shutter assembly or louver.
3. Hazard: hurricane, tornado or both.
4. Missile weight and speed.
5. *Design tornado pressure, design wind pressure,* or both.
6. Edition of ICC 500.

IS-STM 03-05-23 AM; IS-STM 03-06-23 AM

306.4.1.2 ~~306.4.1.3~~ Alternate anchorage ~~Anchorage~~ for impact-protective systems. Where anchorage of *impact-protective systems* to the *storm shelter* structure is required by means other than those provided in the manufacturer's listed system ~~listing in accordance with Section 112~~, anchorage shall be designed for pull-out and shear to resist the tornado and wind loads in accordance with Section 304.

SECTION 307
CONNECTION OF STORM SHELTERS TO FOUNDATIONS OR SLABS

307.1.1 Calculation of resistance. Structural stability of *storm shelters* shall be determined by engineering calculations for design tornado and wind loads. Where *storm shelters* are anchored to ~~foundations~~ foundation systems and such top surfaces extending outward from the *storm shelter* walls are at grade, the top surfaces of the foundation systems shall not be considered to have tornado and wind uplift forces acting on them.

307.1.2 Elevated storm shelter foundation systems. Where *storm shelters* are constructed with the top of the supporting foundation system located at an elevation higher than the surrounding finished grade level, the structural stability of the *storm shelter* and elevated supporting foundation system shall be computed assuming that both are fully exposed to the *storm shelter* design tornado, wind and flood loads. Where applicable, and in accordance with the *applicable code*, the impacts of flood-borne debris on stability of the foundation system shall be considered.

307.2 Slabs-on-ground. Where slabs-on-ground are serving as part of the foundation system for the *storm shelter*, the slabs-on-ground shall be designed in accordance with ACI 318 to resist all loads specified in Chapter 3 and to transfer the resultant forces into the ground.

Exceptions:

1. Slabs-on-ground within a *storm shelter* not utilized to transfer tornado and wind forces acting on the *storm shelter* to the ground or to a foundation system supporting the storm shelter shall be designed in accordance with the *applicable code*.
2. Slabs-on-ground within a one- or two-family dwelling and supporting a *residential storm shelter* shall be designed in accordance with ACI 318 or ACI 332.

CHAPTER 4

SITING

CHAPTER 5

IS-STM 05-01-23 AS; IS-STM 05-06-23 AM

~~OCCUPANCY~~ OCCUPANT DENSITY, ~~ACCESS~~ ENTRY, ACCESSIBILITY, EGRESS AND SIGNAGE

SECTION 508
SIGNAGE

IS-STM 05-16-23 AS

508.2 Design information signage. All *storm shelters* shall have a sign on or within the *storm shelter* with all of the following:

1. ~~The *design*~~ *Design occupant capacity.*
2. ~~The storm~~ Storm type.
3. ~~The *design*~~ Design tornado and wind speed.
4. ~~The edition~~ Edition of the ICC 500 used for the design.
5. ~~The name~~ Name of the manufacturer or builder of the *storm shelter*.

CHAPTER 6
FIRE SAFETY

SECTION 602
FIRE PROTECTION SYSTEMS

602.1 Fire protection system. Fire protection systems shall be provided within the *storm shelter* where required by the *applicable code* for the normal use of the space. These systems are not required to remain functional for the design storm event and minimum period of shelter occupancy (24 hours for *hurricane shelters*, 2 hours for *tornado shelters*) or to be protected from the tornado and wind load and impact requirements of Chapter 3 or the flood-resistance requirements of Chapter 4.

CHAPTER 7

IS-STM 07-01-23 AS

~~STORM SHELTER~~ ESSENTIAL FEATURES AND ACCESSORIES

SECTION 701
GENERAL

701.2 Protection of storm shelter critical support systems. *Storm shelter critical support systems* shall remain functional for the design storm event and minimum period of *storm shelter* occupancy (24 hours for hurricane shelters, 2 hours for tornado shelters). *Storm shelter critical support systems* located outside of the *storm shelter* areas shall be protected by a means that meets the tornado and wind load and impact requirements of Chapter 3, and, as applicable, the flood-resistance requirements of Chapter 4.

CHAPTER 8
TEST METHODS FOR IMPACT AND PRESSURE TESTING

SECTION 802
TEST SPECIMENS

802.1 Test assembly. All parts of the test *specimen* shall be full size, using the same materials, details, methods of construction and methods of attachment as proposed for actual use. Testing of components consisting of wall assemblies, roof assemblies, or *impact-protective systems* shall be allowed in lieu of testing entire *storm shelters*.

Where failure of framing members controls the impact performance, wall and roof assemblies subjected to impact testing shall be a minimum of 4 feet (1219 mm) wide and the full length of the span of the wall or roof section from support to support. Where failure of framing members has been shown through testing to not control the impact performance, wall and roof sections subjected to debris impact testing shall be a minimum of 4 feet (1219 mm) wide by 4 feet (1219 mm) high unless dimensions of the actual assembly are less than these dimensions.

Impact-protective systems shall be impact tested and cyclic pressure tested where applicable, at the maximum and minimum size *listed* for use. Static pressure testing shall be conducted on the maximum size *listed* for use. Operable door assemblies and window assemblies shall be tested for the conditions of swing and latching including inward or outward swing separately as specified for use of the product. *Impact-protective systems* shall be static pressure tested in both directions unless a clear worst-case direction is determined by the *test laboratory*. Paired doors and their latching hardware shall be tested independently from single doors. The *specimen* shall consist of the entire assembled unit and shall, where practical, be mounted as it will be installed in a *storm shelter*, and shall contain all devices used to resist tornado and wind forces and wind-borne debris. Where it is not practical to install for testing door assemblies and window assemblies as they will be mounted in a *storm shelter*, then the unit or assembly shall be mounted in a test buck to connect the *specimen* to the test frame, stand or *test chamber*. Details of the mounting shall be described in the test report.

SECTION 803
IMPACT TESTING

803.9.7.1 Alcove or baffled storm shelter entry systems for which no testing is required. *Storm shelter* entrances, whether provided with a door assembly or not, that are protected by an alcove or baffled *storm shelter* entry system that require missiles to impact at least two surfaces meeting the requirements of Section 306.3 prior to arriving at the protected occupant area shall not be required to undergo impact testing. See Figure 803.9.7.1 for an example. Where a solid door assembly is installed as a closure for this type of entry system or to meet the fire-resistance requirements in Section 603, the door assembly need not meet the tornado and wind load requirements of Section 304.

803.9.7.2 Door assembly subject to rebound impact. Where the *alcove or baffled storm shelter entry system* prevents a first impact of the missile on the door assembly but the door assembly is subject to a *rebound impact* of the missile after it has impacted one surface meeting the requirements of Section 306.3 (see Figure 803.9.7.2 for an example), then a door assembly shall meet the tornado and wind load requirements of Section 304 and the impact requirements of Section 305 except that the missile shall be, at a minimum, a 9-pound (4.1 kg) sawn lumber 2 by 4 traveling at 50 feet per second (15.2 m/s). Entry systems having door assemblies that are protected from the initial and first *rebound impacts* of missile shall comply with the requirements of Section 803.9.7.1.

IS-STM 08-12-23 AS

803.9.7.3 Door assemblies subject to first impact. Where a first-strike angle missile will impact on the door assembly (see Figure 803.9.7.3 for an example) the door assembly shall meet the tornado or wind load requirements of Section 306.3, the fire-resistance requirements of Section 603, and ~~meets~~ meet one of the following debris impact criteria:

1. The door assembly withstands the impact of a missile striking the door assembly at an angle closest to perpendicular to the plane of the door.
2. The door assembly withstands missile impacts by the design missile striking perpendicular to the surface with speed equal to or greater than the *storm shelter* design missile's velocity component perpendicular to the door assembly for the most critical angle that can occur in the application.

The minimum debris impact criterion for the door assembly shall be an impact perpendicular to the door assembly of a 9-pound sawn lumber 2 by 4 traveling at 50 feet per second [34 mph (15.2 m/s)].

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.1 Pressure testing procedures. For wall assemblies, roof assemblies and *impact-protective systems* that are components of the *storm shelter envelope,* static or cyclic pressure testing shall be in accordance with Sections 805.2 and 805.3, as applicable. *Design tornado pressure* and *design wind pressures* used for static or cyclic pressure testing of the *storm shelter envelope* shall be in accordance with Section 304.

805.2 Wall assemblies and roof assemblies. Where testing of wall assemblies and roof assemblies is required, such assemblies shall be static pressure tested in the as-supplied condition. Static pressure testing of roof assemblies shall be conducted in accordance with FM 4474, ASTM E1592, UL 1897 or ASTM E330, whichever is applicable, to a static pressure 1.2 times the *design tornado pressure* and *design wind pressure* or greater. Static pressure testing of wall assemblies shall be conducted in accordance with ASTM E330 to 1.2 times the *design tornado pressure* and *design wind pressure* or greater.

805.3.1 Tornado shelters. Impact-protective systems for use in tornado shelters shall be tested for static pressure to a pressure of 1.2 times the *design* tornado ~~*wind*~~ *pressure* or greater in accordance with ASTM E330.

Reason: This change is for coordination with terminology throughout the standard with the changes in 03-02-23 for tornado loads.
Staff note: Some editorial changes were made during the discussion which are reported in the text above.

Vote: As Modified (11-0-0)

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Committee decision: AM	***Committee Vote at Meeting: Part A 10-0-0; Part B 9-0-0; Reconsideration 11-0-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):

Staff note 6-15-2023 – the reconsideration was with the modified proposals so that the coordination could be throughout the standard with current text. Red text shows this modification.

Replace and revise as follows:

Introduction
In May of 2002 the International Code Council (ICC) and the National Storm Shelter Association (NSSA) initiated a joint project to write a standard for the design and construction of storm shelters. A standard development committee was created, and the first meeting of that committee was in May of 2003. The scope of the standard is to provide minimum design and construction requirements for storm shelters that provide a safe refuge from storms that produce high winds, hurricanes and tornadoes. Hurricanes and tornadoes generate high winds that produce ~~wind~~ pressures on buildings and structures and that create flying debris at levels and intensities that are higher than those for which most commercial building and residences are designed. The magnitude of the tornado and wind speeds associated with these storms are such that building occupants and residents are required to evacuate the area or seek protection in a shelter designed for resistance to extraordinary loads and flying debris. This standard provides design requirements for the main wind force resisting structural system and components and cladding of these shelters, and provides basic occupant life safety and health requirements for these shelters, including means of egress, lighting, sanitation, ventilation, fire safety and minimum required floor space for occupants.

CHAPTER 1
APPLICATION AND ADMINISTRATION

SECTION 106
SUBMITTAL DOCUMENTS

IS-STM 01-03-23 AM
106.2 Design Information ~~required~~. The following information applicable to the design, construction, and operation of the storm shelter shall be ~~supplied as part of the construction documents~~ documented or explicitly referenced on a single sheet within the construction documents.

IS-STM 01-03-23 AM; IS-STM 01-04-23 AM
~~106.2.1 Design information.~~ ~~For the areas of a building designed for occupancy as a *storm shelter*, the following information shall be provided within the construction documents:~~

1. Type of *storm shelter*: Residential or community and tornado, hurricane or a combination of both.
2. Use of *community storm shelter*: use by the general public, building occupants or a combination of both.
3. A statement that the design conforms to the provisions of the ICC 500 *Standard for the Design and Construction of Storm Shelters*, with the edition year specified.
4. The *storm shelter* tornado speed, V_T or design wind speed, ~~V_{ult}~~ V_H, or both, mph (m/s).
5. The tornado and wind exposure category (indicate all where more than one is used).
6. The internal pressure coefficient, GC_{pi} and GC_{piT}.
7. The topographic factor, K_{zt}.
8. The directionality factor, K_d and K_{dt}.

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9. *Design* tornado and *wind pressures* and their applicable zones with dimensions needed for the specification of the components and cladding of the *storm shelter envelope*, psf (kN/m^2).
10. Where the *storm shelter* is subject to the requirements of Section 402.1, a statement that the *storm shelter* has or has not been constructed in accordance with Chapter 4.
11. Where the *storm shelter* is subject to the requirements of Section 402.1, the minimum elevation of the lowest floor required by the *authority having jurisdiction* for the location where the *storm shelter* is installed; the *base flood elevation, 500-year flood elevation* and *storm surge flood elevation* where applicable; and the *storm shelter* floor elevation. Where the National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) or other approved source is utilized for data, the construction documents shall indicate the version, date and the source of the maps.
12. Documentation showing that components of the *storm shelter envelope* will meet the static and cyclic pressure and impact test requirements identified in Chapters 3 and 8.
13. A floor plan drawing or image indicating location of the *storm shelter* on a site or within a building or facility; including a drawing or image indicating the entire facility.
14. A *storm shelter* section or elevation indicating the height of the *storm shelter* relative to the finished grade, finished floor and the *host building*, where applicable.
15. The lowest *storm shelter* floor elevation and corresponding datum, except for *residential tornado shelters* outside of special *flood hazard areas*.
16. The *design occupant capacity.*
17. Calculations for the *usable floor area,* in square feet (m^2).
18. Calculations for the venting area provided and the locations in the *storm shelter*.
19. Calculations for the number of sanitation facilities for *community storm shelters.*
20. Minimum foundation capacity requirements including foundation thickness, steel reinforcement and concrete cover.
21. Installation requirements for prefabricated *storm shelters, ~~Storm~~ storm shelter* structural components, and *impact protective systems* ~~installation requirements,~~ including anchor location, minimum edge and end distance and minimum required capacity for all post-installed anchors.
22. For *hurricane shelters*, the rainfall rate of the roof primary drainage system.
23. For *hurricane shelters*, the rainfall rate of the roof secondary (overflow) drainage system where required.
24. For *hurricane shelters*, the rainwater drainage design rainfall rate for facilities subject to rainwater impoundment.

CHAPTER 2
DEFINITIONS

SECTION 202
DEFINITIONS

DESIGN WIND PRESSURE. For hurricane shelters, ~~The~~ the wind pressure on a specific location of the *storm shelter envelope*, as determined in accordance with Section 304, ~~Wind Loads,~~ which controls the design of components and cladding (C & C) of the *storm shelter envelope* or the main wind force resisting system (MWFRS) for the *storm shelter*.

DESIGN TORNADO PRESSURE. For tornado shelters, the tornado pressure on a specific location of the *storm shelter envelope*, as determined in accordance with Section 304, which controls the design of components and cladding (C & C) of the *storm shelter envelope* or the main wind force resisting system (MWFRS) for the *storm shelter*.

HAZARDS.
Coastal. See **"**Coastal high hazard area.**"**
Falling debris. Exterior components, cladding, and appurtenances, such as parapet walls, masonry cladding, or rooftop equipment, that could fall onto the roof of a *storm shelter* from ~~wind~~ windstorm damage to adjacent, taller buildings or taller sections of a *host building*.
Flood. See "500-year flood hazard area" and " Flood hazard area."
Laydown. Adjacent building elements, other structures and natural objects, that could fall onto the roof of a *storm shelter*, such as exterior walls of adjacent single story structures, self-supporting towers, poles or large trees.
Storm surge. See "Storm surge flood hazard area.**"**

WIND PRESSURE. See "Design wind pressure" and "Design tornado pressure."

SECTION 203
SYMBOLS AND NOMENCLATURE

IS-STM 03-02-23 AM

APC = atmospheric pressure change.
D = dead load.
F_{aH} = flood load on *hurricane shelters* in accordance with Section 303.5.
GC_{pi} = internal pressure coefficient.
GC_{piT} = internal tornado pressure coefficient.
L = uniform live load for floors in *hurricane shelters* in accordance with the *applicable code* for the normal use of the space.
L_T = uniform live load for floors in *tornado shelters* in accordance with Section 303.2.
L_{rH} = roof live load for *hurricane shelters* in accordance with Sections 303.3 and 305.3.
L_{rT} = roof live load for *tornado shelters* in accordance with Sections 303.3 and 305.3.

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LRFD = load and resistance factor design.
K_d = directionality factor for wind loads.
K_{dT} = directionality factor for tornado loads
~~K_{zt} = topographic factor~~
MWFRS = main wind force resisting system.
R_H = rain load for *hurricane shelters* in accordance with Section 303.1.1.
R = rain load for *tornado shelters* in accordance with the *applicable code*.
V_H = design wind speed for hurricanes.
V_T = design ~~wind~~ tornado speed ~~for tornadoes~~.
W_H = load due to hurricane winds.
W_T = load due to ~~tornadoes winds~~ tornadic winds.

CHAPTER 3
STRUCTURAL DESIGN AND TESTING CRITERIA

SECTION 301
GENERAL

301.4 Performance based design for tornado loads. Where tornado loads are determined using a performance-based procedures, the tornado loads shall be in accordance with ASCE 7 Section 32.1.3, providing loads are not lesser in magnitude than required by this chapter.

301.5 Performance based design for wind loads. Where wind loads are determined using a performance-based procedures, the wind loads shall be in accordance with ASCE 7 Section 26.1.3, providing loads are not lesser in magnitude than required by this chapter.

SECTION 304
TORNADO LOADS AND WIND LOADS

304.1 General. ~~Wind loads from hurricanes, W_H, and tornadoes~~ Tornado loads, W_T, wind loads for hurricanes, W_H, and wind loads for storms in Alaska, W_H, shall be determined in accordance with ASCE 7, Chapters 26 through ~~31~~ 32, except as modified by this section. For tornado loads the procedures from ASCE 7 Section 32.1.2 shall be applicable.

304.2 Design tornado ~~wind~~ speed. For *tornado shelters*, the design ~~wind~~ tornado speed, V_T, shall be in accordance with Figure 304.2(1).

Notes:
1. Values are nominal three-second gust wind speeds in miles per hour at 33 feet above ground for Exposure Category C.
2. Multiply miles per hour by 0.477 to obtain meters per second.
3. Location-specific storm shelter design ~~wind~~ tornado speeds shall be permitted to be determined using the ATC Hazards by Location website, https://hazards.atcouncil.org/.

FIGURE 304.2(1)
DESIGN ~~WIND~~ TORNADO SPEEDS, V_T, ~~FOR TORNADOES~~

304.3 Design wind speed. For *hurricane shelters*, the design wind speed, V_H, shall be in accordance with Figure 304.2(2). For *storm shelters* in Alaska, the design wind speed, V_H, shall be in accordance with Figure 304.2(3).

304.4 ~~304.3~~ Tornado and wind ~~Wind~~ directionality ~~factor~~ factors. The directionality factors for tornado loads, K_{dT} and the directionality factors for wind loads, K_d, shall be taken as ~~K_d =~~ 1.0.

304.5 ~~304.4~~ Exposure category. ~~For *tornado shelters*, wind loads shall be based on Exposure Category C.~~ For *hurricane shelters*, ~~use of~~ that are located in Exposure Category B ~~is not permitted~~ in accordance with ASCE 7 Section 26.7, Exposure C shall be used.

Exception: ~~For *hurricane shelters*, wind~~ Wind loads for the main wind force-resisting system (MWFRS) only shall be permitted to be based on Exposure Category B, where Exposure Category B exists for all wind directions and is likely to remain Exposure Category B after a hurricane with design wind speeds as determined from Section 304.3 ~~304.2~~.

~~**304.5 Topographic effects.** For *tornado shelters*, the topo- graphic factor, K_{zt}, need not exceed 1.0.~~

304.6 Enclosure classifications. Enclosure classifications for *storm shelters* shall be determined in accordance with ASCE 7, Chapter 26. For determining the enclosure classification for *community storm shelters*, the largest opening protected by an *impact-protective system* on a wall that receives positive external pressure shall be considered as an

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opening.

304.7 Tornado Internal Pressure Coefficient for Enclosed Buildings ~~Atmospheric Pressure Change (APC)~~. For *tornado shelters* classified as enclosed buildings, the ~~additional internal pressures caused by atmospheric pressure change shall be included in the design. The~~ internal pressure coefficient, GC_{piT}, shall be taken as ±0.18 where atmospheric pressure change (APC) venting area of 1 square foot (0.0929 m^2) per 1,000 cubic feet (28.3 m^3) of interior *storm shelter* volume is provided. APC venting shall consist of openings in the *storm shelter* roof having a pitch 10 degrees or less from the horizontal or openings divided equally (within 10 percent of one another) on opposite walls. A combination of APC venting meeting the above requirements is permitted.

Exception: ~~Calculation of venting area to relieve APC is not required for *tornado shelters* classified as partially enclosed buildings.~~ An internal pressure coefficient of GC_{piT} = ±0.55 shall be used for *tornado shelters* where APC venting meeting the requirements of Section 304.7 is not provided~~, or where APC venting area requirements are not calculated~~.

SECTION 305
DEBRIS HAZARDS

305.1.1 Missile criteria for tornado shelters. The missile testing for all components of the *storm shelter envelope* of *tornado shelters* shall be a 15-pound (6.8 kg) sawn lumber 2 by 4 traveling at the speeds shown in Table 305.1.1.

TABLE 305.1.1
MISSILE SPEED FOR TORNADO SHELTERS

DESIGN ~~WIND~~ TORNADO SPEED	MISSILE SPEED AND IMPACT SURFACE
130 mph	80 mph Vertical Surfaces 53 mph Horizontal Surfaces
160 mph	84 mph Vertical Surfaces 56 mph Horizontal Surfaces
200 mph	90 mph Vertical Surfaces 60 mph Horizontal Surfaces
250 mph	100 mph Vertical Surfaces 67 mph Horizontal Surfaces

For SI: 1 mile per hour = 0.447 m/s.

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.1 Storm shelters meeting tornado impact test requirements. *Storm shelter envelope* components meeting impact test requirements for *tornado shelters* at the 250 mph design ~~wind~~ tornado speed in accordance with Section 305.1.1 shall be considered acceptable for the impact test requirements for *hurricane shelters* provided the components meet the structural design load requirements for *hurricane shelters*.

306.3 Roof and wall assemblies. Roof and wall assemblies shall meet the impact criteria of Section 305.1, and the *design tornado pressure* and *design wind pressure* in accordance with Section 304.

IS-STM 03-06-23 AM

306.4.1 Impact-protective systems. *Impact-protective systems* for use in the *storm shelter envelope* shall be tested, listed and labeled for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to *listed impact-protective systems,* such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.

Exceptions:

1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an *impact-protective system* are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an *impact-protective system* are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the *design tornado pressure* or *design wind pressures* are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.

IS-STM 01-11-23 AM relocated

306.4.1.1.1 ~~112.1.1~~ Marking. The following function and performance characteristics shall be provided on the *label* for each *impact-protective system* tested:

1. Manufacturer's identification reference or listing number for the assembly

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2. Type of *impact-protective system,* such as window assembly, door assembly, shutter assembly or louver.
3. Hazard: hurricane, tornado or both.
4. Missile weight and speed.
5. *Design tornado pressure, design wind pressure,* or both.
6. Edition of ICC 500.

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306.4.1.2 ~~306.4.1.3~~ Alternate anchorage ~~Anchorage~~ for impact-protective systems. Where anchorage of *impact-protective systems* to the *storm shelter* structure is required by means other than those provided in the manufacturer's listed system ~~listing in accordance with Section 112~~, anchorage shall be designed for pull-out and shear to resist the tornado and wind loads in accordance with Section 304.

SECTION 307
CONNECTION OF STORM SHELTERS TO FOUNDATIONS OR SLABS

307.1.1 Calculation of resistance. Structural stability of *storm shelters* shall be determined by engineering calculations for design tornado and wind loads. Where *storm shelters* are anchored to ~~foundations~~ foundation systems and such top surfaces extending outward from the *storm shelter* walls are at grade, the top surfaces of the foundation systems shall not be considered to have tornado and wind uplift forces acting on them.

307.1.2 Elevated storm shelter foundation systems. Where *storm shelters* are constructed with the top of the supporting foundation system located at an elevation higher than the surrounding finished grade level, the structural stability of the *storm shelter* and elevated supporting foundation system shall be computed assuming that both are fully exposed to the *storm shelter* design tornado, wind and flood loads. Where applicable, and in accordance with the *applicable code*, the impacts of flood-borne debris on stability of the foundation system shall be considered.

307.2 Slabs-on-ground. Where slabs-on-ground are serving as part of the foundation system for the *storm shelter*, the slabs-on-ground shall be designed in accordance with ACI 318 to resist all loads specified in Chapter 3 and to transfer the resultant forces into the ground.

Exceptions:

1. Slabs-on-ground within a *storm shelter* not utilized to transfer tornado and wind forces acting on the *storm shelter* to the ground or to a foundation system supporting the storm shelter shall be designed in accordance with the *applicable code*.
2. Slabs-on-ground within a one- or two-family dwelling and supporting a *residential storm shelter* shall be designed in accordance with ACI 318 or ACI 332.

CHAPTER 5

IS-STM 05-01-23 AS; IS-STM 05-06-23 AM

~~OCCUPANCY~~ OCCUPANT DENSITY, ~~ACCESS~~ ENTRY, ACCESSIBILITY, EGRESS AND SIGNAGE

SECTION 508
SIGNAGE

IS-STM 05-16-23 AS

508.2 Design information signage. All *storm shelters* shall have a sign on or within the *storm shelter* with all of the following:

1. ~~The *design*~~ *Design occupant capacity.*
2. ~~The storm~~ Storm type.
3. ~~The *design*~~ Design tornado and wind speed.
4. ~~The edition~~ Edition of the ICC 500 used for the design.
5. ~~The name~~ Name of the manufacturer or builder of the *storm shelter*.

CHAPTER 6
FIRE SAFETY

SECTION 602
FIRE PROTECTION SYSTEMS

602.1 Fire protection system. Fire protection systems shall be provided within the *storm shelter* where required by the *applicable code* for the normal use of the space. These systems are not required to remain functional for the design storm event and minimum period of shelter occupancy (24 hours for *hurricane shelters*, 2 hours for *tornado shelters*) or to be protected from the tornado and wind load and impact requirements of Chapter 3 or the flood-resistance requirements of Chapter 4.

CHAPTER 7

IS-STM 07-01-23 AS

~~STORM SHELTER~~ ESSENTIAL FEATURES AND ACCESSORIES

Report for *03-02– 23*

SECTION 701
GENERAL

701.2 Protection of storm shelter critical support systems. *Storm shelter critical support systems* shall remain functional for the design storm event and minimum period of *storm shelter* occupancy (24 hours for hurricane shelters, 2 hours for tornado shelters). *Storm shelter critical support systems* located outside of the *storm shelter* areas shall be protected by a means that meets the tornado and wind load and impact requirements of Chapter 3, and, as applicable, the flood-resistance requirements of Chapter 4.

CHAPTER 8
TEST METHODS FOR IMPACT AND PRESSURE TESTING

SECTION 802
TEST SPECIMENS

802.1 Test assembly. All parts of the test *specimen* shall be full size, using the same materials, details, methods of construction and methods of attachment as proposed for actual use. Testing of components consisting of wall assemblies, roof assemblies, or *impact-protective systems* shall be allowed in lieu of testing entire *storm shelters*.

Where failure of framing members controls the impact performance, wall and roof assemblies subjected to impact testing shall be a minimum of 4 feet (1219 mm) wide and the full length of the span of the wall or roof section from support to support. Where failure of framing members has been shown through testing to not control the impact performance, wall and roof sections subjected to debris impact testing shall be a minimum of 4 feet (1219 mm) wide by 4 feet (1219 mm) high unless dimensions of the actual assembly are less than these dimensions.

Impact-protective systems shall be impact tested and cyclic pressure tested where applicable, at the maximum and minimum size *listed* for use. Static pressure testing shall be conducted on the maximum size *listed* for use. Operable door assemblies and window assemblies shall be tested for the conditions of swing and latching including inward or outward swing separately as specified for use of the product. *Impact-protective systems* shall be static pressure tested in both directions unless a clear worst-case direction is determined by the *test laboratory*. Paired doors and their latching hardware shall be tested independently from single doors. The *specimen* shall consist of the entire assembled unit and shall, where practical, be mounted as it will be installed in a *storm shelter*, and shall contain all devices used to resist tornado and wind forces and wind-borne debris. Where it is not practical to install for testing door assemblies and window assemblies as they will be mounted in a *storm shelter*, then the unit or assembly shall be mounted in a test buck to connect the *specimen* to the test frame, stand or *test chamber*. Details of the mounting shall be described in the test report.

SECTION 803
IMPACT TESTING

803.9.7.1 Alcove or baffled storm shelter entry systems for which no testing is required. *Storm shelter* entrances, whether provided with a door assembly or not, that are protected by an alcove or baffled *storm shelter* entry system that require missiles to impact at least two surfaces meeting the requirements of Section 306.3 prior to arriving at the protected occupant area shall not be required to undergo impact testing. See Figure 803.9.7.1 for an example. Where a solid door assembly is installed as a closure for this type of entry system or to meet the fire-resistance requirements in Section 603, the door assembly need not meet the tornado and wind load requirements of Section 304.

803.9.7.2 Door assembly subject to rebound impact. Where the *alcove or baffled storm shelter entry system* prevents a first impact of the missile on the door assembly but the door assembly is subject to a *rebound impact* of the missile after it has impacted one surface meeting the requirements of Section 306.3 (see Figure 803.9.7.2 for an example), then a door assembly shall meet the tornado and wind load requirements of Section 304 and the impact requirements of Section 305 except that the missile shall be, at a minimum, a 9-pound (4.1 kg) sawn lumber 2 by 4 traveling at 50 feet per second (15.2 m/s). Entry systems having door assemblies that are protected from the initial and first *rebound impacts* of missile shall comply with the requirements of Section 803.9.7.1.

IS-STM 08-12-23 AS

803.9.7.3 Door assemblies subject to first impact. Where a first-strike angle missile will impact on the door assembly (see Figure 803.9.7.3 for an example) the door assembly shall meet the tornado or wind load requirements of Section 306.3, the fire-resistance requirements of Section 603, and ~~meets~~ meet one of the following debris impact criteria:

1. The door assembly withstands the impact of a missile striking the door assembly at an angle closest to perpendicular to the plane of the door.
2. The door assembly withstands missile impacts by the design missile striking perpendicular to the surface with speed equal to or greater than the *storm shelter* design missile's velocity component perpendicular to the door assembly for the most critical angle that can occur in the application.

The minimum debris impact criterion for the door assembly shall be an impact perpendicular to the door assembly of a 9-pound sawn lumber 2 by 4 traveling at 50 feet per second [34 mph (15.2 m/s)].

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.1 Pressure testing procedures. For wall assemblies, roof assemblies and *impact-protective systems* that are components of the *storm shelter envelope,* static or cyclic pressure testing shall be in accordance with Sections 805.2 and 805.3, as applicable.

Report for *03-02– 23*

Design tornado pressure and *design wind pressures* used for static or cyclic pressure testing of the *storm shelter envelope* shall be in accordance with Section 304.

805.2 Wall assemblies and roof assemblies. Where testing of wall assemblies and roof assemblies is required, such assemblies shall be static pressure tested in the as-supplied condition. Static pressure testing of roof assemblies shall be conducted in accordance with FM 4474, ASTM E1592, UL 1897 or ASTM E330, whichever is applicable, to a static pressure 1.2 times the *design tornado pressure* and *design wind pressure* or greater. Static pressure testing of wall assemblies shall be conducted in accordance with ASTM E330 to 1.2 times the *design tornado pressure* and *design wind pressure* or greater.

805.3.1 Tornado shelters. Impact-protective systems for use in tornado shelters shall be tested for static pressure to a pressure of 1.2 times the *design* tornado ~~*wind*~~ *pressure* or greater in accordance with ASTM E330.

CHAPTER 9

REFERENCED STANDARDS

ASCE
7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No. 1.

Committee Reason:
Part A – Update referenced standard to ASCE7 -22 including supplement 1 (which updates referenced standards) and to incorporate the relevant components of the new ASCE 7 tornado loads. Need to coordinate with terminology in other chapters of the standard (e.g. 'wind loads' in chapter 8).

Part B – Approval of 301.4 and 301.5 performance options provides a clarification of the shelter application of ASCE 7-22 specifically permitted performance-based wind and tornado design procedures. The option in Section 304 and 305 was disapproved because this would generally lower wind speeds for tornado shelters.

Reconsideration: This change is for coordination with terminology throughout the standard with the changes in 03-02-23 for tornado loads.

PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-03- 23
304.9

Proponent: ICC 500 Work Group 3

Revise as follows:

SECTION 304
WIND LOADS

304.9 Storm shelters connected to host buildings. Where ~~an~~ a structural element or component of the host building is connected to a storm shelter, the storm shelter shall be designed to resist the maximum force that could be transmitted to the *storm shelter* equal to the ultimate failure strength of the connection or element being connected, whichever is lower, concurrent with the other wind loads on the *storm shelter* required by Chapter 3.

Reason: This is a clarification. With current text would an "element or component" be structural or flashing?

IS-STM 03-03- 23 modification
304.9

Proponent: ICC 500 Work Group 3

Further modify as follows:

SECTION 304
WIND LOADS

304.9 Storm shelters connected to host buildings. Where a structural element ~~or component~~ of the host building is connected to a storm shelter, the storm shelter shall be designed to resist the maximum force that could be transmitted to the *storm shelter* equal to the ultimate failure strength of the connection or element being connected, whichever is lower, concurrent with the other wind loads on the *storm shelter* required by Chapter 3.

Reason: Removing ‘or component’ would further clarify that the main concern for the shelter design are the connected structural elements and the loads they could transfer to the shelter.

Committee Action: Approval as Modified (Vote:10-0-1)
Modification (if any):
Further modify as follows:

SECTION 304
WIND LOADS

304.9 Storm shelters connected to host buildings. Where a structural element ~~or component~~ of the host building is connected to a storm shelter, the storm shelter shall be designed to resist the maximum force that could be transmitted to the *storm shelter* equal to the ultimate failure strength of the connection or element being connected, whichever is lower, concurrent with the other wind loads on the *storm shelter* required by Chapter 3.

Committee Reason: Removing 'or component' would further clarify that the main concern for the shelter design are the connected structural elements and the loads they could transfer to the shelter.

Note 4-6-2023: Send back to Work Group 3; concern is elements that are not part of a host building such as a canopy; consider fire wall connections language in the IBC. Discuss transfer of loads – ultimate failure; breakaway allowance.

From Julie Furr:
Where an element or component that is not required for the functionality of the storm shelter, is connected to the storm shelter, the element or component connections shall be designed to breakaway without impacting the functionality of the storm shelter. The storm shelter shall maintain sufficient structural stability under storm conditions to allow the breakaway connections without impacting function of the storm shelter.

<table>
<tr><td colspan="3">Report for 03-03– 23</td></tr>
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<tr><td colspan="3">REPORT OF HEARING:
Modification (if any):
Further modify as follows:

SECTION 304
WIND LOADS

304.9 Storm shelters connected to host buildings. Where a structural element ~~or component~~ of the host building is connected to a storm shelter, the storm shelter shall be designed to resist the maximum force that could be transmitted to the storm shelter equal to the ultimate failure strength of the connection or element being connected, whichever is lower, concurrent with the other wind loads on the storm shelter required by Chapter 3.</td></tr>
<tr><td colspan="3">Committee Reason: Removing 'or component' would further clarify that the main concern for the shelter design are the connected structural elements and the loads they could transfer to the shelter.</td></tr>
<tr><td colspan="3">PUBLIC COMMENT- FIRST DRAFT:
Proponent:</td></tr>
<tr><td colspan="3">Desired Action:</td></tr>
<tr><td colspan="3">Modification:</td></tr>
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<tr><td colspan="3">FINAL ACTION:
Modification (if any):</td></tr>
<tr><td colspan="3">Committee Reason:</td></tr>
</table>

IS-STM 03-04-23
305.2.2

Proponent: ICC Work Group 3

Revise as follows:

SECTION 305
DEBRIS HAZARDS

305.2.2 Soil-covered portions of storm shelters. Portions of soil-covered *storm shelters*, with less than 12 inches (305 mm) of soil cover protecting *storm shelter* horizontal surfaces, or with less than 36 inches (914 mm) of soil cover protecting *storm shelter* vertical surfaces, shall be tested for resistance to ~~missile~~ ~~perforation~~ impact as though the surfaces were exposed. To qualify for shielding from soil cover, the soil surfaces shall slope away from the entrance walls or other near-grade enclosure surfaces of underground *storm shelters* at a slope of not more than 2 inches per foot for a horizontal distance of not less than 3 feet (914 mm) from the exposed portions of the *storm shelter* or unexposed portions deemed to be protected by soil cover. See Figure 305.2.2 for an example.

Reason: Perforation is not a term that is used in this standard for impact resistance.

Committee Action: Approval as Submitted (Vote:10-0-0)
Modification (if any):
Committee Reason: Perforation is one of the performance criteria. What you are testing for here impact of a missile. Removing 'missile' is coordination with last cycle terminology.

Notes 4-6-2023: This section is only for testing, not soil uplift or soil protection. Maybe need a separate section.

Report for *03-04– 23*		
Committee decision: AS	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Perforation is one of the performance criteria. What you are testing for here impact of a missile. Removing 'missile' is coordination with last cycle terminology.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		

Report for *03-04– 23*
Committee Reason:

IS-STM 03-05- 23

306.4, 306.4.1.1, 306.4.1.2, 306.4.1.3, 306.4.1.4, 306.4.2, 306.5, 306.6

Proponent: ICC Work Group 3

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4 Roof and wall openings. All openings in the *storm shelter envelope* shall be protected in accordance with Sections 306.4.1 through ~~306.4.2~~ 306.4.4, as applicable.

306.4.1 Impact-protective systems. *Impact-protective systems* for use in the *storm shelter envelope* shall be tested for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to *listed impact-protective systems,* such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.

Exceptions:

1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an *impact-protective system* are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an *impact-protective system* are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the *design wind pressures* are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.

306.4.1.1 ~~306.4.1.4~~ Installation. *Impact-protective systems* shall be installed in accordance with the manufacturer's listing and installation instructions.

306.4.1.2 ~~306.4.1.3~~ Anchorage for impact-protective systems. Where anchorage of *impact-protective systems* to the *storm shelter* structure is required by means other than those provided in the manufacturer's listing in accordance with Section 112, anchorage shall be designed for pull-out and shear to resist the wind loads in accordance with Section 304.

306.4.1.3 ~~306.4.1.2~~ Impact-protective systems in tornado shelters. *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered operation capabilities from inside the *storm shelter*.

306.4.1.4 ~~306.4.1.1~~ Door undercut. Door assemblies for use in the *storm shelter envelope* with a threshold at the level of exit discharge shall be limited to a $^{3}/_{4}$-inch (19.1 mm) maximum undercut.

306.4.2 ~~Testing of alcove~~ Alcove or baffled storm shelter entry systems. All protective elements of *alcove or baffled storm shelter entry systems* shall be tested for impact in accordance with Section 803.9.7.

306.4.3 ~~306.6~~ Penetrations of storm shelter envelope by mechanical, electrical and plumbing systems. Penetrations through the *storm shelter envelope* of mechanical, electrical and plumbing systems, including piping and utility lines, larger than $3^1/_2$ square inches (2258 mm^2) in area for rectangular penetrations or $2^1/_2$ inches (64 mm) in diameter for circular penetrations, shall be considered openings and shall be protected in accordance with Section 306.4. Penetrations of the *storm shelter envelope* shall not degrade the structural integrity of the *storm shelter* and impact resistance of the *storm shelter envelope*.

Penetrations of the *storm shelter envelope* by hazardous gas or liquid lines shall have automatic shutoffs to protect against leakage due to movement of the utility line. The threshold movements for shutoff shall be as defined by the *applicable* codes and standards governing such utility lines.

306.4.4 ~~306.5~~ Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* similar to masonry control joints, expansion joints, opening protective device shim spaces, air louver blades, grates, grilles, screens or precast panel joints shall be considered openings and shall be protected in accordance with Sections ~~306.4.1~~ 306.4.

Exceptions:

1. Masonry control joints and masonry or concrete expansion joints $^3/_8$-inch (9.5 mm) or less in width, sealed with joint material in accordance with TMS 602 for masonry or ASTM C920 for concrete.
2. Precast concrete panel joints in accordance with one of the following:
   2.1. For wall panels 6 inches (152 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) in width and sealed on each face with a Type S joint material in accordance ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.
   2.2. For roof panels 4 inches (102 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) and sealed with a Type S joint material in accordance with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.
3. Joints, gaps or voids that will not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the *protected occupant area*. Straight missile paths and elastic impacts are assumed in determining missile trajectories.

Reason: This is a reorganization. Sections under 306.4.1 are reordered from more general to specific. Joins and penetrations are also openings, so they should be under the general provisions for opening protectives.

Committee Action: Approval as Modified (Vote:8-0-0)

Modification (if any):

Further modify as follows:

306.4.3 Penetrations of storm shelter envelope by mechanical, electrical and plumbing systems. Penetrations through the *storm shelter envelope* of mechanical, electrical and plumbing systems, including piping and utility lines, larger than $3^1/_2$ square inches (2258 mm^2) in area for rectangular penetrations or $2^1/_2$ inches (64 mm) in diameter for circular penetrations, shall be considered openings and shall be protected in accordance with Section 306.4. Penetrations of the *storm shelter envelope* shall not degrade the structural integrity of the *storm shelter* and impact resistance of the *storm shelter envelope*.

701.3 Shutoffs at penetrations. ~~Penetrations of the *storm shelter envelope* by hazardous~~ Hazardous gas or liquid lines penetrating the *storm shelter envelope* shall have automatic shutoffs to protect against leakage due to movement of the utility line. The threshold movements for shutoff shall be as defined by the *applicable* codes and standards governing such utility lines.

Committee Reason: This is a reorganization. Sections under 306.4.1 are reordered from more general to specific. Joins and penetrations are also openings, so they should be under the general provisions for opening protectives.
The additional modification would place the shut off requirements in Chapter 7 since the shut offs are essential features to the safety of the shelter. It is not a protection option which is what Section 306 is about.

Report for *03-05– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further modify as follows:** **306.4.3 Penetrations of storm shelter envelope by mechanical, electrical and plumbing systems.** Penetrations through the *storm shelter envelope* of mechanical, electrical and plumbing systems, including piping and utility lines, larger than $3^1/_2$ square inches (2258 mm^2) in area for rectangular penetrations or $2^1/_2$ inches (64 mm) in diameter for circular penetrations, shall be considered openings and shall be protected in accordance with Section 306.4. Penetrations of the *storm shelter envelope* shall not degrade the structural integrity of the *storm shelter* and impact resistance of the *storm shelter envelope*. **701.3 Shutoffs at penetrations.** ~~Penetrations of the *storm shelter envelope* by hazardous~~ Hazardous gas or liquid lines penetrating the *storm shelter envelope* shall have automatic shutoffs to protect against leakage due to movement of the utility line. The threshold movements for shutoff shall be as defined by the *applicable* codes and standards governing such utility lines.		
Committee Reason: This is a reorganization. Sections under 306.4.1 are reordered from more general to specific. Joins and penetrations are also openings, so they should be under the general provisions for opening protectives. The additional modification would place the shut off requirements in Chapter 7 since the shut offs are essential features to the safety of the shelter. It is not a protection option which is what Section 306 is about.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

Report for *03-05– 23*		
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-06- 23
306.4.1, 306.4.1.3

Proponent: ICC Work Group 3

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1 Impact-protective systems. *Impact-protective systems* for use in the *storm shelter envelope* shall be listed, labeled and tested for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to *listed impact-protective systems,* such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.

Exceptions:

1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an *impact-protective system* are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an *impact-protective system* are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the *design wind pressures* are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.

306.4.1.3 Alternate Anchorage for impact-protective systems. Where anchorage of *impact-protective systems* to the *storm shelter* structure is required by means other than those provided in the manufacturer's listed system ~~listing in accordance with Section 112~~, anchorage shall be designed for pull-out and shear to resist the wind loads in accordance with Section 304.

Reason: Section 306.4.1 is to clarify the need for listed and labeled for the impact protective systems. Section 306.4.1.3 should not point back to the administrative section.

Committee Action: Approval as Modified (Vote:8-0-0)
Modification (if any):

Further modify as follows:

306.4.1 Impact-protective systems. *Impact-protective systems* for use in the *storm shelter envelope* shall be ~~listed, labeled and~~ tested*, listed* and *labeled* for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to *listed impact-protective systems,* such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.

Exceptions:

1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an *impact-protective system* are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an *impact-protective system* are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the *design wind pressures* are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.

Committee Reason: Section 306.4.1 revisions are to clarify the need for listed and labeled impact protective systems. The modification to change the order because testing supports the labeling and listing. Section 306.4.1.3 revisions are because the text shouldn't point back to administrative section.

<table>
<tr><td colspan="3">Report for 03-06– 23</td></tr>
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<tr><td colspan="3">REPORT OF HEARING:
Modification (if any):
Further modify as follows:

306.4.1 Impact-protective systems. Impact-protective systems for use in the storm shelter envelope shall be ~~listed, labeled and~~ tested<u>, listed and labeled</u> for impact in accordance with Section 803 and static and cyclic pressure in accordance with Sections 804 and 805. Any changes to listed impact-protective systems, such as a change of glazing, shall require evaluation by the listing agency or retesting of the entire assembly.
Exceptions:
1. Window assemblies and other glazed openings where the opening is protected on the exterior side by an impact-protective system are not required to be tested for impact.
2. Window assemblies and other glazed openings where the opening is protected on the interior side by an impact-protective system are not required to be tested for impact and static and cyclic pressure.
3. Nonoperable, permanently affixed shields or cowlings designed to resist the design wind pressures are not required to be tested for static and cyclic pressure in accordance with Sections 804 and 805.</td></tr>
<tr><td colspan="3">Committee Reason: Section 306.4.1 revisions are to clarify the need for listed and labeled impact protective systems. The modification to change the order because testing supports the labeling and listing. Section 306.4.1.3 revisions are because the text shouldn't point back to administrative section.</td></tr>
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Proponent:</td></tr>
<tr><td colspan="3">Desired Action:</td></tr>
<tr><td colspan="3">Modification:</td></tr>
<tr><td colspan="3">Reason:</td></tr>
<tr><td>Committee decision: AS/AM/D</td><td>Committee Vote at Meeting:</td><td>Committee Vote on Ballot:</td></tr>
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<tr><td>Committee decision: AS/AM/D</td><td>Committee Vote at Meeting:</td><td>Committee Vote on Ballot:</td></tr>
<tr><td colspan="3">FINAL ACTION:
Modification (if any):</td></tr>
<tr><td colspan="3">Committee Reason:</td></tr>
</table>

IS-STM 03-07- 23

306.4.1.1

Proponent: ICC Work Group 3

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.1 Door undercut. ~~Door~~ Side-swinging door assemblies for use in the *storm shelter envelope* with a threshold at the level of exit discharge shall be limited to a $^{3}/_{4}$-inch (19.1 mm) maximum undercut.

Reason: This is a reasonable allowance for joints and gaps when at the level of exit discharge for the shelter. Add "side swinging doors" to clarify which type of doors. DASMA rolling doors are designed to close and seal the bottom gap completely

Notes: 4-6-2023 See also 03-08-23; void at bottom of rolling/sectional door? Threshold or finished floor? Undercut or clearance? Hold for work group 3.

Notes from Work Group 3 – The work group felt that making this only side-swinging doors would result in no criteria for the bottom joint at sectional and rolling overhead doors. Recommend disapproval. See the proposed replacement to IS-STM 03-08-23.

Committee Action: Disapproval (Vote: 11-0-0)

Modification (if any):

Committee Reason: Addressed by committee action in 03-08-2023

Report for *03-07– 23*		
Committee decision: D	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Addressed by committee action in 03-08-2023		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-08-23

306.4.1.1, 306.5

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

~~**306.4.1.1 Door undercut.** Door assemblies for use in the storm shelter envelope with a threshold at the level of exit discharge shall be limited to a 3/4-inch (19.1 mm) maximum undercut.~~

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a storm shelter envelope that open ~~opens~~ into the protected occupant area similar to masonry control joints, expansion joints, opening protective device shim spaces, air louver blades, grates, grilles, screens or precast panel joints shall be considered openings and shall be protected in accordance with Section ~~Sections~~ 306.4.1.

Exceptions:

1. Masonry control joints and masonry or concrete expansion joints 3/8-inch (9.5 mm) or less in width, sealed with joint material in accordance with TMS 602 for masonry or ASTM C920 for concrete.
2. Precast concrete panel joints in accordance with one of the following:
   2.1 For wall panels 6 inches (152 mm) in thickness or greater where the joint is a maximum of 3/4 inches (19 mm) in width and sealed on each face with a Type S joint material in accordance with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.
   2.2 For roof panels 4 inches (102 mm) in thickness or greater where the joint is a maximum of 3/4 inches (19 mm) and sealed with a Type S joint material in accordance with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.
3. Joints, gaps or voids that will not allow a direct debris path through the storm shelter envelope into the protected occupant area. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the protected occupant area. Straight missile paths and elastic impacts are assumed in determining missile trajectories.
4. Door undercut 3/4-inch or less in height in door assemblies with a threshold at the level of exit discharge.
5. A joint 3/16-inch or less in width at the meeting edge of a pair of doors.

Reason:
1) Two editorial corrections are recommended where singular/plural agreement is currently incorrect.

2) Door undercut is a permitted joint in the shelter envelope and therefore is more logically located in Section 306.5. The section has been relocated from 306.4.1.1 to 306.5 Exception 4 without alteration of the original requirements except that "in the storm shelter envelope" has been removed because the scope of 306.5 is already specified as joints, gaps, and voids *in the storm shelter envelope*.

3) An exposed joint is typically found at the meeting edge of pair door assemblies, but the current language in 306.5 could be read to require that this joint be "protected" by an astragal or mullion. Astragals and mullions are not always feasible in shelter design and so this joint has been added to the list of exceptions in 306.5 to clarify its allowance and establish a maximum permitted size. The 3/16 inch maximum width is aligned with the requirements of NFPA 80 for fire doors, which requires that the clearance at the meeting edge of pair door assemblies be 1/8" +/- 1/6". This addition to 306.5 is intended to provide clarity regarding the allowance of a meeting edge joint but does not remove the meeting edge impact required by Section 803.9.4.1. This required impact evaluates the ability of the meeting edge joint to protect against debris impact.

Staff suggestion: To address three questions:
Is a threshold required?
Height of undercut above threshold? Or above the floor and the threshold is assumed to fill the undercut?
Hazard below the level of exit discharge?

4. For doors located at or below the level of exit discharge, a door undercut of 3/4-inch or less in height measured from the finished floor or top of the threshold to the bottom of the door.

Notes: 4-6-2023 hold for Work Group 3 meeting; see notes on 03-07

IS-STM 03-08-23 Replacement

306.4.1.1, 306.5

Proponent: ICC 500 Work Group 3

Replace and revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.1 Door ~~undercut~~ clearance. Floor clearance for door ~~Door~~ assemblies ~~for use~~ in the storm shelter envelope ~~with a threshold at the level of exit discharge~~ shall be ~~limited to a~~ 3/4-inch (19.1 mm) maximum, ~~undercut~~ measured from the top of the threshold or finished floor. (See example in Figure 306.4.1.1).

The joint clearance at the meeting edge of a pair of side-swinging doors in the storm shelter envelope shall be 3/16-inch (4.8 mm) maximum.

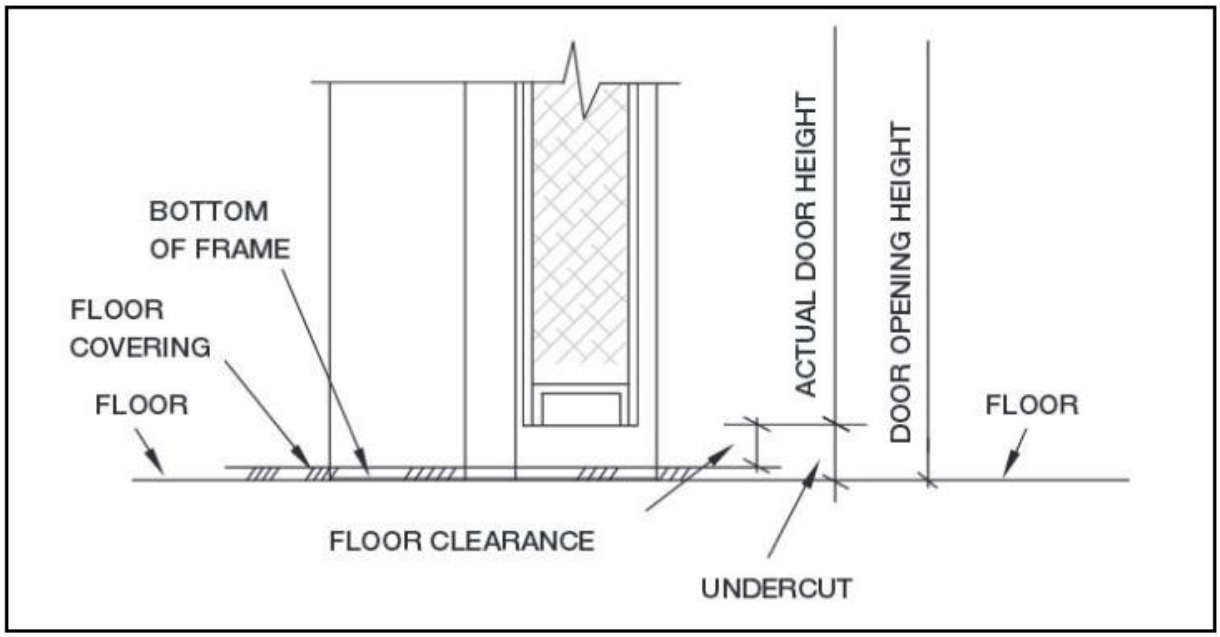

Figure 306.4.1.1
Door clearance

From NFPA 80 – need new figure similar to this, but add threshold, change verbiage to match text.

Reason: Moving this section as originally proposed would not work with the revised text in IS-STM 03-11. The main text in 306.5 does reference 306.4.1, which would include this subsection as a type of joint.

The clearances are consistent with NFPA 80 for smoke intrusion.

Additional criteria may be needed for the bottom edge of sectional or rolling doors later, but there is no guidance right now for what that should be. So this proposal is keeping this general for all doors until that is determined.

Committee Action: Approval as Modified (Vote: 7-4-0)

Modification (if any):

Replace and revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.1 Door ~~undercut~~ clearance. Floor clearance for door ~~Door~~ assemblies ~~for use~~ in the storm shelter envelope ~~with a threshold at the level of exit discharge~~ shall be ~~limited to a~~ 3/4-inch (19.1 mm) maximum, ~~undercut~~ measured from the top of the threshold or finished floor. (See example in Figure 306.4.1.1).

The joint clearance at the meeting edge of a pair of side-swinging doors in the storm shelter envelope shall be 3/16-inch (4.8 mm) maximum.

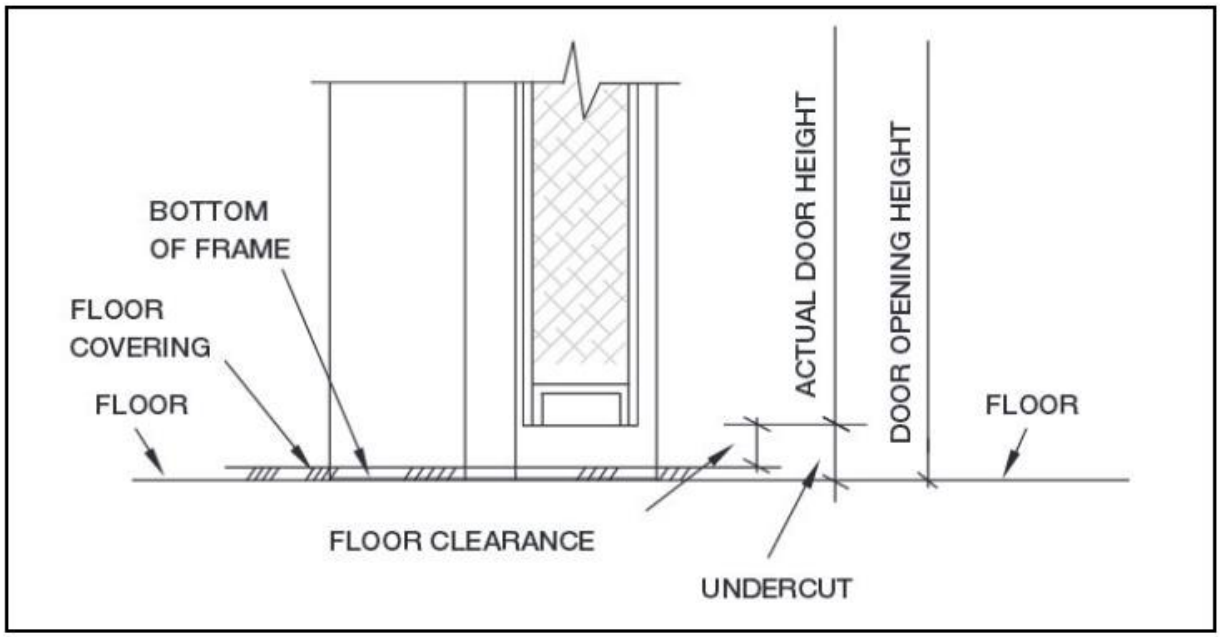

Figure 306.4.1.1
Door clearance

From NFPA 80 – need new figure similar to this, but add threshold, change verbiage to match text.

Committee Reason: This addresses floor clearance at the bottom of the door and the joint between doors. Using 'floor clearance' would allow for field verification without knowing the thickness of floor finishes or thresholds. There was concern expressed with not using the industry term 'door undercut' vs. 'floor clearance'.

Report for *03-08– 23*		
Committee decision: AM	***Committee Vote at Meeting: 7-4-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Replace and revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.1 Door ~~undercut~~ clearance. Floor clearance for door ~~Door~~ assemblies ~~for use~~ in the storm shelter envelope ~~with a threshold at the level of exit discharge~~ shall be ~~limited to a~~ 3/4-inch (19.1 mm) maximum, ~~undercut~~ measured from the top of the threshold or finished floor. (See example in Figure 306.4.1.1).

The joint clearance at the meeting edge of a pair of side-swinging doors in the storm shelter envelope shall be 3/16-inch (4.8 mm) maximum.

Report for *03-08– 23*

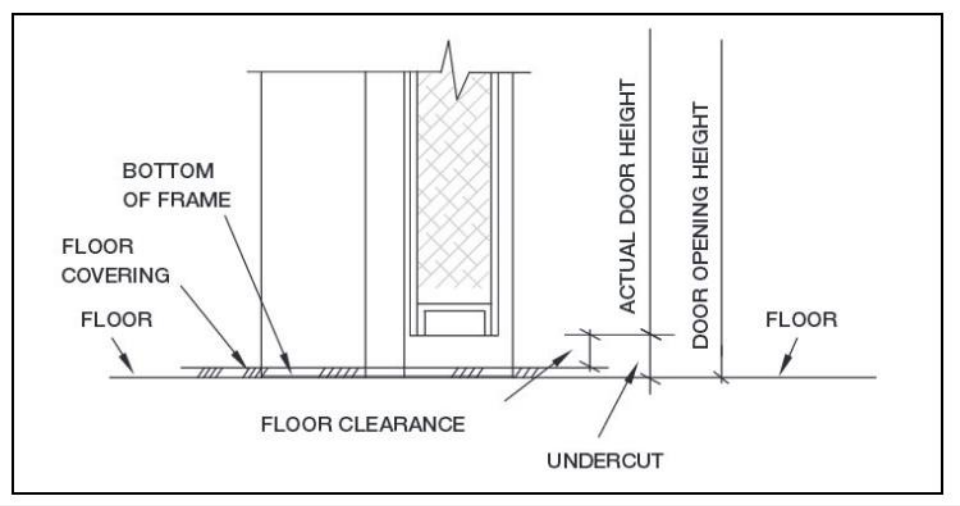

Figure 306.4.1.1
Door clearance

From NFPA 80 – need new figure similar to this, but add threshold, change verbiage to match text.

Committee Reason: This addresses floor clearance at the bottom of the door and the joint between doors. Using 'floor clearance' would allow for field verification without knowing the thickness of floor finishes or thresholds. There was concern expressed with not using the industry term 'door undercut' vs. 'floor clearance'.

PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-09-23
306.4.1.2

Proponent: Trevor Errington, representing Cornell Cookson

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.2 Impact-protective systems in tornado shelters. *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered operation capabilities from inside the *storm shelter*.

Exceptions:

1. *Impact-protective systems* not installed in a means of egress are not required to include manual, nonpowered operation capabilities to return to the undeployed position.
2. When *impact-protective systems* are installed as fire-rated assemblies, *impact-protective systems* are not required to have manual, nonpowered operation capabilities when equipped with a fail-safe device.

Reason: In storm shelters, there are openings, such as windows at an elevated height, that require impact protective systems but are not in a means of egress or readily accessible to the shelter occupants. In this scenario, it is important that the impact protective system is deployed to the safe position, but should not be required to have manual nonpowered operation to open the impact protective system as there is no need for the shelter occupants for have egress capabilities through these openings.

When an impact-protective system is used in a fire rated application, it is imperative that the fire rated assembly remain deployed to protect the shelter and its occupants from any fire hazard. Fire protectives are sometimes equipped with a fail-safe device to ensure that the opening remains protected and may preclude manual operation. NFPA 80, Standard for Fire Doors and Other Opening Protectives, can be referenced for details and requirements specific for fire rated protectives.

Staff Note: The committee may want to consider any possible conflict between Exception 2 and Chapter 6 doors. The IFC approved an exception for closers to allow for shelter staff to control the closure of the openings to allow for quick access or egress into the shelter.

FS85-21

2024 IBC

716.2.6.1 Door closing. Fire doors shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. Fire doors located in common walls separating sleeping units in Group R-1 shall be permitted without automatic- or self-closing devices.
2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
3. Fire doors required solely for compliance with ICC 500 shall not be required to be self-closing or automatic-closing.

IS-STM 03-09-23 Modification

306.4.1.2

Proponents: Dave Monsour, representing DASMA

Further revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.2 Impact-protective systems in tornado shelters. *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered operation capabilities from inside the *storm shelter*.

Exceptions:

1. *Impact-protective systems* not installed in a means of egress are not required to include manual, nonpowered operation capabilities to return to the undeployed position.
2. ~~When~~ Rolling door assemblies installed as *impact-protective systems* ~~are installed as~~ in fire-rated assemblies~~, *impact-protective systems*~~ are not required to have manual, nonpowered operation capabilities ~~when equipped with a fail-safe device~~ to return to the undeployed position.

Reason:
The exception should not be contingent on the presence of a fail-safe device. Rolling fire doors are designed to prioritize closing and blocking fire, which does not always permit manual operation post-deployment.
The term “fail-safe device” is not defined and may refer to several devices used in conjunction with rolling fire doors.

IS-STM 03-09-23 Replacement

306.4.1.2

Proponents: Work Group 3

Replace and revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.2 Impact-protective systems in tornado shelters. *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered, deployment operation capabilities from inside the *storm shelter*.

Reason:
If it is clarified that this requirement is for closing up the shelter openings for protection and is not related to opening after the storm event, the proposed exceptions are not needed. Egress opening are covered by the building code. Evacuation of shelters is addressed in Chapter 5.

Committee Action: Approval as Modified (Vote: 8-0-0)

Modification (if any):
Replace and revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.2 Impact-protective systems in tornado shelters. *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered, deployment operation capabilities from inside the *storm shelter*.

Committee Reason: This modification clarifies that this requirement is for closing up the shelter openings for protection and is not related to opening after the storm event.

Staff note: Coordination may be needed between IS-STM 03-09-23 and 05-12-23

Report for *03-09– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and revise as follows:** **SECTION 306** **STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING** **306.4.1.2 Impact-protective systems in tornado shelters.** *Impact-protective systems* in *tornado shelters* shall be permanently affixed. All operable *impact-protective systems* shall include manual, nonpowered, deployment operation capabilities from inside the *storm shelter*.		
Committee Reason: This modification clarifies that this requirement is for closing up the shelter openings for protection and is not related to opening after the storm event.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 03-10- 23

306.4.1.5(New)

Proponent: ICC 500 Work Group 3

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.5 Louvers. Louvers shall be tested in accordance with Section 803.9.6 and shall be designed or configured such that debris particles shall impact at least two surfaces before passing through the *storm shelter envelope* into the *protected occupant area*. Straight missile paths and elastic impacts are assumed in determining missile trajectories.

Reason: Louvers are a type of opening protective that was not previously addressed. Louvers are needed for natural ventilation.

IS-STM 03-10- 23 Modification

306.4.1.5(New)

Proponent: ICC 500 Work Group 3

Further revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.5 Louvers. Louvers shall be tested in accordance with Section 803.9.6 and shall be designed or configured such that debris particles shall impact at least two surfaces of the louver before passing through the *storm shelter envelope* and into the *protected occupant area*. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.

Reason:
[1] The phrase “of the louver” was added as some interpretations of previous ICC-500 resulted in two independent louvers being installed back to back to meet the debris impacting “two surfaces”, where a single louver was only considered a single “surface”. I believe the intent is for only a single louver to be required as long as the particles hit two surfaces of that one louver.
[2] The word “and” was added.
[3] In 2 places, update "missile" to "debris particle" as debris particle was used in the first part of the section, and we are not talking about a complete missile.

Committee Action: Approval as Modified (Vote:7-1-0)
Modification (if any):

Further revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.5 Louvers. Louvers shall be tested in accordance with Section 803.9.6 and shall be designed or configured such that debris particles shall impact at least two surfaces of the louver before passing through the *storm shelter envelope* and into the *protected occupant area*. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.

Committee Reason: There was concern about the use of the word 'particle'. Should there be a requirement for debris particles on a louver if we do not test for these for other openings? Should there be a size/type limitation for what a particle is? Is this straight line testing of particles (similar to rebound testing) vs. particles that follow the wind path through the louver. This proposal is addressing straight particles moving through gaps in a louver. This is design criteria – text criteria will be defined in Chapter 8. 'Missile' does not work because we define a much larger size than this is trying to address. 'Debris particle' is currently used in the text.

<table>
<tr><td colspan="3">Report for 03-10– 23</td></tr>
<tr><td>Committee decision: AM</td><td>Committee Vote at Meeting: 7-1-0</td><td>Committee Vote on Ballot:</td></tr>
<tr><td colspan="3">REPORT OF HEARING:
Modification (if any):

Further revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.4.1.5 Louvers. Louvers shall be tested in accordance with Section 803.9.6 and shall be designed or configured such that debris particles shall impact at least two surfaces of the louver before passing through the storm shelter envelope and into the protected occupant area. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.</td></tr>
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<tr><td colspan="3">PUBLIC COMMENT- FIRST DRAFT:
Proponent:</td></tr>
<tr><td colspan="3">Desired Action:</td></tr>
<tr><td colspan="3">Modification:</td></tr>
<tr><td colspan="3">Reason:</td></tr>
<tr><td>Committee decision: AS/AM/D</td><td>Committee Vote at Meeting:</td><td>Committee Vote on Ballot:</td></tr>
<tr><td colspan="3">REPORT OF HEARING – FIRST DRAFT</td></tr>
<tr><td colspan="3">Modification (if any):</td></tr>
<tr><td colspan="3">Committee Reason:</td></tr>
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<tr><td colspan="3">Desired Action:</td></tr>
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<tr><td colspan="3">FINAL ACTION:
Modification (if any):</td></tr>
<tr><td colspan="3">Committee Reason:</td></tr>
</table>

IS-STM 03-11- 23

306.5, 306.5.1(New), 306.5.2(New), 306.5.2.1(New), 306.5.2.2(New)

Proponent: ICC 300 Work Group 3

Revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* ~~similar to masonry control joints, expansion joints, opening protective device shim spaces, air louver blades, grates, grilles, screens or precast panel joints~~ shall be considered openings and shall ~~be protected in accordance with Sections 306.4.1~~ comply with the following:.

~~**Exceptions:**~~

~~1. Masonry control joints and masonry or concrete expansion joints $^3/_8$ inch (9.5 mm) or less in width, sealed with joint material in accordance with TMS 602 for masonry or ASTM C920 for concrete.~~

~~2. Precast concrete panel joints in accordance with one of the following:~~

~~2.1. For wall panels 6 inches (152 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) in width and sealed on each face with a Type S joint material in accordance ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.~~

~~2.2. For roof panels 4 inches (102 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) and sealed with a Type S joint material in accordance with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.~~

1. Joints, gaps or voids shall be protected by permanent opening protection as approved by the engineer or record and the authority having jurisdiction.

2.~~3.~~ Joints, gaps or voids shall ~~that will~~ not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the *protected occupant area*. Straight missile paths and elastic impacts are assumed in determining missile trajectories.

3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section 306.5.1.1 or 306.5.1.2.

306.5.1 Masonry control and expansion joints. Masonry control and expansion joints 3/8-inch (9.5 mm) or less in width shall be permitted where sealed with joint material in accordance with TMS 602 for masonry or ASTM C920 for concrete.

306.5.2 Precast Concrete construction joints. Precast concrete panel joints shall comply Section 306.5.2.1 or 306.5.2.2, as applicable.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) in width and sealed on each face with a Type S joint material in accordance ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

306.5.2.2 Precast concrete roof panels. For roof panels 4 inches (102 mm) in thickness or greater where the joint is a maximum of $^3/_4$ inches (19 mm) and sealed with a Type S joint material in accordance with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

Reason: This is a rearrangement of current requirements for joints, gaps and voids.

IS-STM 03-11- 23 Modification 1

306.5, 306.5.1(New), 306.5.2(New), 306.5.2.1(New), 306.5.2.2(New)

Proponent: ICC 300 Work Group 3

Further revise as follows:

SECTION 306
STORM SHELTER ENVELOPE COMPONENT DESIGN AND TESTING

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* shall be considered openings and shall comply with the following:

1. Joints, gaps or voids shall be protected by permanent opening protection as approved by the engineer ~~or~~ of record and the authority having jurisdiction.
2. Joints, gaps or voids shall not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the *protected occupant area*. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.
3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section ~~306.5.1.1~~ 306.5.1 or ~~306.5.1.2~~ 306.5.2.

306.5.1 Masonry control and expansion joints. Masonry control and expansion joints 3/8-inch (9.5 mm) or less in width shall be ~~permitted where~~ sealed with joint material ~~in accordance~~ that complies with TMS 602 for masonry or ASTM C920 for concrete.

306.5.2 Precast Concrete construction joints. Precast concrete panel joints shall comply with Section 306.5.2.1 or 306.5.2.2~~, as applicable~~.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater where the joint is ~~a maximum of~~ 3/4 inches (19 mm) or less in width, joints shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

306.5.2.2 Precast concrete roof panels. For roof panels 4 inches (102 mm) in thickness or greater where the joint is ~~a maximum of~~ 3/4 inches (19 mm) or less in width, joints shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

Reason: Editorial modifications to correct spelling and numbering errors. This also coordinates the terminology between sections and modification to IS-STM 03-10-23.
The overall proposal impro

IS-STM 03-11- 23 Modification 2

306.5, 306.5.1(New), 306.5.2(New), 306.5.2.1(New), 306.5.2.2(New)

Proponent: ICC 300 Work Group 3

Further revise as follows:

103.1 Dimensions. Dimensions stated as “maximum” or “minimum” are actual limits. ~~All~~ Dimensions that are not stated as “maximum” or “minimum” are nominal. Nominal ~~All~~ dimensions are subject to conventional industry tolerances unless otherwise noted.

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* shall be considered openings and shall comply with the following:

1. Joints, gaps or voids shall be protected by permanent opening protection as approved by the engineer ~~or~~ of record and the authority having jurisdiction.
2. Joints, gaps or voids shall not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the

protected occupant area. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.

3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section ~~306.5.1.1~~ 306.5.1 or ~~306.5.1.2~~ 306.5.2.

306.5.1 Masonry control and expansion joints. Masonry control and expansion joints shall be a maximum of ~~3/8~~ 1/2-inch (~~9.5~~ 12.7 mm) ~~or less~~ in width and shall be ~~permitted where~~ sealed with joint material ~~in accordance~~ that complies with TMS 602 for masonry or ASTM C920 for concrete.

306.5.2 Precast Concrete construction joints. Precast concrete panel joints shall comply with Section 306.5.2.1 or 306.5.2.2~~, as applicable~~.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^{3}/_{4}$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^{3}/_{4}$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

Reason: Editorial modifications to correct spelling and numbering errors. This also coordinates the terminology between sections and modification to IS-STM 03-10-23. The change to 103.1 is to emphasize that these dimensions already include industry tolerances.

Committee Action: Approval as Modified (Vote:8-0-0)

Modification (if any):

Further revise as follows:

103.1 Dimensions. Dimensions stated as “maximum” or “minimum” are actual limits. ~~All~~ Dimensions that are not stated as “maximum” or “minimum” are nominal. Nominal ~~All~~ dimensions are subject to conventional industry tolerances unless otherwise noted.

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* shall be considered openings and shall comply with the following:

1. Joints, gaps or voids shall be protected by permanent opening protection as approved by the engineer ~~or~~ of record and the authority having jurisdiction.
2. Joints, gaps or voids shall not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the *protected occupant area*. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.
3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section ~~306.5.1.1~~ 306.5.1 or ~~306.5.1.2~~ 306.5.2.

306.5.1 Masonry control and expansion joints. Masonry control and expansion joints shall be a maximum of ~~3/8~~ 1/2-inch (~~9.5~~ 12.7 mm) ~~or less~~ in width and shall be ~~permitted where~~ sealed with joint material ~~in accordance~~ that complies with TMS 602 for masonry or ASTM C920 for concrete.

306.5.2 Precast Concrete construction joints. Precast concrete panel joints shall comply with Section 306.5.2.1 or 306.5.2.2~~, as applicable~~.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^{3}/_{4}$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^{3}/_{4}$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

Committee Reason: The changes to Section 103.1 were to clarify that the dimensions shown for joints in masonry and concrete do not allow for any additional construction tolerances. The other revisions are for consistent language between the two materials.
The overall proposal improves the standard by moving the exceptions to specific requirements.

Notes 5-18-2023 – Take back to work group 3. Provide a precise measurement for maximum or nominal with a tolerance (see Section 103.1). Consider same format with 'opening' limitations.
6-5-2023 – return to committee.

Report for *03-11– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		

Report for *03-11– 23*

Further revise as follows:

103.1 Dimensions. Dimensions stated as "maximum" or "minimum" are actual limits. ~~All~~ Dimensions that are not stated as "maximum" or "minimum" are nominal. Nominal ~~All~~ dimensions are subject to conventional industry tolerances unless otherwise noted.

306.5 Joints, gaps or voids in storm shelter envelope. Joints, gaps or voids in a *storm shelter envelope* that opens into the *protected occupant area* shall be considered openings and shall comply with the following:

1. Joints, gaps or voids shall be protected by permanent opening protection as approved by the engineer ~~or~~ of record and the authority having jurisdiction.
2. Joints, gaps or voids shall not allow a direct debris path through the *storm shelter envelope* into the *protected occupant area*. Debris particles shall impact at least two surfaces meeting the impact criteria of Section 305.1 prior to arriving at the *protected occupant area*. Straight ~~missile~~ debris particle paths and elastic impacts are assumed in determining ~~missile~~ debris particle trajectories.
3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section ~~306.5.1.1~~ 306.5.1 or ~~306.5.1.2~~ 306.5.2.

306.5.1 Masonry control and expansion joints. Masonry control and expansion joints shall be a maximum of ~~3/8~~ 1/2-inch (~~9.5~~ 12.7 mm) ~~or less~~ in width and shall be ~~permitted where~~ sealed with joint material ~~in accordance~~ that complies with TMS 602 for masonry or ASTM C920 for concrete.

306.5.2 Precast Concrete construction joints. Precast concrete panel joints shall comply with Section 306.5.2.1 or 306.5.2.2~~, as applicable~~.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^3/_4$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

306.5.2.1. Precast concrete wall panels. For wall panels 6 inches (152 mm) in thickness or greater, ~~where the joint is~~ joints shall be a maximum of $^3/_4$ inches (19 mm) in width and shall be ~~and~~ sealed on each face with a Type S joint material ~~in accordance~~ that complies with ASTM C920. The panel thickness shall be measured perpendicular to the joint and at 1 inch (25 mm) or less from the joint center.

Committee Reason: The changes to Section 103.1 were to clarify that the dimensions shown for joints in masonry and concrete do not allow for any additional construction tolerances. The other revisions are for consistent language between the two materials.
The overall proposal improves the standard by moving the exceptions to specific requirements.

PUBLIC COMMENT- FIRST DRAFT:		
Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT:		
Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION:		
Modification (if any):		
Committee Reason:		

Chapter 4
SITING

No proposal to Chapter 4 at this time.

Chapter 5
OCCUPANCY, MEANS OF EGRESS, ACCESS AND ACCESSIBILITY

IS-STM 05-01-23
502

Proponent: ICC 500 Work Group 5

Revise as follows:

SECTION 502
~~OCCUPANCY~~ OCCUPANT DENSITY IN COMMUNITY STORM SHELTERS

Reason: Coordination with text in section.

Committee Action: Approval as submitted (Vote:11-0-0)
Modification (if any):
Committee Reason: This change in the title will coordination with text in section.

Report for *05-01– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This change in the title will coordination with text in section.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-02-23

502.2.1, 502.2.2, 502.3, 503.2

Proponent: ICC 500 Work Group 5

Revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.1 General. A *community storm shelter* shall comply with the requirements of Sections 502.2 through 502.4.

502.2 Design occupant capacity. The *design occupant capacity* served by the storm shelter shall be assigned or calculated in accordance with Section 502.2.1 or 502.2.2.

502.2.1 Assigned. The assigned *design occupant capacity* shall be ~~based on the *design occupant capacity* of the *storm shelter*, as~~ determined by the designer and the owner or the owner's authorized agent, and *approved* by the *authority having jurisdiction*.

502.2.2 Calculated. The calculated *design occupant capacity* shall be determined by the *usable floor area* divided by the ~~unit of area prescribed per~~ occupant density in Table 502.3.

502.3 Required usable floor area. For *community storm shelters*, the minimum required *usable floor area* shall be computed ~~at the rate of one~~ per the occupant density ~~per unit of area prescribed in~~ Table 502.3.
Each *storm shelter* shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.

TABLE 502.3
OCCUPANT DENSITY—COMMUNITY STORM SHELTERS

TYPE OF OCCUPANTS	MINIMUM REQUIRED USABLE FLOOR AREA IN SQUARE FEET PER OCCUPANT
Tornado	
Occupants who are standing or seated	5
Occupants using a wheelchair	10
Occupants who are relocated in a bed or stretcher	30
Hurricane	

Occupants who are standing or seated	20
Occupants using a wheelchair	20
Occupants who are relocated in a bed or stretcher	40

SECTION 503
OCCUPANT DENSITY IN RESIDENTIAL STORM SHELTERS

503.1 General. A *residential storm shelter* shall comply with the requirements of Sections 503.2 through 503.3.

503.2 Required usable floor area. For *residential storm shelters,* the minimum required *usable floor area* shall be computed ~~at the rate of one~~ per the occupant density ~~per unit of area prescribed~~ in Table 503.2.

TABLE 503.2
OCCUPANT DENSITY—RESIDENTIAL STORM SHELTERS

TYPE OF OCCUPANTS	MINIMUM REQUIRED USABLE FLOOR AREA IN SQUARE FEET PER OCCUPANT
Tornado	
One- and two-family dwelling	3
Other residential	5
Hurricane	
One- and two-family dwelling	7
Other residential	10

For SI: 1 square foot = 0.0929 m^2.

Reason: Should not have repetitive terms, same as definition. This is a simplification of language. Omitting unnecessary wording.

Committee Action: Approval as submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: 502.2.1 – this allows for actual occupant load for the shelter design vs. the size of the shelter. This is consistent with the change to the IBC to address the same issue. This could be further addressed in commentary. 502.3 and 503.2 - This is a simplification of language.

IS-STM 05-02-23 Reconsideration (05-03-23)

502.3, 502.3.1(New), 502.3.2(New)

Proponent: ICC 500 Work Group 5

Reconsideration IS-STM 05-02-2021 and 05-03-2021

5-30-2023 meeting: Coordination needed between IS-STM 05-02-2021 and 05-03-2021. Please see IS-STM 05-03-2021 for the reconsideration. AM 11-0-0

Report for *05-02– 23*		
Committee decision: AS/AM	***Committee Vote at Meeting: 11-0-0/11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: 502.2.1 – this allows for actual occupant load for the shelter design vs. the size of the shelter. This is consistent with the change to the IBC to address the same issue. This could be further addressed in commentary. 502.3 and 503.2 - This is a simplification of language.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-03-23

502.3, 502.3.1(New), 502.3.2(New)

Proponent: ICC 500 Work Group 5

Revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.3 ~~Required usable floor area~~ Occupant density. For *community storm shelters*, the minimum required *usable floor area* per occupant ~~shall be computed at the rate of one occupant per unit of area prescribed in~~ shall be in accordance with Table 502.3.

~~Each *storm shelter* shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.~~

502.3.1 Type of occupants. The number of occupants who are standing, seated, use a wheelchair, or are relocated in a bed or stretcher shall be determined based upon the needs of the intended shelter occupants.

502.3.2 Wheelchair spaces. Each *storm shelter* shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.

TABLE 502.3
OCCUPANT DENSITY—COMMUNITY STORM SHELTERS

TYPE OF OCCUPANTS	MINIMUM REQUIRED USABLE FLOOR AREA IN SQUARE FEET PER OCCUPANT
Tornado	
Occupants who are standing or seated	5
Occupants using a wheelchair	10
Occupants who are relocated in a bed or stretcher	30
Hurricane	
Occupants who are standing or seated	20
Occupants using a wheelchair	20
Occupants who are relocated in a bed or stretcher	40

Reason: 502.3 Occupant density. The minimum required usable floor area per occupant shall be in accordance with Table 502.3.

502.3.1 Type of occupants. The number of standing or seated occupants, wheelchair, and bedridden spaces, shall be determined based upon the needs of the intended occupants.

502.3.2 Wheelchair spaces. Each storm shelter shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.

Committee Action: Approval as modified (Vote: 11-0-0)

Modification (if any):

Further revise as follows:

502.3 Required usable floor area ~~Occupant density~~. For *community storm shelters*, the minimum required *usable floor area* per occupant shall be in accordance with Table 502.3.

Committee Reason: The modification to the title is for consistency with the residential section and the coordination between 502.3 and 502.4. This is a clarification of requirements. 502.3.1 is clarification to base the size on the use of the space tailored based on the occupants served.

IS-STM 05-03-23 Reconsideration (05-02-23)

502.3, 502.3.1(New), 502.3.2(New)

Proponent: ICC 500 Work Group 5

Reconsideration IS-STM 05-02-2021 and 05-03-2021

Coordination needed between IS-STM 05-02-2021 and 05-03-2021.

Further modify as follows:

502.3 Required usable floor area. For *community storm shelters*, the minimum required *usable floor area* per ~~the~~ occupant ~~density~~ shall be in accordance with Table 502.3.

502.3.1 Type of occupants. The number of occupants who are standing, seated, use a wheelchair, or are relocated in a bed or stretcher shall be determined based upon the needs of the intended shelter occupants.

502.3.2 Wheelchair spaces. Each *storm shelter* shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.

TABLE 502.3
OCCUPANT DENSITY—COMMUNITY STORM SHELTERS

TYPE OF OCCUPANTS	MINIMUM REQUIRED USABLE FLOOR AREA IN SQUARE FEET PER OCCUPANT
Tornado	
Occupants who are standing or seated	5

Occupants using a wheelchair	10
Occupants who are relocated in a bed or stretcher	30
Hurricane	
Occupants who are standing or seated	20
Occupants using a wheelchair	20
Occupants who are relocated in a bed or stretcher	40

503.2 Required usable floor area. For *residential storm shelters,* the minimum required *usable floor area* ~~shall be computer per the occupant density in~~ per occupant shall be in accordance with Table 503.2.

TABLE 503.2
OCCUPANT DENSITY—RESIDENTIAL STORM SHELTERS

TYPE OF OCCUPANTS	MINIMUM REQUIRED USABLE FLOOR AREA IN SQUARE FEET PER OCCUPANT
Tornado	
One- and two-family dwelling	3
Other residential	5
Hurricane	
One- and two-family dwelling	7
Other residential	10

For SI: 1 square foot = 0.0929 m^2.

Reason: Clarification and coordination. Vote: As Modified (11-0-0)

Report for *05-03– 23*		
Committee decision: AM/AM	***Committee Vote at Meeting: 11-0-0/11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further revise as follows:** **502.3 Required usable floor area ~~Occupant density~~.** For *community storm shelters*, the minimum required *usable floor area* per occupant shall be in accordance with Table 502.3. **503.2 Required usable floor area.** For *residential storm shelters,* the minimum required *usable floor area* ~~shall be computer per the occupant density in~~ per occupant shall be in accordance with Table 503.2.		
Committee Reason: The modification to the title is for consistency with the residential section and the coordination between 502.3 and 502.4. This is a clarification of requirements. 502.3.1 is clarification to base the size on the use of the space tailored based on the occupants served.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		

Report for *05-03– 23*		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-04-23
502.3

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.3 Required usable floor area. For *community storm shelters*, the minimum required *usable floor area* shall not include storm shelter *occupant support areas* and shall be computed at the rate of one occupant per unit of area prescribed in Table 502.3.
Each *storm shelter* shall be sized to accommodate a minimum of one wheelchair space for every 200 storm shelter occupants or portion thereof.

Reason: This item needs additional work, but currently only the definition bars use of support areas. We should consider moving Section 502.5 up as an exception and second paragraph regarding wheelchairs could become free-standing. subsection.

Staff Note: The definition for Usable Floor Area is:

USABLE FLOOR AREAS. The portions of the floor area within the *storm shelter envelope* not including *occupant support areas*, used to determine the *design occupant capacity of the storm shelter*.

OCCUPANT SUPPORT AREAS. Areas within the *storm shelter envelope* provided to serve the health, safety and wellbeing of occupants including, but not limited to, *storm shelter* management, food preparation, storage, electrical and mechanical rooms, toilet and other sanitation rooms and firstaid stations.

IS-STM 05-04-23 Replacement
502.4, 502.5

Proponent: Work Group 5

Replace and revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.4 Provided usable floor area. The *usable floor area* provided shall be determined by Section 502.4.1, 502.4.2 or a combination of these methods. The *usable floor area* provided shall meet or exceed required *usable floor area* determined in Section 502.3.Useable floor areas shall not include storm shelter *occupant support areas*.

Exception: In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:
1. The entire *storm shelter* is a single occupant toilet room area.

2. The *storm shelter* includes multi-stall toilet rooms, the toilet room area other than the toilet stalls and temporary water closet privacy areas.

~~**502.5 Tornado shelter usable floor area.** In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:~~
~~1. The entire *storm shelter* is a single occupant toilet room area.~~
~~2. The *storm shelter* includes multi-stall toilet rooms, the toilet room area other than the toilet stalls and temporary water closet privacy areas.~~

Reason: Putting a statement saying you cannot use occupant support areas as part of the useable floor area in 502.3 would be a conflict with 502.5. By putting this statement in 502.4 and moving the exceptions for tornado shelters in 502.5 to 502.4 all the requirements for useable floor area are together and before the calculations in 502.4.1 and 502.4.2.

Note 3-23-2023: Move to work group 5 for alternatives and further discussion

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Committee Action: Approval as Modified (Vote:8-0-0)

Modification (if any):

Further modify the replacement as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.4 Provided usable floor area. The *usable floor area* provided shall be determined by Section 502.4.1, 502.4.2 or a combination of these methods. The *usable floor area* provided shall meet or exceed required *usable floor area* determined in Section 502.3.Useable floor areas shall not include storm shelter *occupant support areas*.

Exception: In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:

1. ~~The entire *storm shelter* is a~~ A single occupant toilet room area that is the entire shelter.
2. ~~The *storm shelter* includes multi-stall~~ Multi-stall toilet rooms, ~~the toilet room area other than~~ not including the toilet stalls and temporary water closet privacy areas.

The complete modification as follows:

Replace and revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.4 Provided usable floor area. The *usable floor area* provided shall be determined by Section 502.4.1, 502.4.2 or a combination of these methods. The *usable floor area* provided shall meet or exceed required *usable floor area* determined in Section 502.3.Useable floor areas shall not include storm shelter *occupant support areas*.

Exception: In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:

1. A single occupant toilet room area that is the entire shelter.
2. Multi-stall toilet rooms, not including the toilet stalls and temporary water closet privacy areas.

~~**502.5 Tornado shelter usable floor area.** In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:~~

~~1. The entire *storm shelter* is a single occupant toilet room area.~~

~~2. The *storm shelter* includes multi-stall toilet rooms, the toilet room area other than the toilet stalls and temporary water closet privacy areas.~~

Committee Reason: The additional modification is an editorial clarification that meets the same intent. The modification simplifies the standard by moving the language for where occupant support areas can be considered useable floor areas currently in 502.5 into an exception in Section 502.4.

Report for *05-04– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and revise as follows:** **SECTION 502** **OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS** **502.4 Provided usable floor area.** The *usable floor area* provided shall be determined by Section 502.4.1, 502.4.2 or a combination of these methods. The *usable floor area* provided shall meet or exceed required *usable floor area* determined in Section 502.3.Useable floor areas shall not include storm shelter *occupant support areas*. **Exception:** In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*: 1. A single occupant toilet room area that is the entire shelter. 2. Multi-stall toilet rooms, not including the toilet stalls and temporary water closet privacy areas. ~~**502.5 Tornado shelter usable floor area.** In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:~~ ~~1. The entire *storm shelter* is a single occupant toilet room area.~~ ~~2. The *storm shelter* includes multi-stall toilet rooms, the toilet room area other than the toilet stalls and temporary water closet privacy areas.~~		
Committee Reason: The additional modification is an editorial clarification that meets the same intent. The modification simplifies the standard by moving the language for where occupant support areas can be considered useable floor areas currently in 502.5 into an exception in Section 502.4.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-05-23
502.5

Proponent: ICC Work Group 5

Revise as follows:

SECTION 502
OCCUPANCY DENSITY IN COMMUNITY STORM SHELTERS

502.5 Tornado shelter usable floor area. In *community tornado shelters,* the following *occupant support areas* shall be permitted to be considered *usable floor area*:

1. The entire *storm shelter* is a single occupant toilet room area complying with Section 702.3.3.
2. The *storm shelter* includes multi-stall toilet rooms, the toilet room area other than the toilet stalls and temporary water closet privacy areas.

Reason: Need to clarify that a privacy partition is still required in order for the single use toilet room area other than the toilet stall to be used as usable floor area.

Staff note: Technically this reference does not accomplish what is stated in the reason statement.

IS-STM 05-05-23 Replacement
702.3.3

Proponent: ICC Work Group 5

Replace and revise as follows:

SECTION 702
TORNADO SHELTERS

702.3.3 Water closet privacy. Each water closet shall occupy a separate ~~compartment~~ area within the room with compartment walls, partitions, curtains or equivalent that enclose the water closet to ensure privacy.

Reason: The proposed reference in 502.5 to this section was not clear. This modification clarifies the language for privacy in a single occupant toilet room. Privacy in a single occupant toilet room should be address further in commentary for Sections 502.5 and 702.3.3.

Note 3-23-2023: Move to work group 5 for alternatives and further discussion

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Committee Action: Approval as Modified (Vote:8-0-0)

Modification (if any):

Replace and revise as follows:

SECTION 702
TORNADO SHELTERS

702.3.3 Water closet privacy. Each water closet shall occupy a separate ~~compartment~~ area within the room with compartment walls, partitions, curtains or equivalent that enclose the water closet to ensure privacy.

Committee Reason: The proposed reference in 502.5 to this section was not clear. This modification clarifies the language for privacy in a single occupant toilet room. Privacy in a single occupant toilet room should be address further in commentary for Sections 502.5 and 702.3.3.

Report for *05-05– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and revise as follows:** **SECTION 702** **TORNADO SHELTERS** **702.3.3 Water closet privacy.** Each water closet shall occupy a separate ~~compartment~~ area within the room with compartment walls, partitions, curtains or equivalent that enclose the water closet to ensure privacy.		
Committee Reason: The proposed reference in 502.5 to this section was not clear. This modification clarifies the language for privacy in a single occupant toilet room. Privacy in a single occupant toilet room should be address further in commentary for Sections 502.5 and 702.3.3.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-06-23

504.1, 504.3, 504.4, 504.5, 505.2, 505.3, 505.3.1, 506.1, 506.3, 506.3.1, 506.5

Proponent: ICC 500 Work Group 5

Revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the access and egress requirements of Sections 504.2 through ~~504.6~~ 504.7. All community storm shelters shall be provided with a minimum of one opening that provides access and egress. Egress shall be provided by a means of egress door complying with 504.4. Where required or provided, emergency escape openings shall comply with Section 504.5, and overhead hatches shall comply with Section 504.6.*Community storm shelters* shall also comply with Section 603, as applicable.

504.2 ~~504.3~~ Accessibility. Buildings and space used as *community storm shelters* shall be accessible for persons with disabilities in accordance with the *applicable code*.

504.3 ~~504.2~~ Wall and roof openings-All access openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. The number of doors shall also comply with Section 603.

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening ~~in accordance with Section 504.5~~ or an overhead hatch ~~accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506~~.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

504.5 Emergency escape opening. ~~The emergency~~ Emergency escape ~~opening~~ openings shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency

stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

5. The emergency escape opening shall be arranged a reasonable distance apart from the means of egress door, and where practicable, located on a opposite or perpendicular wall, roof or floor of the shelter envelope so that if one becomes blocked, the others will be available.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

504.6 ~~506.5~~ Overhead hatches. Where provided, overhead hatches ~~at the tops of~~ shall be accessed by emergency stairs, ladders or alternating tread devices complying with Section 506, as applicable. The overhead hatch shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung ~~of the emergency stairs, ladders or alternating tread devices~~ on the climbing side of the emergency stairs, ladders or alternating tread devices.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Overhead Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Overhead Hatches shall be counterweighted or otherwise held in the open position when opened.
7. The overhead hatch shall be located a reasonable distance apart from the means of egress door, so that if one becomes blocked, the other will be available.

504.7 ~~504.6~~ Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access and egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

Exception: Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.

SECTION 505
ACCESS AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.1 General. A *residential storm shelter* shall comply with the access and egress requirements of Sections 505.2 through 505.4.

505.2 ~~505.3~~ Access and egress. A *residential storm shelter* shall be provided with a method of access and egress by a means of egress door, or an access and egress opening with a clear of 24 inches by 30 inches (610 mm by 762 mm) minimum ~~complying with Section 505.3.1 or an overhead hatch complying with Section 506.5.~~

~~**505.3.1 Access and egress openings.** Access and egress openings shall have a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum.~~

505.3 ~~**505.2**~~ **Wall and roof openings.** All access and egress openings~~,~~ and means of egress doors ~~and overhead hatches~~ in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

505.4 Vertical access and egress. Where provided, vertical access and egress to a *residential storm shelter* shall be by an emergency stair complying with Section 506.2, or by a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

SECTION 506
VERTICAL ACCESS AND EGRESS DEVICES

506.1 General. ~~Where stairways are required for means of egress for normal use of the space, they shall comply with the *applicable code*. An emergency stair~~ Emergency stairs shall comply with Section 506.2. ~~A ladder~~ Ladders shall comply with Section 506.3. ~~An alternating tread device~~ Alternating tread devices shall comply with Section 506.4. ~~Overhead hatches shall comply with Section 506.5. Where stairways are~~ Stairways required for means of egress for normal use of the space, they shall comply with the *applicable code*.

506.2 Emergency stairs. Emergency stairs shall comply with all of the following:

1. Treads shall have a minimum depth of 8 inches (203 mm).
2. Treads shall not be required to have a nosing.
3. Surfaces or treads shall be slip resistant.
4. The maximum height of risers shall be 9 $^{9}/_{16}$ inches (243 mm).
5. The minimum width of the emergency stairs shall be 22 inches (559 mm).
6. The angle of the emergency stair from horizontal shall be a maximum of 50 degrees (0.87 rad).

Exception: For *residential storm shelters*, which have a rise between the *storm shelter* floor level and *storm shelter entrance* level of 70 inches (1778 mm), maximum, the maximum height of risers shall be 10 inches (254 mm).

506.2.1 Headroom. The minimum headroom clearance shall be 80 inches (2032 mm), measured vertically from a line connecting the edge of the nosing.

Exceptions:

1. The minimum headroom clearance is permitted to be reduced to 60 inches (1524 mm) where signage is provided at the top and bottom of the emergency stair conspicuously warning the user of low headroom.
2. Entrances that are entered by persons seated on the entrance threshold and that are not high enough for a person to enter standing erect shall not be required to provide minimum headroom clearance provided there is no more than two risers leading into the *storm shelter*.

506.2.2 Handrails. A continuous handrail shall be located on one side of an emergency stair having more than three risers. Handrail extensions are not required.

506.3 Ladders. Ladders shall comply with the all of the following:

1. The clear width between rails shall be not less than 16 inches (406 mm).
2. Rungs shall be a minimum of $^3/_4$ inch (19 mm) in diameter.
3. Rungs or treads shall be capable of withstanding a 300 pound (136 kg) load.
4. Rungs or treads shall be spaced uniformly at not greater than 12 inches (305 mm).
5. The minimum clearance between the centerline of the rungs or treads to the nearest permanent object in back of the ladder on the toe side shall be no less than 7 inches (178 mm).
6. Ladders shall have a maximum slope of 90 degrees (1.57 rad) from horizontal and a minimum slope of 75 degrees (1.31 rad) from horizontal where measured on the toe side of the ladder.
7. Where provided, ladders providing access to an emergency escape opening or overhead hatch shall have a minimum of 15 inches (381 mm) 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 an obstruction on the climbing side of the ladder.

Exception: A minimum clearance is not required on the back side of the ladder where there is no obstruction on the climbing side of the ladder, and where ladder treads of 11 inches (279 mm) or greater in depth are molded or fabricated in a continuous series of treads and risers as detailed in Figure 506.3.

~~**506.3.1 Ladder wells.** Ladder wells where provided shall have a minimum of 15 inches (381 mm) 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 ladder well or obstruction on the climbing side of the ladder.~~

506.4 Alternating tread devices. Alternating tread devices shall comply with the applicable requirements listed in the *applicable code*.

Reason: Need reason

The purpose is some reorganization of this section for additional clarity.

Existing 504.2 – add phrase “persons with disabilities” to clearly separate accessibility from access.

Existing 505.3 and 505.3.1 – The hatch in a residential shelter should meet the same requirements regardless of location. It should not have to meet the more restrictive overhead hatch requirement.

Existing 504.5, Item 5 and 506.5, Item 7 – separation language is similar to IBC Section 1007.1.2. This will assure that both ways out will not be blocked. IBC has separation for doors, but other openings might not be able to be separated because best options would be outside rather than into the building. These are single exit shelters, so the best shelter protection would limit opening and probably locate the shelter away from most outside walls.

Existing 506.3 and 506.3.1 – Ladder wells are not defined. The criteria for adequate space to get out of the hatch is moved to from 506.3.1 to Item 506.3, Item 7.

Existing 506.1 – editorial coordination

Existing 506.5 – Relocate overhead hatch to openings. Require access by an emergency stair, ladder or alternating tread device.

IS-STM 05-06-23 Replacement – Item 1

504.1, 504.3, 504.4, 504.5, 505.2, 505.3, 505.3.1, 506.1, 506.3, 506.3.1, 506.5

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the access and egress requirements of Sections 504.2 through ~~504.6~~ 504.7. *Community storm shelters* shall also comply with Section 603, as applicable.

504.2 ~~504.3~~ Accessibility. Buildings and space used as *community storm shelters* shall be accessible for persons with disabilities in accordance with the *applicable code*.

504.3 ~~504.2~~ Wall and roof openings. All access openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. The number of doors shall also comply with Section 603.

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening ~~in accordance with Section 504.5~~ or an overhead hatch ~~accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506~~.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

504.5 Emergency escape opening. ~~The emergency~~ Emergency escape ~~opening~~ openings shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency

stair, ~~complying with Section 506.2 or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

504.6 ~~506.5~~ Overhead hatches. Where provided, overhead hatches ~~at the tops of emergency stairs, ladders or alternating tread devices~~ shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung ~~of the emergency stairs, ladders or alternating tread devices~~ on the climbing side of the emergency stairs, ladders or alternating tread devices.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Overhead Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Overhead Hatches shall be counterweighted or otherwise held in the open position when opened.
7. Vertical access to the overhead hatch shall be provided by an emergency stair, a ladder or an alternating tread device complying with Section 506.

504.7 ~~504.6~~ Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access and egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair, ~~complying with Section 506.2 or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

Exception: Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.

SECTION 505
ACCESS AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.1 General. A *residential storm shelter* shall comply with the access and egress requirements of Sections 505.2 through 505.4.

505.2 Wall and roof openings. All access and egress openings~~,~~ and means of egress doors ~~and overhead hatches~~ in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

505.3 Access and egress. A *residential storm shelter* shall be provided with a method of access and egress by a means of egress door, or an access and egress opening with a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum ~~complying with Section 505.3.1 or an overhead hatch complying with Section 506.5.~~

~~**505.3.1 Access and egress openings.** Access and egress openings shall have a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum.~~

505.4 Vertical access and egress. Where provided, vertical access and egress to a *residential storm shelter* shall be by an emergency stair ~~complying with Section 506.2~~, ~~or by~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

SECTION 506
VERTICAL ACCESS AND EGRESS

506.1 General. ~~Where stairways are~~ Stairways required for means of egress for normal use of the space, ~~they~~ shall comply with the *applicable code*. ~~An emergency stair~~ Emergency stairs shall comply with Section 506.2. ~~A ladder~~ Ladders shall comply with Section 506.3. ~~An alternating tread device~~ Alternating tread devices shall comply with Section 506.4. ~~Overhead hatches shall comply with Section 506.5.~~

506.2 Emergency stairs. Emergency stairs shall comply with all of the following:

1. Treads shall have a minimum depth of 8 inches (203 mm).
2. Treads shall not be required to have a nosing.
3. Surfaces or treads shall be slip resistant.
4. The maximum height of risers shall be 9 $^{9}/_{16}$ inches (243 mm).
5. The minimum width of the emergency stairs shall be 22 inches (559 mm).
6. The angle of the emergency stair from horizontal shall be a maximum of 50 degrees (0.87 rad).

Exception: For *residential storm shelters*, which have a rise between the *storm shelter* floor level and *storm shelter entrance* level of 70 inches (1778 mm), maximum, the maximum height of risers shall be 10 inches (254 mm).

506.2.1 Headroom. The minimum headroom clearance shall be 80 inches (2032 mm), measured vertically from a line connecting the edge of the nosing.

Exceptions:

1. The minimum headroom clearance is permitted to be reduced to 60 inches (1524 mm) where signage is provided at the top and bottom of the emergency stair conspicuously warning the user of low headroom.
2. Entrances that are entered by persons seated on the entrance threshold and that are not high enough for a person to enter standing erect shall not be required to provide minimum headroom clearance provided there is no more than two risers leading into the *storm shelter*.

506.2.2 Handrails. A continuous handrail shall be located on one side of an emergency stair having more than three risers. Handrail extensions are not required.

506.3 Ladders. Ladders shall comply with the all of the following:

1. The clear width between rails shall be not less than 16 inches (406 mm).
2. Rungs shall be a minimum of $^{3}/_{4}$ inch (19 mm) in diameter.

3. Rungs or treads shall be capable of withstanding a 300 pound (136 kg) load.
4. Rungs or treads shall be spaced uniformly at not greater than 12 inches (305 mm).
5. The minimum clearance between the centerline of the rungs or treads to the nearest permanent object in back of the ladder on the toe side shall be no less than 7 inches (178 mm).
6. Ladders shall have a maximum slope of 90 degrees (1.57 rad) from horizontal and a minimum slope of 75 degrees (1.31 rad) from horizontal where measured on the toe side of the ladder.
7. Ladders shall have a minimum of 15 inches (381 mm) 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 an obstruction on the climbing side of the ladder.

Exception: A minimum clearance is not required on the back side of the ladder where there is no obstruction on the climbing side of the ladder, and where ladder treads of 11 inches (279 mm) or greater in depth are molded or fabricated in a continuous series of treads and risers as detailed in Figure 506.3.

~~**506.3.1 Ladder wells.** Ladder wells where provided shall have a minimum of 15 inches (381 mm) 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 ladder well or obstruction on the climbing side of the ladder.~~

506.4 Alternating tread devices. Alternating tread devices shall comply with the applicable requirements listed in the *applicable code*.

Reason: The intent of this modification is to address some reorganization and coordination.
Section 504 will include all openings – so overhead hatches has been moved to 504.6.
Section 504.2 and 504.3 are switched to group opening requirements together.
504.5, 504.5, 504.7 have coordinated the references for emergency stairways, ladders and alternating tread devices.
504.5 – coordinates formatting between emergency escape opening and overhead hatches – 504.6 Item 7 is similar to 504.4 Item 4.
505.3.1 moved into 505.3.
506.3.1 moves into 506.3

IS-STM 05-06-23 Replacement – Item 2

504.1, 504.3, 504.4, 504.5, 505.2, 505.3, 505.3.1, 506.1, 506.3, 506.3.1, 506.5

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

CHAPTER 5
OCCUPANT DENSITY, ~~ACCESS~~ ENTRY, ACCESSIBILITY, EGRESS AND SIGNAGE

SECTION 501
GENERAL

501.1 Scope. The requirements of this chapter shall govern the occupant density, ~~access~~ entry, accessibility, egress and signage for *storm shelters*.

SECTION 504
~~ACCESS~~ ENTRY AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 504.2 through 504.6. *Community storm shelters* shall also comply with Section 603, as applicable.

504.2 Wall and roof openings. All ~~access~~ entry openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

504.3 Accessibility. Buildings and space used as *community storm shelters* shall be accessible in accordance with the *applicable code*.

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. The number of doors shall also comply with Section 603.

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening in accordance with Section 504.5 or an overhead hatch accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

504.5 Emergency escape opening. The emergency escape opening shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

504.6 Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access ~~and~~ for emergency egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

Exception: Provide an emergency escape opening or overhead hatch to allow for emergency vertical access ~~and~~ for emergency egress to the roof.

SECTION 505
~~ACCESS~~ ENTRY AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.1 General. A *residential storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 505.2 through 505.4.

505.2 Wall and roof openings. All ~~access~~ entry and egress openings, means of egress doors and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

505.3 ~~Access~~ Entry and egress. A *residential storm shelter* shall be provided with a method of ~~access~~ entry and egress by a means of egress door, an ~~access~~ entry and egress opening complying with Section 505.3.1 or an overhead hatch complying with Section 506.5.

505.3.1 ~~Access~~ Entry and egress openings. ~~Access~~ Entry and egress openings shall have a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum.

505.4 Vertical access ~~and egress~~. Where provided, vertical access ~~and egress~~ to a entry and egress opening in a *residential storm shelter* shall be by an emergency stair complying with Section 506.2, or by a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

SECTION 506
VERTICAL ACCESS AND EGRESS

506.1 General. Where stairways are required for means of egress for normal use of the space, they shall comply with the *applicable code*. Vertical access for emergency egress shall be provide by An emergency stair ~~shall comply~~ complying with Section 506.2~~.~~; A ladder ~~shall comply~~ complying with Section 506.3~~.~~or An alternating tread device shall ~~shall comply~~ complying Section 506.4. ~~Overhead hatches shall comply with Section 506.5.~~

506.2 Emergency stairs. Emergency stairs shall comply with all of the following:

1. Treads shall have a minimum depth of 8 inches (203 mm).

2. Treads shall not be required to have a nosing.
3. Surfaces or treads shall be slip resistant.
4. The maximum height of risers shall be 9 $^{9}/_{16}$ inches (243 mm).
5. The minimum width of the emergency stairs shall be 22 inches (559 mm).
6. The angle of the emergency stair from horizontal shall be a maximum of 50 degrees (0.87 rad).

Exception: For *residential storm shelters*, which have a rise between the *storm shelter* floor level and *storm shelter entrance* level of 70 inches (1778 mm), maximum, the maximum height of risers shall be 10 inches (254 mm).

506.2.1 Headroom. The minimum headroom clearance shall be 80 inches (2032 mm), measured vertically from a line connecting the edge of the nosing.

Exceptions:

1. The minimum headroom clearance is permitted to be reduced to 60 inches (1524 mm) where signage is provided at the top and bottom of the emergency stair conspicuously warning the user of low headroom.
2. Entrances that are entered by persons seated on the entrance threshold and that are not high enough for a person to enter standing erect shall not be required to provide minimum headroom clearance provided there is no more than two risers leading into the *storm shelter*.

506.2.2 Handrails. A continuous handrail shall be located on one side of an emergency stair having more than three risers. Handrail extensions are not required.

506.3 Ladders. Ladders shall comply with the all of the following:

1. The clear width between rails shall be not less than 16 inches (406 mm).
2. Rungs shall be a minimum of $^{3}/_{4}$ inch (19 mm) in diameter.
3. Rungs or treads shall be capable of withstanding a 300 pound (136 kg) load.
4. Rungs or treads shall be spaced uniformly at not greater than 12 inches (305 mm).
5. The minimum clearance between the centerline of the rungs or treads to the nearest permanent object in back of the ladder on the toe side shall be no less than 7 inches (178 mm).
6. Ladders shall have a maximum slope of 90 degrees (1.57 rad) from horizontal and a minimum slope of 75 degrees (1.31 rad) from horizontal where measured on the toe side of the ladder.

Exception: A minimum clearance is not required on the back side of the ladder where there is no obstruction on the climbing side of the ladder, and where ladder treads of 11 inches (279 mm) or greater in depth are molded or fabricated in a continuous series of treads and risers as detailed in Figure 506.3.

506.3.1 Ladder wells. Ladder wells where provided shall have a minimum of 15 inches (381 mm) 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 ladder well or obstruction on the climbing side of the ladder.

506.4 Alternating tread devices. Alternating tread devices shall comply with the applicable requirements listed in the *applicable code*.

506.5 Overhead hatches. Where provided, overhead hatches ~~at the tops of emergency stairs, ladders or alternating tread devices~~ shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung ~~of the emergency stairs, ladders or alternating tread devices~~ on the climbing side-of the emergency stairs, ladders or alternating tread devices.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Overhead Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Overhead Hatches shall be counterweighted or otherwise held in the open position when opened.
7. Vertical access to the overhead hatch shall be provided by an emergency stair, a ladder or an alternating tread device complying with Section 506.

SECTION 508
SIGNAGE

508.6 Entry signage. Signage indicating “Tornado Shelter,” or “Hurricane Shelter,” and appropriate symbols as applicable, shall be installed on the outside of the *storm shelter*, adjacent to every ~~access~~ entry opening intended to provide entry for occupants into the *storm shelter*.

508.7 Perimeter signage. Signs shall be installed inside of the *storm shelter* adjacent to every ~~access~~ entry or egress opening, which access nonprotected areas located outside of the *storm shelter*. For example, signage indicating “Notice: Now leaving the Tornado Shelter,” or “Notice: Now leaving the Hurricane Shelter.”

Appendix

A104.4.1 Storm shelter floor plans. A storm shelter floor plan shall be provided. The plan shall indicate the following:

1. ~~Access~~ Entry and means of egress doors.
2. Emergency escape openings, where provided.
3. *Impact-protective systems* that need to be secured in place.
4. Layout and function of *occupant support areas*.
5. Mechanical vents or mechanical ventilation systems that need to be activated, where provided.
6. Water closet and lavatory locations, including locations for set up of temporary water closets and lavatories, where provided.
7. Standby power supply, where provided.
8. Storage of required supplies such as first aid kits and flashlights.

9. Location of fire extinguishers.

Reason: The intent of this proposal is for coordination with ICC 500 terminology for entry/access throughout the standard and terminology in the I-codes. This should improve understanding of the intent.

In the I-codes, because of confusion between accessibility for persons with physical limitations and for access/accessibility to mechanical equipment, shut offs and inspection requirements, the codes have all adopted the following definitions:

[BE] ACCESSIBLE. A site, *building*, *facility* or portion thereof that complies with Chapter 11.

[M] ACCESS (TO). That which enables a fixture, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel,

[M] READY ACCESS. That which enables a fixture, appliance or equipment to be directly reached without requiring the removal or movement of any panel, door or similar obstruction and without the use of a portable ladder, step stool or similar device. Door or similar obstruction (see "*Ready access*").

These definitions coming from the codes may cause confusion within 'access' in Section 504. 505 and 506.
The ICC 500 already has requirements for entry signage and entrances. Entry system is used in 803.9.7. Entrance is used in 303.4, 305.2.2, 403.1, 506.2, 506.2.1, A104.4.3, A104.4.4 and A105.3.
In community shelters, emergency escape openings and roof hatches are not ways occupant enter/access the shelter.
However, emergency escape openings and emergency stairs already imply 'emergency egress'.
Stairways, ladders and alternating tread devices provide 'vertical access' to openings.
The change to 506.5 is the same as in Item 1.

IS-STM 05-06-23 Replacement – Item 3

504.1, 504.2, 504.4, 505.2

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the access and egress requirements of Sections 504.2 through 504.6. ~~*Community storm shelters* shall also comply with Section 603, as applicable.~~

504.2 ~~Wall and roof~~ Entry and egress openings. All ~~access~~ entry and egress openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4. Such openings shall also comply with the requirements in Section 402.6.1 and 603, as applicable.

504.3 Accessibility. Buildings and space used as *community storm shelters* shall be accessible in accordance with the *applicable code*.

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. ~~The number of doors shall also comply with Section 603.~~

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening in accordance with Section 504.5 or an overhead hatch accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

SECTION 505
ACCESS AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.2 Wall and roof openings. All access and egress openings, means of egress doors and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

Reason: For community shelters, there are requirements for placement and protection for openings in 306.4, 402.6.1 and 603. While 504.2 is a pointer, it brings the requirements together in one place. Residential shelters do not have egress requirements in the flood or fire resistance requirements.

IS-STM 05-06-23 Replacement – Item 4

504.1, 504.2, 504.4, 505.2

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.5 Emergency escape opening. The emergency escape opening shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.
5. To decrease the probability of both the emergency escape opening and the egress door being blocked by debris comply with the following:
   - 5.1. Where practicable, the emergency escape opening shall be located on an opposite wall, ~~or~~ perpendicular wall, roof, or floor of the shelter envelope from the means of egress door.
   - 5.2 The emergency escape opening shall be separated from the means of egress door by a distance not less ~~the~~ than 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

506.5 Overhead hatches. Where provided, hatches at the tops of emergency stairs, ladders or alternating tread devices shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung of the emergency stairs, ladders or alternating tread devices on the climbing side.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Hatches shall be counterweighted or otherwise held in the open position when opened.
7. To decrease the probability of both the overhead hatch and the egress door being blocked by debris comply with the following:
   - 7.1. Where practicable, the overhead hatch shall be located on an opposite wall, ~~or~~ perpendicular wall, ~~or~~ roof, or floor of the shelter envelope from the means of egress door.

7.2 The overhead hatch shall be separated from the means of egress door by a distance not less ~~the~~ than 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

Reason: This modification is a replacement for the last item proposed for Section 504.5 and 506.5 in the original proposal. The intent is to address concerns that both ways our of the shelter may be blocked.
The text in the initial proposal matches the performance language in the IBC for the third exit. This modification provides more precise measurement requirements.

IS-STM 05-06-23 Replacement – Item 5

504.5.1

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.5.1 Area Wells. Where provided, area~~s~~ wells at emergency escape openings shall comply with the International Building Code, Section 1031.5.

Reason: This addresses a missing piece for evacuation for where opening are below grade. The reference to the IBC will avoid conflicts over time for area wells. The specific reference is to not allow for the argument than EERO requirements in IBC are not the same as EEO in ICC 500. Commentary should emphasize that doors that are required for means of egress, they have to have stairways; and the door can be an EEO under the ICC 500.

2024 IBC Text –

1031.5 **Area wells.** An *emergency escape and rescue opening* with the bottom of the clear opening below the adjacent grade shall be provided with an area well in accordance with Sections 1031.5.1 through 1031.5.3.

1031.5.1 **Minimum size.** The minimum horizontal area of the area well shall be 9 square feet (0.84 m^2), with a horizontal projection and width of not less than 36 inches (914 mm). The area well shall allow the *emergency escape and rescue opening* to be fully opened.

Exception: The ladder or steps required by Section 1031.5.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.

1031.5.2 **Ladders or steps.** Area wells with a vertical depth of more than 44 inches (1118 mm) shall be equipped with an *approved* permanently affixed ladder or steps. The ladder or steps shall not be obstructed by the *emergency*

escape and rescue opening when the window or door is in the open position. Ladders or steps required by this section shall not be required to comply with Section 1011.

1031.5.2.1 Ladders. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center (o.c.) vertically for the full height of the area well.

1031.5.2.2 Steps. Steps shall have an inside width of not less than 12 inches (305 mm), shall have treads greater than 5 inches (127 mm) in depth and a riser height not greater than 18 inches (457 mm) for the full height of the area well.

1031.5.3 Drainage. Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section 1805.

Exception: A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, in accordance with Section 1803.5.1.

1031.6 **Bars, grilles, covers and screens.** Where bars, grilles, covers, screens or similar devices are placed over *emergency escape and rescue openings* or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 and 1031.5. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the *emergency escape and rescue opening*.

Committee Action: Approval/Approval as Modified/Disapproval

Vote:

Item 1 – AM 10-0-0
Item 2 - AM 10-0-0
Item 3 – AM 10-0-0
Item 4 – AM 9-0-0
Item 5 – AM 10-0-0

Modification (if any):

IS-STM 05-01-23 AS

CHAPTER 5
~~OCCUPANCY~~ OCCUPANT DENSITY, ~~ACCESS~~ ENTRY, ACCESSIBILITY, EGRESS AND SIGNAGE

SECTION 501
GENERAL

501.1 Scope. The requirements of this chapter shall govern the occupant density, ~~access~~ entry, accessibility, egress and signage for *storm shelters*.

SECTION 504
~~ACCESS~~ ENTRY AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 504.2 through ~~504.6~~ 504.7. ~~*Community storm shelters* shall also comply with Section 603, as applicable.~~

~~504.2~~ 504.2 ~~504.3~~ Accessibility. Buildings and space used as *community storm shelters* shall be accessible for persons with disabilities in accordance with the *applicable code*.

~~504.3~~ 504.3 ~~504.2 Wall and roof~~ Entry and egress openings. All ~~access~~ entry and egress openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4. Such openings shall also comply with the requirements in Section 402.6.1 and 603, as applicable.

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. ~~The number of doors shall also comply with Section 603.~~

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening ~~in accordance with Section 504.5 or~~ an overhead hatch ~~accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506~~.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

504.5 Emergency escape opening. ~~The emergency~~ Emergency escape ~~opening~~ openings shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency stair, ~~complying with Section 506.2 or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.
5. To decrease the probability of both the emergency escape opening and the egress door being blocked by debris comply with the following:
   - 5.1. Where practicable, the emergency escape opening shall be located on an opposite wall, perpendicular wall, roof, or floor of the shelter envelope from the means of egress door.
   - 5.2 The emergency escape opening shall be separated from the means of egress door by a distance not less than 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

504.5.1 Area Wells. Where provided, area wells at emergency escape openings shall comply with the International Building Code, Section 1031.5.

504.6 ~~**506.5**~~ **Overhead hatches.** Where provided, overhead hatches ~~at the tops of emergency stairs, ladders or alternating tread devices~~ shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung ~~of the emergency stairs, ladders or alternating tread devices~~ on the climbing side of the emergency stairs, ladders or alternating tread devices.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Overhead Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Overhead Hatches shall be counterweighted or otherwise held in the open position when opened.
7. Vertical access to the overhead hatch shall be provided by an emergency stair, a ladder or an alternating tread device complying with Section 506.
8. To decrease the probability of both the overhead hatch and the egress door being blocked by debris comply with the following:
   - 8.1. Where practicable, the overhead hatch shall be located on an opposite wall, perpendicular wall, roof, or floor of the shelter envelope from the means of egress door.
   - 8.2 The overhead hatch shall be separated from the means of egress door by a distance not less than 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

504.7 ~~**504.6**~~ **Multistory shelter.** *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access ~~and~~ for emergency egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair, ~~complying with Section 506.2~~ ~~or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

Exception: Provide an emergency escape opening or overhead hatch to allow for emergency vertical access ~~and~~ for emergency egress to the roof.

SECTION 505
~~ACCESS~~ ENTRY AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.1 General. A *residential storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 505.2 through 505.4.

505.2 Wall and roof openings. All ~~access~~ entry and egress openings~~,~~ and means of egress doors ~~and overhead hatches~~ in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

505.3 ~~Access~~ Entry and egress. A *residential storm shelter* shall be provided with a method of ~~access~~ entry and egress by a means of egress door, or an ~~access~~ entry and egress opening with a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum ~~complying with Section 505.3.1 or an overhead hatch complying with Section 506.5.~~

~~**505.3.1 Access and egress openings.** Access and egress openings shall have a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum.~~

505.4 Vertical access ~~and egress~~. Where provided, vertical access ~~and egress~~ to a entry and egress opening in a *residential storm shelter* shall be by an emergency stair ~~complying with Section 506.2~~, ~~or by~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

SECTION 506
VERTICAL ACCESS AND EGRESS

506.1 General. ~~Where stairways are~~ Stairways required for means of egress for normal use of the space, ~~they~~ shall comply with the *applicable code*. Vertical access for emergency egress shall be provide by an ~~An~~ emergency stair ~~shall comply~~ complying with Section 506.2~~.~~; ~~A~~ a ladder ~~shall comply~~ complying with Section 506.3~~.~~or ~~An~~ an alternating tread device shall ~~shall comply~~ complying Section 506.4. ~~Overhead hatches shall comply with Section 506.5.~~

506.2 Emergency stairs. Emergency stairs shall comply with all of the following:

1. Treads shall have a minimum depth of 8 inches (203 mm).
2. Treads shall not be required to have a nosing.
3. Surfaces or treads shall be slip resistant.
4. The maximum height of risers shall be 9 $^{9}/_{16}$ inches (243 mm).
5. The minimum width of the emergency stairs shall be 22 inches (559 mm).
6. The angle of the emergency stair from horizontal shall be a maximum of 50 degrees (0.87 rad).

Exception: For *residential storm shelters*, which have a rise between the *storm shelter* floor level and *storm shelter entrance* level of 70 inches (1778 mm), maximum, the maximum height of risers shall be 10 inches (254 mm).

506.2.1 Headroom. The minimum headroom clearance shall be 80 inches (2032 mm), measured vertically from a line connecting the edge of the nosing.

Exceptions:

1. The minimum headroom clearance is permitted to be reduced to 60 inches (1524 mm) where signage is provided at the top and bottom of the emergency stair conspicuously warning the user of low headroom.
2. Entrances that are entered by persons seated on the entrance threshold and that are not high enough for a person to enter standing erect shall not be required to provide minimum headroom clearance provided there is no more than two risers leading into the *storm shelter*.

506.2.2 Handrails. A continuous handrail shall be located on one side of an emergency stair having more than three risers. Handrail extensions are not required.

506.3 Ladders. Ladders shall comply with the all of the following:

1. The clear width between rails shall be not less than 16 inches (406 mm).
2. Rungs shall be a minimum of $^{3}/_{4}$ inch (19 mm) in diameter.
3. Rungs or treads shall be capable of withstanding a 300 pound (136 kg) load.
4. Rungs or treads shall be spaced uniformly at not greater than 12 inches (305 mm).
5. The minimum clearance between the centerline of the rungs or treads to the nearest permanent object in back of the ladder on the toe side shall be no less than 7 inches (178 mm).
6. Ladders shall have a maximum slope of 90 degrees (1.57 rad) from horizontal and a minimum slope of 75 degrees (1.31 rad) from horizontal where measured on the toe side of the ladder.
7. Ladders shall have a minimum of 15 inches (381 mm) 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 an obstruction on the climbing side of the ladder.

Exception: A minimum clearance is not required on the back side of the ladder where there is no obstruction on the climbing side of the ladder, and where ladder treads of 11 inches (279 mm) or greater in depth are molded or fabricated in a continuous series of treads and risers as detailed in Figure 506.3.

~~**506.3.1 Ladder wells.** Ladder wells where provided shall have a minimum of 15 inches (381 mm) 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 ladder well or obstruction on the climbing side of the ladder.~~

506.4 Alternating tread devices. Alternating tread devices shall comply with the applicable requirements listed in the *applicable code*.

SECTION 508
SIGNAGE

IS-STM 05-18-23 AS

508.6 Entry signage. Signage indicating “Tornado Shelter,” ~~or~~ “Hurricane Shelter,” or “Hurricane and Tornado Shelter”, and appropriate symbols as applicable, shall be installed on the outside of the *storm shelter*, adjacent to every ~~access~~ entry opening intended to provide entry for occupants into the *storm shelter*.

508.7 Perimeter signage. Signs shall be installed inside of the *storm shelter* adjacent to every ~~access~~ entry or egress opening, which access nonprotected areas located outside of the *storm shelter*. For example, signage indicating "Notice: Now leaving the Tornado Shelter," or "Notice: Now leaving the Hurricane Shelter."

Appendix

A104.4.1 Storm shelter floor plans. A storm shelter floor plan shall be provided. The plan shall indicate the following:

1. ~~Access~~ Entry and means of egress doors.
2. Emergency escape openings, where provided.
3. *Impact-protective systems* that need to be secured in place.
4. Layout and function of *occupant support areas*.
5. Mechanical vents or mechanical ventilation systems that need to be activated, where provided.
6. Water closet and lavatory locations, including locations for set up of temporary water closets and lavatories, where provided.
7. Standby power supply, where provided.
8. Storage of required supplies such as first aid kits and flashlights.
9. Location of fire extinguishers.

Committee Reason:
Item 1: The committee agreed with the intent of the reorganization and simplification of the requirements.
Item 2: The change from 'access' to 'entry' coordinates terminology within the standard and provides clarification.
Item 3: The modification brought relevant pointers for entry and egress openings together in one section.
Item 4: The intent of the proposal is to separate the emergency escape opening and roof hatches the same as egress doors. The building code has requirements for separation of the egress doors, so this would put in the same requirements for emergency escape openings and overhead hatches. There were some concerns about the implementation of the 1/3 separation depending on the occupancy above (e.g. basement shelter for an apartment building).
Item 5: This provides criteria for emergency escape and rescue opening located below grade to have sufficient space for emergency evacuation.

Report for *05-06– 23*

Committee decision: AM	*Committee Vote at Meeting: 10-0-0*	*Committee Vote on Ballot:*

REPORT OF HEARING:
Modification (if any):
IS-STM 05-01-23 AS

CHAPTER 5
~~OCCUPANCY~~ OCCUPANT DENSITY, ~~ACCESS~~ ENTRY, ACCESSIBILITY, EGRESS AND SIGNAGE

SECTION 501
GENERAL

501.1 Scope. The requirements of this chapter shall govern the occupant density, ~~access~~ entry, accessibility, egress and signage for *storm shelters*.

SECTION 504
~~ACCESS~~ ENTRY AND EGRESS IN COMMUNITY STORM SHELTERS

504.1 General. A *community storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 504.2 through ~~504.6~~ 504.7. ~~*Community storm shelters* shall also comply with Section 603, as applicable.~~

~~504.2~~ 504.2 ~~504.3~~ Accessibility. Buildings and space used as *community storm shelters* shall be accessible for persons with disabilities in accordance with the *applicable code*.

Report for *05-06– 23*

504.3 ~~504.2 Wall and roof~~ Entry and egress openings. All ~~access~~ entry and egress openings, means of egress doors, emergency escape openings and overhead hatches in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4. Such openings shall also comply with the requirements in Section 402.6.1 and 603, as applicable.

504.4 Egress doors. The means of egress doors in the *storm shelter envelope* shall be determined based upon the occupant load for the normal occupancy of the space in accordance with the *applicable code*. ~~The number of doors shall also comply with Section 603.~~

Where the *applicable code* requires only one means of egress door from the *storm shelter*, the storm shelter shall also provide an emergency escape opening ~~in accordance with Section 504.5 or~~ an overhead hatch ~~accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506~~.

Exception: Storm shelters having a *design occupant capacity* not exceeding 16 are not required to provide an emergency escape opening or an overhead hatch.

504.5 Emergency escape opening. ~~The emergency~~ Emergency escape ~~opening~~ openings shall be an additional door or an opening that complies with the following:

1. Has a minimum net clear opening of 5.7 square feet (0.530 m^2).
2. Has a minimum net clear opening height of 24 inches (610 mm) and a minimum net clear opening width of 20 inches (508 mm).
3. Shall be operable from the inside without the use of tools or special knowledge.
4. Where the bottom of the clear opening is located more than 44 inches (1118 mm) above the floor, vertical access to the opening shall be provided by an emergency stair, ~~complying with Section 506.2 or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

5. To decrease the probability of both the emergency escape opening and the egress door being blocked by debris comply with the following:
   - 5.1. Where practicable, the emergency escape opening shall be located on an opposite or perpendicular wall, roof, or floor of the shelter envelope from the means of egress door.
   - 5.2 The emergency escape opening shall be separated from the means of egress door by a distance not less the 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

Exception: The minimum net clear opening shall be permitted to be 5 square feet (0.46 m^2) where the bottom of the emergency escape opening is not more than 44 inches (1118 mm) above or below finished grade.

504.5.1 Area Wells. Where provided, areas wells at emergency escape openings shall comply with the International Building Code, Section 1031.5.

504.6 ~~506.5~~ Overhead hatches. Where provided, overhead hatches ~~at the tops of emergency stairs, ladders or alternating tread devices~~ shall comply with the following:

1. A minimum clear dimension of 24 inches by 30 inches (610 mm by 762 mm).
2. A clear opening of 24 inches (610 mm) minimum from the face of the top tread or rung ~~of the emergency stairs, ladders or alternating tread devices~~ on the climbing side ~~of the emergency stairs, ladders or alternating tread devices~~.
3. A minimum of 15 inches (372 mm) on either side of the centerline of the top tread or rungs.
4. Where the access opening is located on a vertical surface in accordance with Section 305.2, the height of the opening shall be 30 inches (762 mm) minimum.
5. Overhead Hatches shall open a minimum of 60 degrees (1.04 rad) from the closed position.
6. Overhead Hatches shall be counterweighted or otherwise held in the open position when opened.
7. Vertical access to the overhead hatch shall be provided by an emergency stair, a ladder or an alternating tread device complying with Section 506.
8. To decrease the probability of both the overhead hatch and the egress door being blocked by debris comply with the following:
   - 8.1. Where practicable, the overhead hatch shall be located on an opposite or perpendicular wall, or roof, or floor of the shelter envelope from the means of egress door.
   - 8.2 The overhead hatch shall be separated from the means of egress door by a distance not less the 1/3 of the overall diagonal dimension of the storm shelter. The distance shall be measured horizontally in a straight line between any point along the openings.

504.7 ~~504.6~~ Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access ~~and~~ for emergency egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair, ~~complying with Section 506.2 or~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

Exception: Provide an emergency escape opening or overhead hatch to allow for emergency vertical access ~~and~~ for emergency egress to the roof.

SECTION 505
~~ACCESS~~ ENTRY AND EGRESS IN RESIDENTIAL STORM SHELTERS

505.1 General. A *residential storm shelter* shall comply with the ~~access~~ entry and egress requirements of Sections 505.2 through 505.4.

505.2 Wall and roof openings. All ~~access~~ entry and egress openings~~,~~ and means of egress doors ~~and overhead hatches~~ in the *storm shelter envelope* shall be considered openings and shall be protected in accordance with Section 306.4.

505.3 ~~Access~~ Entry and egress. A *residential storm shelter* shall be provided with a method of ~~access~~ entry and egress by a means of egress door, or an ~~access~~ entry and egress opening with a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum ~~complying with Section 505.3.1 or an overhead hatch complying with Section 506.5.~~

~~**505.3.1 Access and egress openings.** Access and egress openings shall have a clear opening of 24 inches by 30 inches (610 mm by 762 mm) minimum.~~

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505.4 Vertical access ~~and egress~~. Where provided, vertical access ~~and egress~~ to a entry and egress opening in a *residential storm shelter* shall be by an emergency stair ~~complying with Section 506.2~~, ~~or by~~ a ladder ~~complying with Section 506.3,~~ or an alternating tread device complying with Section ~~506.4~~ 506.

SECTION 506
VERTICAL ACCESS AND EGRESS

506.1 General. ~~Where~~ ~~stairways~~ ~~are~~ Stairways required for means of egress for normal use of the space, ~~they~~ shall comply with the *applicable code*. Vertical access for emergency egress shall be provide by an ~~An~~ emergency stair ~~shall comply~~ complying with Section 506.2~~.~~, ~~A~~ a ladder ~~shall comply~~ complying with Section 506.3~~.~~or ~~An~~ an alternating tread device shall ~~shall comply~~ complying Section 506.4. ~~Overhead hatches shall comply with Section 506.5.~~

506.2 Emergency stairs. Emergency stairs shall comply with all of the following:

1. Treads shall have a minimum depth of 8 inches (203 mm).
2. Treads shall not be required to have a nosing.
3. Surfaces or treads shall be slip resistant.
4. The maximum height of risers shall be $9\ ^{9}/_{16}$ inches (243 mm).
5. The minimum width of the emergency stairs shall be 22 inches (559 mm).
6. The angle of the emergency stair from horizontal shall be a maximum of 50 degrees (0.87 rad).

Exception: For *residential storm shelters*, which have a rise between the *storm shelter* floor level and *storm shelter entrance* level of 70 inches (1778 mm), maximum, the maximum height of risers shall be 10 inches (254 mm).

506.2.1 Headroom. The minimum headroom clearance shall be 80 inches (2032 mm), measured vertically from a line connecting the edge of the nosing.

Exceptions:

1. The minimum headroom clearance is permitted to be reduced to 60 inches (1524 mm) where signage is provided at the top and bottom of the emergency stair conspicuously warning the user of low headroom.
2. Entrances that are entered by persons seated on the entrance threshold and that are not high enough for a person to enter standing erect shall not be required to provide minimum headroom clearance provided there is no more than two risers leading into the *storm shelter*.

506.2.2 Handrails. A continuous handrail shall be located on one side of an emergency stair having more than three risers. Handrail extensions are not required.

506.3 Ladders. Ladders shall comply with the all of the following:

1. The clear width between rails shall be not less than 16 inches (406 mm).
2. Rungs shall be a minimum of $^{3}/_{4}$ inch (19 mm) in diameter.
3. Rungs or treads shall be capable of withstanding a 300 pound (136 kg) load.
4. Rungs or treads shall be spaced uniformly at not greater than 12 inches (305 mm).
5. The minimum clearance between the centerline of the rungs or treads to the nearest permanent object in back of the ladder on the toe side shall be no less than 7 inches (178 mm).
6. Ladders shall have a maximum slope of 90 degrees (1.57 rad) from horizontal and a minimum slope of 75 degrees (1.31 rad) from horizontal where measured on the toe side of the ladder.
7. Ladders shall have a minimum of 15 inches (381 mm) 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 an obstruction on the climbing side of the ladder.

Exception: A minimum clearance is not required on the back side of the ladder where there is no obstruction on the climbing side of the ladder, and where ladder treads of 11 inches (279 mm) or greater in depth are molded or fabricated in a continuous series of treads and risers as detailed in Figure 506.3.

~~**506.3.1 Ladder wells.** Ladder wells where provided shall have a minimum of 15 inches (381 mm) 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 ladder well or obstruction on the climbing side of the ladder.~~

506.4 Alternating tread devices. Alternating tread devices shall comply with the applicable requirements listed in the *applicable code*.

SECTION 508
SIGNAGE

IS-STM 05-18-23 AS

508.6 Entry signage. Signage indicating “Tornado Shelter,” ~~or~~ “Hurricane Shelter,” or “Hurricane and Tornado Shelter”, and appropriate symbols as applicable, shall be installed on the outside of the *storm shelter,* adjacent to every ~~access~~ entry opening intended to provide entry for occupants into the *storm shelter*.

508.7 Perimeter signage. Signs shall be installed inside of the *storm shelter* adjacent to every ~~access~~ entry or egress opening, which access nonprotected areas located outside of the *storm shelter*. For example, signage indicating “Notice: Now leaving the Tornado Shelter,” or “Notice: Now leaving the Hurricane Shelter.”

Appendix

A104.4.1 Storm shelter floor plans. A storm shelter floor plan shall be provided. The plan shall indicate the following:

1. ~~Access~~ Entry and means of egress doors.
2. Emergency escape openings, where provided.
3. *Impact-protective systems* that need to be secured in place.
4. Layout and function of *occupant support areas*.
5. Mechanical vents or mechanical ventilation systems that need to be activated, where provided.
6. Water closet and lavatory locations, including locations for set up of temporary water closets and lavatories, where provided.
7. Standby power supply, where provided.
8. Storage of required supplies such as first aid kits and flashlights.

Report for *05-06– 23*		
9. Location of fire extinguishers.		
Committee Reason: **Item 1:** The committee agreed with the intent of the reorganization and simplification of the requirements. **Item 2:** The change from 'access' to 'entry' coordinates terminology within the standard and provides clarification. **Item 3:** The modification brought relevant pointers for entry and egress openings together in one section. **Item 4:** The intent of the proposal is to separate the emergency escape opening and roof hatches the same as egress doors. The building code has requirements for separation of the egress doors, so this would put in the same requirements for emergency escape openings and overhead hatches. There were some concerns about the implementation of the 1/3 separation depending on the occupancy above (e.g. basement shelter for an apartment building). **Item 5:** This provides criteria for emergency escape and rescue opening located below grade to have sufficient space for emergency evacuation.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-07-23

504.6

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.6 Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access and egress provided within the *storm shelter* to a level of exit discharge or to the roof provided by an emergency stair com- plying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

~~**Exception:** Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.~~

Reason: Alternate approach eliminates the exception. Should we also clarify that provision only applies to upper stories of the multistory shelter?

Staff note: 05-07 and 05-08 were submitted as alternatives.

Committee Action: Approval as Modified (Vote: 8-0-1)

Modification (if any): See IS-STM 05-09-2023 for Replacement

Committee Reason: The committee felt that the replacement modification to IS-STM 05-09-23 met the same intent as this proposal to address clarification of vertical access in multi-story shelters.

Report for *05-07– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **See IS-STM 05-09-2023 for Replacement**		
Committee Reason: The committee felt that the replacement modification to IS-STM 05-09-23 met the same intent as this proposal to address clarification of vertical access in multi-story shelters.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-08-23

504.6

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 504
ACCESS AND EGRESS IN COMMUNITY STORM SHELTERS

504.6 Multistory shelter. *Storm shelters* with multiple stories shall be required to have one emergency means of vertical access and egress provided within the *storm shelter* to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.

Exception: Where ~~Provide~~ an emergency escape opening in accordance with Section 504.5 is provided or overhead hatch accessed by an emergency stair, ladder or alternating tread device in accordance with Section 506, to allow for emergency vertical access and egress to the roof, access and egress within the shelter to a level of exit discharge is not required.

Reason: As written, exception text doesn't read like an exception, but maybe we can avoid repetition through alternate proposal?

Staff note: 05-07 and 05-08 were submitted as alternatives.

Committee Action: Approval as Modified (Vote: 8-0-1)

Modification (if any): See IS-STM 05-09-23 for Replacement

Committee Reason: The committee felt that the replacement modification to IS-STM 05-09-23 met the same intent as this proposal to address clarification of vertical access in multi-story shelters.

Report for *05-08– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **See IS-STM 05-09-2023 for Replacement**		
Committee Reason: The committee felt that the replacement modification to IS-STM 05-09-23 met the same intent as this proposal to address clarification of vertical access in multi-story shelters.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		

Report for *05-08– 23*
Committee Reason:

IS-STM 05-09-23

504.6

Proponent: ICC Work Group 5

Revise as follows:

~~**504.6 Multistory shelter.** Storm shelters with multiple stories shall be required to have one emergency means of vertical access and egress provided within the storm shelter to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.~~

~~**Exception:** Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.~~

504.6 Vertical access and egress. Where an occupied floor level of a community storm shelter is not at a level of exit discharge, one means of vertical access and egress shall be provided within the storm shelter from each area or level to a level of exit discharge or emergency escape opening or overhead hatch, accessed by a stairway, an emergency stair complying with Section 506.2, a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4

Reason: Need reason.

Staff Note: The revised text would not allow for shelter occupant to exit the shelter and use the building stairways for egress. This would be a big change for basement shelters.

IS-STM 05-09-23 Replacement

504.6

Proponent: ICC Work Group 5

Replace and revise as follows:

~~**504.6 Multistory shelter.** Storm shelters with multiple stories shall be required to have one emergency means of vertical access and egress provided within the storm shelter to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.~~

~~**Exception:** Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.~~

504.6 Vertical Access Within the Storm Shelter. All storm shelter occupants shall have access within the *storm shelter* to the level of exit discharge or to the roof of the

storm shelter. Vertical access within the *storm shelter* shall be provided by a stairway, or by an emergency stair, ladder or alternating tread device complying with Section 506.

Exception: *Storm shelters* having a *design occupant capacity* not exceeding 16 are not required to provide vertical access within the *storm shelter*.

Reason: The purpose of this requirement is to minimize the chance of entrapment due to falling debris or access to the exit stairways within the building being unavailable. This would include 2nd story shelters (which were previously addressed) and adds basement or elevated shelters. The revised language would address the question of subdivided shelters (e.g. adjacent bathrooms or locker rooms) to require access to the level of exit discharge either through another portion of a storm shelter or directly to the vertical access.

The purpose of the exception is consistency with the exception in Section 504.4.

Committee Action: Approval as Modified (Vote: 8-1-0)

Modification (if any):

Replace and revise as follows:

~~**504.6 Multistory shelter.** Storm shelters with multiple stories shall be required to have one emergency means of vertical access and egress provided within the storm shelter to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.~~

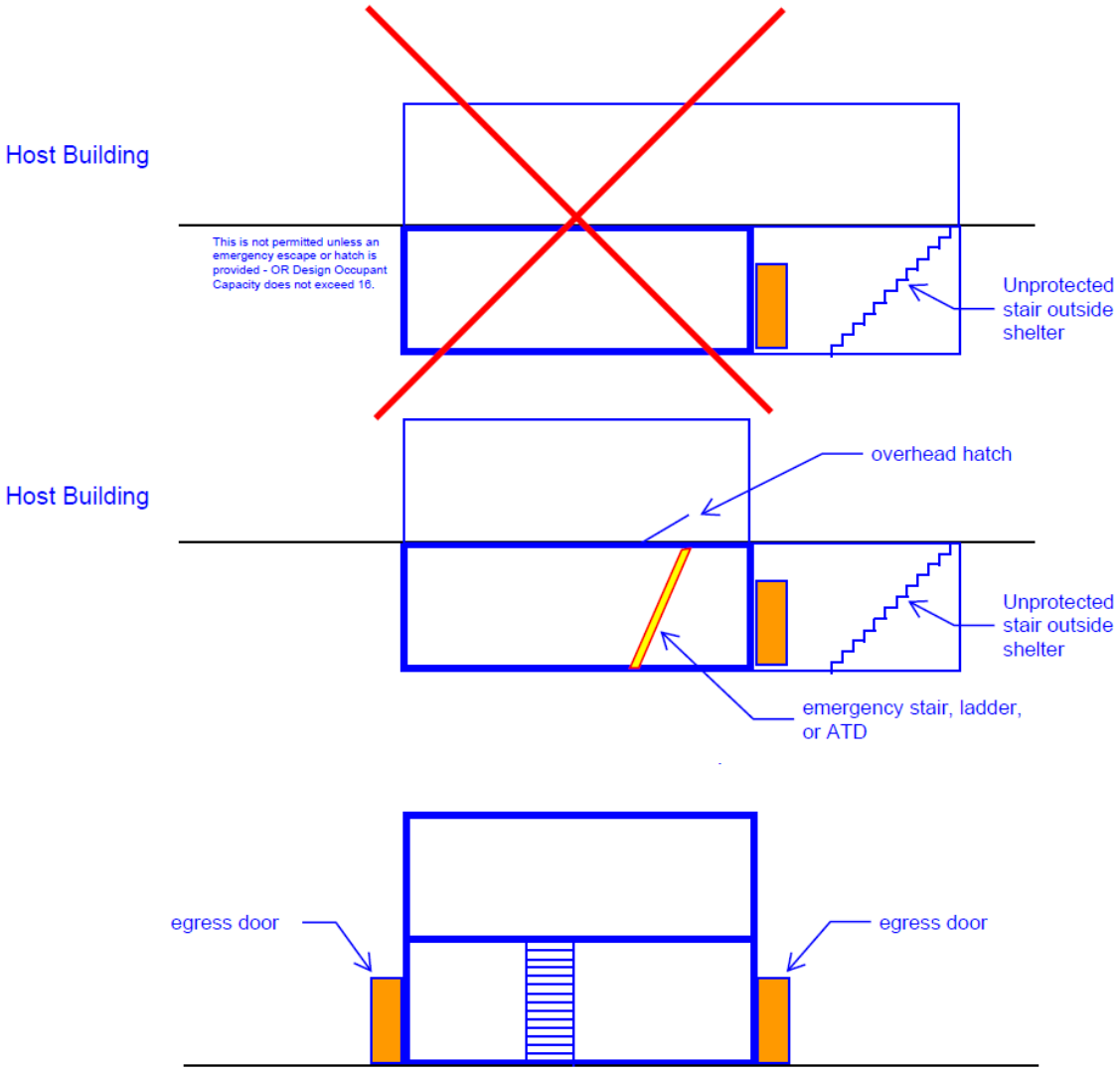
~~**Exception:** Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.~~

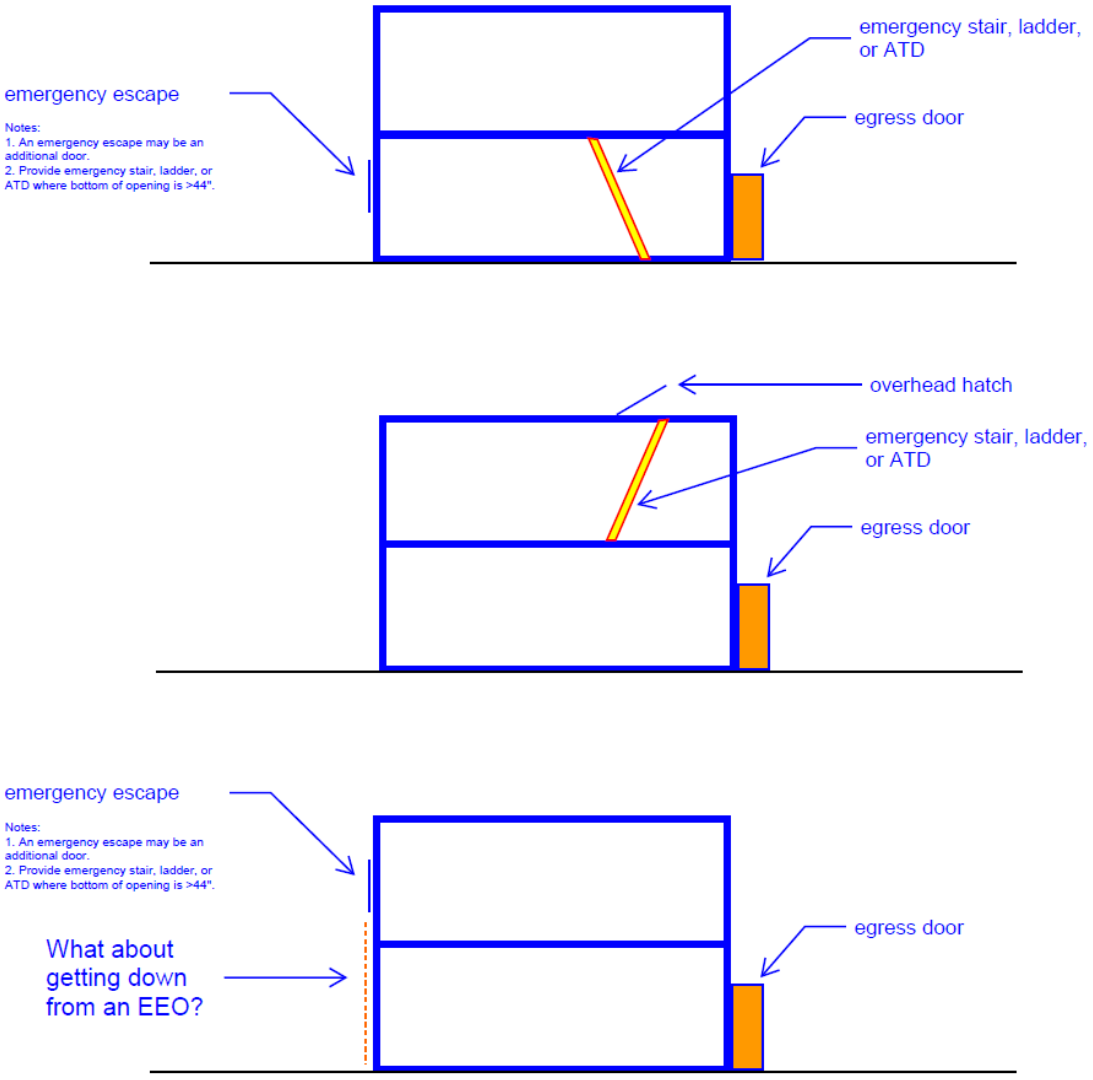
504.6 Vertical Access Within the Storm Shelter. All storm shelter occupants shall have access within the *storm shelter* to the level of exit discharge or to the roof of the *storm shelter*. Vertical access within the *storm shelter* shall be provided by a stairway, or by an emergency stair, ladder or alternating tread device complying with Section 506.

Exception: *Storm shelters* having a *design occupant capacity* not exceeding 16 are not required to provide vertical access within the *storm shelter*.

Committee Reason: The purpose of this requirement is to minimize the chance of entrapment due to falling debris or access to the exit stairways within the building being unavailable. This encompasses basements and 2nd story levels of shelters.

The following diagrams where shown during the meeting to explain the change.





IS-STM 05-09-23 Reconsideration

504.6

Proponent: ICC Work Group 5

Reconsideration IS-STM 05-09-23

5-30-2023 meeting

Further modify as follows:

504.6 Vertical Access Within the Storm Shelter. All storm shelter occupants shall have vertical access within the storm shelter to the level of exit discharge or to the roof

of the storm shelter. Vertical access within the storm shelter shall be provided by a stairway, or by an emergency stair, ladder or alternating tread device complying with Section 506.

Exception: Storm shelters having a design occupant capacity not exceeding 16 are not required to provide vertical access within the storm shelter.

Reason: The added word clarifies this provision is vertical access, not just access.

Committee Reason: Clarification that this is vertical access. Vote: As Modified (10-1-0)

Report for *05-09– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-1-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and revise as follows:** ~~**504.6 Multistory shelter.** Storm shelters with multiple stories shall be required to have one emergency means of vertical access and egress provided within the storm shelter to a level of exit discharge provided by an emergency stair complying with Section 506.2 or a ladder complying with Section 506.3, or an alternating tread device complying with Section 506.4.~~ ~~**Exception:** Provide an emergency escape opening or overhead hatch to allow for emergency vertical access and egress to the roof.~~ **504.6 Vertical Access Within the Storm Shelter.** All storm shelter occupants shall have vertical access within the *storm shelter* to the level of exit discharge or to the roof of the *storm shelter*. Vertical access within the *storm shelter* shall be provided by a stairway, or by an emergency stair, ladder or alternating tread device complying with Section 506. **Exception:** *Storm shelters* having a *design occupant capacity* not exceeding 16 are not required to provide vertical access within the *storm shelter*.		
Committee Reason: The purpose of this requirement is to minimize the chance of entrapment due to falling debris or access to the exit stairways within the building being unavailable. This encompasses basements and 2nd story levels of shelters.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-10-23

507.1(New)

Proponent: ICC Work Group 5

Revise as follows:

SECTION 507
LATCHING

507.1 General. Latching shall comply with the requirements of Sections 507.2 through 507.4. Latching and locking mechanisms for impactive protective systems shall comply with the requirements of 306.4.1.

Reason: Pointer to the requirements of 306.4.1 for latching and locking mechanisms.

Staff note: Section 306.4.1 is for Impact protective systems. This is not specific to latching.

Committee Action: Approval as Modified (Vote: 11-0-0)

Modification (if any):

Further modify as follows:

507.1 General. Latching shall comply with the requirements of Sections 507.2 through 507.4. ~~Latching and locking mechanisms for impactive protective systems shall comply with the requirements of 306.4.1.~~

Committee Reason: The modification is deleting requirements already found for doors in Chapter 8. The general text is standard code language practice to reference the rest of the section for latching.

Report for *05-10– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further modify as follows:** **507.1 General.** Latching shall comply with the requirements of Sections 507.2 through 507.4. ~~Latching and locking mechanisms for impactive protective systems shall comply with the requirements of 306.4.1.~~		
Committee Reason: The modification is deleting requirements already found for doors in Chapter 8. The general text is standard code language practice to reference the rest of the section for latching		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-11-23
507.3

Proponent: ICC Work Group 5

Revise as follows:

SECTION 507
LATCHING

507.3 Operating hardware on the unprotected side. Where operating hardware of an *impact-protective system* is located on the unprotected side of the *storm shelter envelope,* after the latching mechanism is engaged in accordance with Section 507.1, such operating hardware on the non-egress side shall be locked, ~~disabled,~~ or inactive and shall not be susceptible to unintentional unlatching by debris impact.

Reason: The word "disable" is not necessary in this provision and may cause potential confusion with the term "disable" in 507.1 Item 1.

Committee Action: Approval as modified (Vote:10-0-0)
Modification (if any):

Replace with the following:

507.3 Operating hardware on the unprotected side. ~~Where~~ Operating hardware of an *impact-protective system* ~~is~~ located on the unprotected side of the *storm shelter envelope*~~,~~ shall not be susceptible to unlatching by debris impact. After the latching mechanism is engaged in accordance with Section 507.1, such operating hardware on the ~~non-egress~~ unprotected side shall be locked~~, disabled,~~ or inactive ~~and shall not be susceptible to unintentional unlatching by debris impact~~.

Committee Reason: The word "disable" is not necessary in this provision and may cause potential confusion with the term "disable" in 507.1 Item 1. Moving the last phrase would add clarity to what is the intent of this provision. Using ‘unprotected’ clarifies that this is always the outside of the shelter.

Report for *05-11– 23*		
Committee decision: AM	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace with the following:** **507.3 Operating hardware on the unprotected side.** ~~Where~~ Operating hardware of an *impact-protective system* ~~is~~ located on the unprotected side of the *storm shelter envelope* shall not be susceptible to unlatching by debris impact. After the latching mechanism is engaged in accordance with Section 507.1, such operating hardware on the ~~non-egress~~ unprotected side shall be locked~~, disabled,~~ or inactive ~~and shall not be susceptible to unintentional unlatching by debris impact~~.		
Committee Reason: The word "disable" is not necessary in this provision and may cause potential confusion with the term "disable" in 507.1 Item 1. Moving the last phrase would add clarity to what is the intent of this provision. Using ‘unprotected’ clarifies that this is always the outside of the shelter.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		

Report for *05-11– 23*		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-12-23

507.4(New)

Proponent: ICC 500 Work Group 5

Revise as follows:

507.4 Electronic operating hardware. Where an impact-protective system's closing, latching, locking, or disabling is electronically controlled, shelter occupants shall have the ability to immediately secure the impact-protective system in accordance with Sections 507.1 and 507.3.

Reason: Access controls may keep storm shelter doors unsecured during scheduled periods of time without any override by storm shelter occupants. Occupants should be able to override the system within the storm shelter.

Committee Action: Approval as modified (Vote:10-0-0)

Modification (if any):

Further modify as follows:

507.4 Electronic operating hardware. Where an impact-protective system's closing, latching, or locking, ~~or disabling~~ is electronically controlled, shelter occupants shall have the ability to ~~immediately~~ secure the impact-protective system from within the shelter ~~in accordance with Sections 507.1 and 507.3~~.

Committee Reason: The modification to remove 'disabling' is for consistency with 05-11. "immediately' could be misapplied, so 'from within the shelter' would address a potential time gap. 507.1 and 507.3 are already required in this section. The shelter occupants need to be able to control door securement for safety, regardless of automatic electronic locking.
May need to look at this for the duration of the time the shelter is in use.

Note: Coordination may be needed between IS-STM 03-09-23 and 05-12-23

Report for *05-12– 23*		
Committee decision: AM	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further modify as follows:** **507.4 Electronic operating hardware.** Where an impact-protective system's closing, latching, or locking, ~~or disabling~~ is electronically controlled, shelter occupants shall have the ability to ~~immediately~~ secure the impact-protective system from within the shelter ~~in accordance with Sections 507.1 and 507.3~~.		
Committee Reason: **Further modify as follows:** **507.4 Electronic operating hardware.** Where an impact-protective system's closing, latching, or locking, ~~or disabling~~ is electronically controlled, shelter occupants shall have the ability to ~~immediately~~ secure the impact-protective system from within the shelter ~~in accordance with Sections 507.1 and 507.3~~.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

Report for *05-12– 23*		
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-13-23

507.5 (New)

Proponent: ICC 500 Work Group 5

Revise as follows:

507.5 Egress. Latching and locking mechanisms provided on impact protective systems which protect openings required for egress, shall not prohibit egress out of the storm shelter.

Reason: No latching or locking device shall prevent egress from a storm shelter egress opening like a padlock etc.

IS-STM 05-13-23 Modification

507.5 (New)

Proponent: ICC 500 Work Group 5

Further revise as follows:

507.5 Egress. Latching ~~and~~ or locking mechanisms ~~provided on~~ for impact protective systems ~~which~~ that protect openings required for egress~~,~~ shall not prohibit egress out of the storm shelter.

Reason: Editorial. This addresses language concerns brought up during the meeting discussion. The latching to keep the protection in place and having instructions (507.2) but not be something that prohibits egress, like a padlock.

Notes 3-23-2023: Send back to work group 5. Is this not already addressed in the IBC for means of egress paths?

Committee Action: Approval as Modified (Vote:8-0-1)

Modification (if any):
Further revise as follows:

507.5 Egress. Latching ~~and~~ or locking mechanisms ~~provided on~~ for impact protective systems ~~which~~ that protect openings required for egress~~,~~ shall not prohibit egress out of the storm shelter.

Committee Reason: The latching is to keep the protection in place and having instructions (507.2) but not be something that prohibits egress, like a padlock.

Report for *05-13– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further revise as follows:** **507.5 Egress.** Latching ~~and~~ or locking mechanisms ~~provided on~~ for impact protective systems ~~which~~ that protect openings required for egress~~,~~ shall not prohibit egress out of the storm shelter.		
Committee Reason: The latching is to keep the protection in place and having instructions (507.2) but not be something that prohibits egress, like a padlock.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-14-23

508.1

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 508
SIGNAGE

508.1 Signage requirements. All *storm shelters* shall be marked with design information in accordance with Section 508.2. *Community storm shelter* areas shall be marked by signage in accordance with Sections 508.3 through 508.7, as applicable. ~~All~~ Directional, entry and perimeter signs shall comply with the visual character requirements of ICC A117.1.

Reason: Design information signs are not required to facilitate access for occupants. Information conveyed for benefit of owners/operators

IS-STM 05-14-23 Replacement

508.1

Proponent: ICC 500 Work Group 5

Replace and revise as follows:

SECTION 508
SIGNAGE

508.1 Signage requirements. All *storm shelters* shall be marked with design information in accordance with Section 508.2. *Community storm shelter* areas shall be marked by signage in accordance with Sections 508.3 through 508.7, as applicable. ~~All signs~~ Signs required by Sections 508.3 through 508.7 shall comply with the visual character requirements of ICC A117.1.

Reason: The reference to the sections is more specific. The work group agreed that the design information sign is for inspection and review, not for public information.

Committee Action: Approval as Modified (Vote:9-0-0)

Modification (if any):
Replace and revise as follows:

SECTION 508
SIGNAGE

508.1 Signage requirements. All *storm shelters* shall be marked with design information in accordance with Section 508.2. *Community storm shelter* areas shall be marked by signage in accordance with Sections 508.3 through 508.7, as applicable. ~~All signs~~ Signs required by Sections 508.3 through 508.7 shall comply with the visual character requirements of ICC A117.1.

Committee Reason: The reference to the sections is more specific. The work group agreed that the design information sign is for inspection and review, not for public information.

Report for *05-14– 23*		
Committee decision: AM	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and revise as follows:** **SECTION 508** **SIGNAGE** **508.1 Signage requirements.** All *storm shelters* shall be marked with design information in accordance with Section 508.2. *Community storm shelter* areas shall be marked by signage in accordance with Sections 508.3 through 508.7, as applicable. ~~All signs~~ Signs required by Sections 508.3 through 508.7 shall comply with the visual character requirements of ICC A117.1.		
Committee Reason: The reference to the sections is more specific. The work group agreed that the design information sign is for inspection and review, not for public information.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-15-23
508.1

Proponent: ICC 500 Work Group 5

Revise as follows:

SECTION 508
SIGNAGE

508.1 Signage requirements. All *storm shelters* shall be marked with design information in accordance with Section 508.2. *Community storm shelter* areas shall be marked by signage in accordance with Sections 508.3 through 508.7, as applicable. All signs shall comply with the visual character requirements of ICC A117.1. The type and location of signs required by this standard shall be indicated on the floor plans as required by section 106.2.4.

Reason: Design information signs are not required to facilitate access for occupants. Information conveyed for benefit of owners/operators

Committee Action: Withdraw
Modification (if any):
Committee Reason:

Report for *05-15– 23*		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-16-23

508.2

Proponent: ICC 500 Work Group 5

Revise as follows:

508.2 Design information signage. All storm shelters shall have a sign on or within the storm shelter with all of the following:
1. ~~The~~ design occupant capacity.
2. ~~The~~ storm type.
3. ~~The~~ design wind speed.
4. ~~The~~ edition of the ICC 500 used for the design.
5. ~~The~~ name of the manufacturer or builder of the storm shelter.

Reason: Delete the first word "The" in each line 1-5. Better grammar.

Committee Action: Approval as submitted (Vote:10-0-0)

Modification (if any):

Committee Reason: Better grammar. This is editorial. Secretariat to look for other occurrences in the standard.

Report for *05-16– 23*		
Committee decision: AS	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Better grammar. This is editorial. Secretariat to look for other occurrences in the standard.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-17-23

508.3, 508.3.3(New), 508.4, 508.5

Proponent: ICC 500 Work Group 5

Revise as follows:

508.3 Directional Signage. The path of travel to the storm shelter shall be clearly marked with direction signage to direct intended occupants to the storm shelter.

~~508.3~~ 508.3.1 Exterior directional signage. Where the storm shelter serves the general public, exterior directional signage ~~is required~~ shall be provided. ~~to direct intended occupants to the storm shelter.~~

~~508.4~~ 508.3.2 Directional signage for a multibuilding site. Where a storm shelter serves multiple buildings, directional signage shall be provided within the buildings served by ~~to direct intended occupants to~~ the storm shelter.

508.3.3 Host building directional signage. Directional signage shall be provided within the host building.

~~**508.5 Directional signage within a host building.** Where a *storm shelter* is within a *host building*, directional signage is required within the host building to direct intended occupants to the *storm shelter*. The path of travel to the *storm shelter* shall be clearly marked to indicate the direction of travel in cases where the path of travel is not immediately visible to the intended occupants.~~

Reason: This clarifies the language.

Staff note: Errata to 508.3.1. Missing strike out and underline for "~~is required~~ shall be provided"

IS-STM 05-17-23 Modification

508.3, 508.3.3(New), 508.4, 508.5

Proponent: ICC 500 Work Group 5

Further revise as follows:

508.3 Directional Signage. The path of travel to the storm shelter shall be clearly marked with direction signage to direct intended occupants to the storm shelter.

508.3.1 Exterior directional signage. Where the storm shelter serves the general public, exterior directional signage shall be provided.

508.3.2 Directional signage for a multibuilding site. Where a storm shelter serves multiple buildings, directional signage shall be provided at or within the buildings served by the storm shelter.

508.3.3 Host building directional signage. Directional signage shall be provided within the host building in cases where the path of travel is not immediately visible.

Reason: This proposal groups directional signage into one section – so it is more user friendly. 508.3.2 is revised to be more consistent with the intent in the commentary. 508.3.3 is revised to indicate that signs may be required in the building to lead people along the path to the shelter.

Committee Action: Approval as Modified (Vote:9-0-0)

Modification (if any):

Further revise as follows:

508.3.2 Directional signage for a multibuilding site. Where a storm shelter serves multiple buildings, directional signage shall be provided at or within the buildings served by the storm shelter.

508.3.3 Host building directional signage. Directional signage shall be provided within the host building in cases where the path of travel is not readily apparent.

Committee Reason: This proposal groups directional signage into one section – so it is more user friendly. 508.3.2 is revised to be more consistent with the intent in the commentary. 508.3.3 is revised to indicate that signs may be required in the building to lead people along the path to the shelter. The further modification for "immediately visible" to " readily apparent" is consistent with language in the building code for other directional signage.

Report for *05-17– 23*		
Committee decision: AM	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further revise as follows:** **508.3.2 Directional signage for a multibuilding site.** Where a storm shelter serves multiple buildings, directional signage shall be provided at or within the buildings served by the storm shelter. **508.3.3 Host building directional signage.** Directional signage shall be provided within the host building in cases where the path of travel is not readily apparent.		
Committee Reason: This proposal groups directional signage into one section – so it is more user friendly. 508.3.2 is revised to be more consistent with the intent in the commentary. 508.3.3 is revised to indicate that signs may be required in the building to lead people along the path to the shelter. The further modification for "immediately visible" to " readily apparent" is consistent with language in the building code for other directional signage.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		

Report for *05-17– 23*		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 05-18-23
508.6

Proponent: Pataya Scott, representing FEMA

Revise as follows:

SECTION 508
SIGNAGE

508.6 Entry signage. Signage indicating "Tornado Shelter," ~~or~~ "Hurricane Shelter," or "Hurricane and Tornado Shelter", and appropriate symbols as applicable, shall be installed on the outside of the *storm shelter*, adjacent to every access opening intended to provide entry for occupants into the *storm shelter*.

Reason: Revision correlates w/ Section 104.3 and others that address combination shelters.

Committee Action: Approval as submitted (Vote:10-0-0)
Modification (if any):
Committee Reason: This addresses signage for a combined shelter.

Report for *05-18– 23*		
Committee decision: AS	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This addresses signage for a combined shelter.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 6
FIRE SAFETY

IS-STM 06-01-23
603.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1 Fire separation. Walls or horizontal assemblies between *community storm shelters* and ~~other~~ *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. The *design occupant capacity* of 16 or fewer.
2. The *storm shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. The *design occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.

Reason: Delete the word "other" from 603.1, as this word is confusing.

Committee Action: Approval Modified (Vote: 9-0-0)
Modification (if any):

Further modify as follows:

603.1 Fire separation. Walls ~~or~~ and horizontal assemblies between *community storm shelters* and *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. The *design occupant capacity* of 16 or fewer.
2. The *storm shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. The *design occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.

Committee Reason: Delete the word "other" from 603.1, as this word is confusing. The modification to 'or' vs. 'and' matches the exception.

Report for *06-01– 23*		
Committee decision: AM	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further modify as follows:** **603.1 Fire separation.** Walls ~~or~~ and horizontal assemblies between *community storm shelters* and *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*. **Exceptions:** Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations: 1. The *design occupant capacity* of 16 or fewer. 2. The *storm shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*. 3. The *design occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building. 4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.		
Committee Reason: Delete the word "other" from 603.1, as this word is confusing. The modification to 'or' vs. 'and' matches the exception.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-02-23

603.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1 Fire separation. Walls or horizontal assemblies between *community storm shelters* and other *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. ~~The~~ ~~*design*~~ Design *occupant capacity* of 16 or fewer.
2. ~~The~~ ~~*storm*~~ Storm *shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. ~~The~~ ~~*design*~~ Design *occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. ~~The~~ ~~means~~ Means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.

Reason: reads better

Committee Action: Approval as submitted (Vote:9-0-0)

Modification (if any):

Committee Reason: Removes words for clarity.

Report for *06-02– 23*		
Committee decision: AS	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Removes words for clarity.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		

Report for *06-02– 23*		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-03-23

603.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1 Fire separation. Walls or horizontal assemblies between *community storm shelters* and other *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. The *design occupant capacity* of 16 or fewer.
2. ~~The *storm shelter* is located in the basement or underground, the *design*~~ *Design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. The *design occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.

Reason: If you're in a basement and capacity is less than 50 why not allow 2 doors separated or the 2nd exit to be an EEO or hatch directly to exterior? I would agree 2 egress doors for over 50, which IBC would req. for occupant load, but keep in mind this could be a 10x10 box. What is more dangerous - lack of fire rating or a 2nd opening that could fail? At less than 50 either a fire barrier, 2nd exit, or single exit directly to exterior should be adequate. Isn't 1 of the 3 adequate? Exception 2 shouldn't be just for basement? What about a portion is in basement or a portion is not at the level of exit discharge? As written exception 2 allows a basement shelter to have no fire barrier as long as it has 2 exits, which could go into host building, whereas exception 3 for the same shelter at grade would have to have the fire barrier or an additional exit directly to the exterior. 504.4 already req's additional exit - see comments on 504.4.

Committee Action: Disapproval (Vote: 7-1-0)

Modification (if any):

Committee Reason: There was not a consensus at this time. The language should remain as is. We need to look at coordination with Chapter 5 new requirements for a roof hatch.

Report for *06-03– 23*		
Committee decision: D	***Committee Vote at Meeting: 7-1-0***	***Committee Vote on Ballot:***

Report for *06-03– 23*		
REPORT OF HEARING: Modification (if any):		
Committee Reason: There was not a consensus at this time. The language should remain as is. We need to look at coordination with Chapter 5 new requirements for a roof hatch.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-04-23

603.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1 Fire separation. Walls or horizontal assemblies between *community storm shelters* and other *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. The *design occupant capacity* of 16 or fewer.
2. The *storm shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. The *design occupant capacity* is less than 50 and an ~~additional~~ egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.

Reason: Why require additional egress door if less than 50? If the required egress door doesn't exit to exterior than they have to provide a hatch or EEO that does.

Committee Action: Approval as Submitted (Vote: 9-0-0)

Modification (if any):

Committee Reason: If the egress door opens to the outside, an extra door is not needed.

Report for *06-04– 23*		
Committee decision: AS	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason:. If the egress door opens to the outside, an extra door is not needed.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		

Report for *06-04– 23*		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-05-23
603.1, Chapter 9

Proponent: James E. Waller, P.E. representing Remagen Safe Rooms

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1 Fire separation. Walls or horizontal assemblies between *community storm shelters* and other *host building* areas shall be *fire barriers* or *horizontal assemblies* with a minimum fire-resistance rating of 2 hours constructed in accordance with the *applicable code*.

Exceptions: Walls and horizontal assemblies are not required to be fire-resistance rated with any of the following configurations:

1. The *design occupant capacity* of 16 or fewer.
2. The *storm shelter* is located in the basement or underground, the *design occupant capacity* is less than 50, at least two egress doors are provided and the egress doors are separated by a minimum horizontal distance equal to one-third of the overall diagonal dimension of the *storm shelter*.
3. The *design occupant capacity* is less than 50 and an additional egress door, overhead hatch or emergency escape opening opens directly to the exterior of the building.
4. The means of egress is designed in accordance with the *applicable code* for the *design occupant capacity*, the *storm shelter* has at least two egress doors and at least 50 percent of the total required capacity for the means of egress from the *storm shelter* is directly to the exterior of the building.
5. <u>The storm shelter is located inside or contiguous with a building corridor having exits at each end, the ratio of occupants to shelter exit doors does not exceed 25, and there are a minimum of 3 shelter doors on each side of the corridor accessing adjacent rooms which have means of egress exiting directly to the exterior of the building.</u>
6. <u>Spaces within the building are separated by walls or partitions having at least a one-hour fire separation and corridors and exits meet or exceed the NFP 101.</u>

CHAPTER 9
REFERENCED STANDARDS

<u>NFPA 101-21 Life Safety Code</u>

Reason: The purpose for the proposed exception is to facilitate the construction of a storm shelter as part of a school corridor or other building corridor where a large number of corridor doors lead to adjacent rooms having secondary means of egress directly to the exterior of the building.

The existing ICC 500, Section 603.1 Exception 4, excepts storm shelters from having fire separation if there are at least two egress doors and more than 50% of the total required capacity for means of egress

is directly to the exterior of the building. This exception is intended to allow shelter occupants to egress to the exterior of the building without having to pass through a fiery, smoke-filled host building. The proposed exception will also accomplish this goal.

In addition to corridor storm shelter doors which protect primary exits at the ends of the corridor, shelter doors, which are aligned with each classroom or office door, remain open against the corridor wall until occupants have entered the shelter, at which time the doors are closed and latched. During a severe weather event, students and/or other building occupants would enter the corridor storm shelter through the corridor entryways and through doors from individual rooms accessing the corridor. The storm shelter doors would then be closed and latched. After the severe weather event, shelter occupants would exit via egress doors at either corridor end or through doors leading to the rooms adjacent to the corridor and, where necessary, thence through egress doors directly to the exterior of the building.

ICC 500, Section 603.1, Exception 3, provides an exception for the 2-hour fire separation requirement where the occupant-to-exit door ratio does not exceed 25 and one additional door or emergency escape hatch opens directly to the exterior of the building. The corridor storm shelter provides multiple means of egress via primary exits at each end of the corridor shelter as well as through numerous adjacent classrooms or office spaces which are compartmentalized and separated from other parts of the building. A fire occurring in one location within a building with 1-hour fire-rated interior walls would not result in fire and smoke rapidly spreading to the entire building. Occupants of corridor storm shelters would have numerous means of egress available, on multiple sides of the storm shelter, which would not be exposed to fire or smoke from other parts of the building.

There are many old, iconic buildings in the United States, including approximately 40,000 existing school facilities with an average building age of 40 years. School districts often must educate children in these older, often iconic, school buildings due to small populations and financial constraints. Large numbers of these older schools lie in geographical areas which are prone to tornado threats, leading citizens to demand tornado protection within the schools for protection of their children. Schools and other buildings are being converted from their original uses to facilities such as adult education, vocational training, and senior citizens' centers. In addition to providing storm protection for citizens, local jurisdictions often desire to have storm shelters constructed within these iconic or historic buildings for aesthetic, economic, or property limitation reasons. Current construction technology permits tornado shelters to be economically retrofit-constructed within existing corridors. The proposed Exception 5 will facilitate tornado or hurricane shelter construction in corridors of these buildings.

Committee Action: Disapproval (Vote:9-0-0)

Modification (if any):

Committee Reason: The proposal relies on the existing building to provide protection from fire. The reference for means of egress should be the IBC, not NFPA 101 – we don't need to bind in an additional standard as means of egress is adequately addressed. The proposal as worded appears to encompass the whole building, not just the area of the shelter.
The committee could address retrofits in an existing building more comprehensively with future proposals.

Report for *06-05– 23*		
Committee decision: D	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The proposal relies on the existing building to provide protection from fire. The reference for means of egress should be the IBC, not NFPA 101 – we don't need to bind in an additional standard as means of egress is adequately addressed. The proposal as worded appears to encompass the whole building, not just the area of the shelter. The committee could address retrofits in an existing building more comprehensively with future proposals.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

Report for *06-05– 23*		
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-06-23
603.1.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1.1 Opening Protectives. Openings, penetrations, and joints shall comply with the applicable code.

~~**603.1.1**~~ **603.1.1.1 Doors and shutters.** Fire doors and shutters in fire barriers required solely for compliance with Section 603.1 shall not be required to be self or automatic closing.

Reason: The IBC in chapter 7 clearly delineates openings, penetrations, and joints as separate items, so it is fitting that chapter 6 of ICC 500 do the same. Doors should be addressed as a subsection to opening protectives.

Staff note: There were no suggested text for penetrations and joints**.**

Committee Action: Disapproval (Vote:9-0-0)
Modification (if any):
Committee Reason: This is addressed in the general provisions in Section 603.1.

Report for *06-06– 23*		
Committee decision: D	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This is addressed in the general provisions in Section 603.1.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-07-23

603.1.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 603
FIRE-RESISTANCE RATED CONSTRUCTION

603.1.1 Doors and shutters. In ~~Fire doors and shutters in~~ fire barriers required solely for compliance with Section 603.1, fire doors and shutters shall not be required to be self or automatic closing.

Reason: This establishes the condition first, then the doors specifically shall be required to be self or automatic closing.

Committee Action: Approval as Submitted (Vote: 9-0-0)

Modification (if any):

Committee Reason: This establishes the condition first. This clarifies the requirements.

Report for *06-07– 23*		
Committee decision: AS	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This establishes the condition first. This clarifies the requirements.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-08-23

604.1, 604.2, Chapter 9

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 604
FIRE EXTINGUISHERS

604.1 General. A fire extinguisher shall be ~~required within each story of all *community storm shelters*~~ provided in accordance with IBC 906.

604.2 Requirements. A fire extinguisher shall be required within each story of all community storm shelters. ~~Fire extinguishers shall meet the requirements of NFPA 10.~~ Installation of fire extinguishers shall not compromise the structural or missile impact performance of the exterior storm shelter envelope.

CHAPTER 9
REFERENCED STANDARDS

~~NFPA 10-18 Portable Fire Extinguishers~~

Reason: The General section should say that a fire extinguisher shall be provided in accordance with IBC 906 (which references NFPA 10). The Requirements section should then address located in each story and not located in the storm shelter envelope. The reference to NFPA should instead be a reference to IBC Section 906 which references NFPA 10.

IS-STM 06-08-23 Replacement

604.1, 604.2, Chapter 9

Proponent: ICC 500 Work Group 6

Replace and modify as follows:

604.1 General. A fire extinguisher shall be required within each story of all *community storm shelters.*

604.2 Requirements. Fire extinguishers shall ~~meet the requirements of NFPA 10~~ be provided in accordance with the International Building Code Section 906. Installation of fire extinguishers shall not compromise the structural or ~~missile~~ impact performance of the ~~exterior~~ storm shelter envelope.

CHAPTER 9
REFERENCED STANDARDS

~~NFPA 10-18 Portable Fire Extinguishers~~

Reason: Section 604.1 should remain so that this requirement is limited to community shelters. Put in a general reference to the IBC for other fire extinguisher requirements for placement and mounting. Revisions to the last sentence removed 'exterior' since this is all shelter walls, not just walls to the outside and to remove 'missile' for coordination with action last cycle.
This would also address IS-STM 06-09-23.

Committee Action: Approval as Modified (Vote:9-0-0)

Modification (if any):

Replace and modify as follows:

604.1 General. A fire extinguisher shall be required within each story of all *community storm shelters.*

604.2 Requirements. Fire extinguishers shall ~~meet the requirements of NFPA 10~~ be provided in accordance with the International Building Code Section 906. Installation of fire extinguishers shall not compromise the structural or ~~missile~~ impact performance of the ~~exterior~~ storm shelter envelope.

CHAPTER 9
REFERENCED STANDARDS

~~NFPA 10-18 Portable Fire Extinguishers~~

Committee Reason: The committee agreed with the reason statement for the replacement.

Report for *06-08– 23*		
Committee decision: AM	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace and modify as follows:** **604.1 General.** A fire extinguisher shall be required within each story of all *community storm shelters.* **604.2 Requirements.** Fire extinguishers shall ~~meet the requirements of NFPA 10~~ be provided in accordance with the International Building Code Section 906. Installation of fire extinguishers shall not compromise the structural or ~~missile~~ impact performance of the ~~exterior~~ storm shelter envelope. **CHAPTER 9** **REFERENCED STANDARDS** ~~NFPA 10-18 Portable Fire Extinguishers~~		
Committee Reason: The committee agreed with the reason statement for the replacement.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		

Report for *06-08– 23*		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 06-09-23
604.2

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 604
FIRE EXTINGUISHERS

604.2 Requirements. Fire extinguishers shall meet the requirements of NFPA 10. Installation of fire extinguishers shall not compromise the structural or ~~missile~~ impact performance of the exterior storm shelter envelope.

Reason: Consistent use of "missile when referring to testing specifically vs impacts in general.

Committee Action: Approval as submitted (Vote:9-0-0)
Modification (if any):
Committee Reason: Consistent with the committee action on 06-08-2023 and last cycle.

Report for *06-09– 23*		
Committee decision: AS	***Committee Vote at Meeting: 9-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Consistent with the committee action on 06-08-2023 and last cycle.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 7
SHELTER ESSENTIAL FEATURES AND ACCESSORIES

IS-STM 07-01-23
Chapter 7 Title

Proponent: Dan Dain, representing NSSA

Revise as follows:

CHAPTER 7
~~STORM SHELTER~~ ESSENTIAL FEATURES AND ACCESSORIES

Reason: Delete "storm shelter" from title. Not necessary and no other chapter has this in the title.

Committee Action: Approval as Submitted (Vote:11-0-0)
Modification (if any):
Committee Reason: Not necessary and no other chapter has this in the title.

Report for *07-01– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Not necessary and no other chapter has this in the title.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-02-23

701.2 (twice), 702.1, 703.1

Proponent: ICC 500 Work Group 7

Revise as follows:

SECTION 702
TORNADO SHELTERS

702.1 General. *Tornado shelters* shall comply with the requirements of Sections 702.2 through ~~702.9~~ 702.10.

702.2 ~~701.2~~ Protection of tornado ~~storm~~ shelter critical support systems. ~~*Storm*~~ *Tornado shelter critical support systems* shall remain functional for the design storm event and a minimum period of two hours ~~*storm shelter* occupancy (24 hours for hurricane shelters, 2 hours for tornado shelters)~~. ~~*Storm*~~ *Tornado shelter critical support systems* located outside of the ~~*storm*~~ *tornado shelter* areas shall be protected by a means that meets the wind load and impact requirements of Chapter 3, and, as applicable, the flood-resistance requirements of Chapter 4.

Exception: The water supply system and waste water system for water closets and lavatories are not required to comply with this section.

(Renumber following sections)

SECTION 703
HURRICANE SHELTERS

703.1 General. *Hurricane shelters* shall comply with the requirements of Sections 703.2 through ~~703.11~~ 703.12.

703.2 ~~701.2~~ Protection of hurricane ~~storm~~ shelter critical support systems. ~~*Storm*~~ *Hurricane shelter critical support systems* shall remain functional for the design storm event and a minimum period of ~~*storm shelter* occupancy (~~24 hours ~~for hurricane shelters, 2 hours for tornado shelters)~~. ~~*Storm*~~ *Hurricane shelter critical support systems* located outside of the ~~*storm*~~ *hurricane shelter* areas shall be protected by a means that meets the wind load and impact requirements of Chapter 3, and, as applicable, the flood-resistance requirements of Chapter 4.

(Renumber following sections)

Reason: The definition of critical support system includes supply and waste water. With the duration of time in a tornado shelter - either the system will not go down, or if it does go down, this is not critical to survival. This is consistent with the last cycle where the committee removed the storage capacity

requirement for tornado shelters. The supply and waste water for hurricane shelters is addressed in Section 703.

CRITICAL SUPPORT SYSTEMS, STORM SHELTER. Systems and components required to ensure the health, safety and well-being of shelter occupants. Critical support systems include, potable and waste water systems, emergency and standby power and lighting systems and ventilation systems.

IS-STM 07-02-23 replacement (2 options)

701.2 (twice), 702.1, 703.1

Proponent: ICC 500 Work Group 7

Revise as follows:

Alternate 1 – Add to tornado shelters, Rewrite of section to include piping in text

702.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *tornado shelter.*

702.3.4.1 Storage capacity for water supply and wastewater. In community shelters with a *design occupant capacity* of 50 or greater the storage capacity of the plumbing system shall comply with both of the following:

1. The water supply system storage capacity, including within the water supply piping, shall be 1 gallon (3.8 L) or greater per 12 occupants.
2. The waste disposal systems storage capacity, including within sanitary drainage piping, shall be 1.5 gallons (5.68 L) or greater per 12 occupants.

   Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and wastewater storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

703.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *hurricane shelter.*

IS-STM 07-03-23 AS

703.3.4.1 Storage capacity for water supply and wastewater. In community shelters with a *design occupant capacity* of 50 or greater the storage capacity of the plumbing system shall comply with both of the following:

1. The water supply system storage capacity, including within the water supply piping, ~~the capacity of plumbing and waste disposal systems to supply water and contain or dispose of wastewater or solid wastes~~ shall be 1 gallon (3.8 L) or greater per occupant of supply water in addition to the drinking water required in Section 703.4
2. ~~and~~ The waste disposal systems storage capacity, including within sanitary drainage piping, shall be 1.5 gallons (5.68 L) ~~capacity~~ or greater per occupant ~~for containment of wastewater~~.

Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and wastewater storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

Alternate 2 – add to tornado shelters, add new sentence to include piping in text.

702.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *tornado shelter.*

703.2.4.1 Storage capacity for water supply and wastewater. In community shelters with a *design occupant capacity* of 50 or greater, the capacity of plumbing and waste disposal systems to supply water and contain or dispose of wastewater or solid wastes shall be 1 gallon (3.8 L) or greater per occupant of supply water and 1.5 gallons (5.68 L) or greater per occupant for containment of wastewater. The capacity of the plumbing system within the pipes shall be considered towards the required water and wastewater storage.

Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and wastewater storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

703.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *hurricane shelter.*

IS-STM 07-03-23 AS

703.3.4.1 Storage capacity for water supply and wastewater. In community shelters with a *design occupant capacity* of 50 or greater, the capacity of plumbing and waste disposal systems to supply water and contain or dispose of wastewater or solid wastes shall be 1 gallon (3.8 L) or greater per occupant of supply water in addition to the drinking water required in Section 703.4 and 1.5 gallons (5.68 L) or greater ~~capacity~~ ~~of~~ per occupant for containment of wastewater. The capacity of the plumbing system within the pipes shall be considered towards the required supply water and wastewater storage.

Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and wastewater storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

Reason/Questions:

We took out the bladder storage during the last cycle.

Where does the water amount come from? Is this assuming the water is available for a while? Glen only know about one pump site failure in one hurricane. Maybe you don't loose water and this is just a safety factor?

Committee Action: Approval as Submitted (Vote: 9-1-1)

Modification (if any):

Committee Reason: The definition of critical support system includes supply and waste water. With the duration of time in a tornado shelter - either the system will not go down, or if it does go down, this is not critical to survival. This is consistent with the last cycle where the committee removed the storage capacity requirement for tornado shelters. The supply and waste water for hurricane shelters is addressed in Section 703.

Report for *07-02– 23*		
Committee decision: AS	***Committee Vote at Meeting: 9-1-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The definition of critical support system includes supply and waste water. With the duration of time in a tornado shelter - either the system will not go down, or if it does go down, this is not critical to survival. This is consistent with the last cycle where the committee removed the storage capacity requirement for tornado shelters. The supply and waste water for hurricane shelters is addressed in Section 703.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-03-23

702.3, Table 702.3, 702.3.1, 703.2, Table 703.2, 703.2.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 702
TORNADO SHELTERS

702.3 ~~**702.3.1**~~ **Water closets and lavatories.** Water closets and lavatories shall be either permanent plumbing fixtures installed within the tornado shelter, or temporary water closets, such as chemical toilets, or temporary lavatories~~, such as chemical toilets~~ such as portable hand washing stations, or other means approved by the authority having jurisdiction.

702.3.1 ~~**702.3**~~ **Minimum number water closets and lavatories.** Water closets and lavatories shall be located within the *tornado shelter* and provided in the minimum number indicated in Table 702.3.1 ~~702.3~~.

TABLE 702.3.1 ~~702.3~~
REQUIRED WATER CLOSET AND LAVATORIES
FOR TORNADO SHELTERS

TORNADO SHELTER TYPE	WATER CLOSETS	LAVATORIES
Residential, one- and two-family dwellings	Not Required	Not Required
Residential, other	1	Not Required
Community, *design occupant capacity* < 50	1	Not Required
Community, *design occupant capacity* => 50	1 per 250 for the first 500 occupants and 1 additional per 500 occupants or portions thereof > 500 occupants	1 per 1,000 occupants

SECTION 703
HURRICANE SHELTERS

703.3 ~~**703.3.1**~~ **Water closets and lavatories.** Water closets and lavatories shall be either permanent plumbing fixtures installed within the hurricane shelter, or temporary water closets, such as chemical toilets, or temporary lavatories~~, such as chemical toilets~~ such

as portable hand washing stations, or other means approved by the authority having jurisdiction.

~~703.3~~ 703.3.1 Minimum number water closets and lavatories. Water closets and lavatories shall be located within the *hurricane shelter* and provided in the minimum number indicated in Table ~~703.3~~ 703.3.1.

TABLE ~~703.3~~ 703.3.1
REQUIRED WATER CLOSETS AND LAVATORIES
FOR HURRICANE SHELTERS

HURRICANE SHELTER TYPE	WATER CLOSETS	LAVATORIES
Residential, one-and two-family dwellings	Not Required	Not Required
Residential, other	1	Not Required
Community, *design occupant capacity* < 50	1	Not Required
Community, *design occupant capacity* 50	1 per 50 occupants	1 per 100 occupants

Reason: 703.2.1 should be before the requirements for how many, swap 702.3.1 with 702.3. 703.2.1 text gives an example of a temporary water closet, add an example of a temporary lavatory.

Committee Action: Approval as submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: Type should be before the requirements for how many. Proposed text gives an example of a temporary water closet, add an example of a temporary lavatory.

Report for *07-03– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Type should be before the requirements for how many. Proposed text gives an example of a temporary water closet, add an example of a temporary lavatory.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-04-23
702.4

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 702
TORNADO SHELTERS

702.4 Ventilation. Occupied space in tornado shelters shall be provided with natural ventilation in accordance with Section 702.4.1 or with mechanical ventilation in accordance with Section 702.4.2, or a combination.

Reason: Ventilation for a shelter may be by natural or mechanical means, or a combination depending on the size, configuration, and number of areas. Add "or a combination" at end of first sentence.

Committee Action: Disapproval (Vote: 11-0-0)
Modification (if any):
Committee Reason: There could be questions about compliance in a multi-room shelter where parts were natural and part was mechanical. Not clear on how this would be applied/calculated.

Report for *07-04– 23*		
Committee decision: D	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: There could be questions about compliance in a multi-room shelter where parts were natural and part was mechanical. Not clear on how this would be applied/calculated.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-05-23
702.4.2

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 702
TORNADO SHELTERS

702.4.2 Mechanical ventilation. Tornado shelters that rely on mechanical ventilation shall be provided with the minimum mechanical ventilation rate of required outdoor air in accordance with the applicable building code provisions for the normal use of the space ~~at a minimum rate of 5 cubic feet per minute per occupant for the design occupant capacity~~. The mechanical ventilation system shall be connected to a standby power system.

Reason: This change to 5 cubic feet per minute per occupant for the design occupant capacity for tornado shelters will result in a significant increase in HVAC system size, louvers, fans, etc. having a cascading effect, doubling regular and backup power requirements. This will nearly triple CFMs and increase cost exponentially. The current 2014 language supplies enough ventilation for a two hour duration. Revert text in this section to previous requirement per normal use of the space.

IS-STM 07-05-23 Replacement
702.4.2

Proponent: Dan Dain, representing NSSA

Replace with the following and modify –

702.4.2 Mechanical ventilation. Tornado shelters that rely on mechanical ventilation shall be provided with the minimum mechanical ventilation rate of required outdoor air at a minimum rate of ~~5~~ 2.5 cubic feet per minute per occupant for the design occupant capacity. The mechanical ventilation system shall be connected to a standby power system.

Reason: Mechanical calculations indicate that 2.5 cfm per person at the storm shelter design occupant capacity would provide for a 2 hour occupancy period not exceeding the C02 limit for an 8 hour work day according to OSHA recommendations. This would address the initial concern for the normal occupancy of a space has a much lower occupant load that when the space is a shelter.

Committee Action: Approval as Modified (Vote: 11-0-0)
Modification (if any):
Replace with the following and modify –

702.4.2 Mechanical ventilation. Tornado shelters that rely on mechanical ventilation shall be provided with the minimum mechanical ventilation rate of required outdoor air at a minimum rate of ~~5~~ 2.5 cubic feet per minute per occupant for the design occupant capacity. The mechanical ventilation system shall be connected to a standby power system.

Committee Reason: This reduction would provide a conservative estimate for ventilation needed based on the number of shelter occupants and the limited time frame the shelter is occupied (2 hours).

Report for *07-05– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace with the following and modify –** **702.4.2 Mechanical ventilation.** Tornado shelters that rely on mechanical ventilation shall be provided with the minimum mechanical ventilation rate of required outdoor air at a minimum rate of ~~5~~ 2.5 cubic feet per minute per occupant for the design occupant capacity. The mechanical ventilation system shall be connected to a standby power system.		
Committee Reason: This reduction would provide a conservative estimate for ventilation needed based on the number of shelter occupants and the limited time frame the shelter is occupied (2 hours).		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-06-23

702.5, 702.5.1, 702.5.2, 702.5.3, 703.7, 703.7.1, 703.7.2, 703.7.3, 703.7.4. 703.7.5

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 702
TORNADO SHELTERS

702.4 Ventilation. (no change to text)

702.4.1 Natural ventilation. (no change to text)

TABLE 702.4.1
VENTING AREA REQUIRED FOR TORNADO SHELTERS

(no change to table)

702.4.1.1 Location of natural ventilation openings. (no change to text)

702.4.1.2 Mechanical vents. Mechanical vents, louvers or dampers used to operate *ventilation* openings shall be connected to a standby power system.

702.4.2 Mechanical ventilation. *Tornado shelters* that rely on mechanical ventilation shall be provided with the minimum mechanical ventilation rate of required outdoor air at a minimum rate of 5 cubic feet per minute per occupant for the *design occupant capacity*. The mechanical ventilation system shall be connected to a standby power system.

702.4.3 Intake openings. (no change to text)

702.4.4 Opening protection. (no change to text)

702.5 ~~**702.6**~~ **Electrical grounding and bonding of tornado shelters.** (no change to text)

702.6 ~~**702.7**~~ **Exit signs and emergency lighting.** (no change to text)

702.7 ~~**702.8**~~ **Standby lighting.** *Community tornado shelters* shall be provided with a standby lighting system. The standby lighting system shall provide illumination levels of not less than 1 foot-candle (11 lux) at the walking surface in *occupied storm shelter areas* and *occupant support areas*. The standby lighting system shall be connected to a standby power system.

Exception: Personal-use lighting devices such as flashlights with a minimum of 150 lumens or *approved* equivalent lighting devices shall be permitted for *tornado shelters* with a *design occupant capacity* of less than 50. Lighting devices shall be provided at a quantity not less than one per 10 occupants and readily available within the *storm shelter.*

702.8 ~~**702.5**~~ **Standby power.** Where required by Section 702.4 or 702.7 ~~702.8~~, *community tornado shelters* shall be provided with a standby power system. The standby power system shall support *occupied storm shelter areas* and *occupant support areas*.

702.8.1 ~~**702.5.1**~~ **Capacity.** The standby power system shall have adequate capacity and rating to supply all required systems and circuits for standby lighting and any mechanical ventilation systems intended to be operated at one time.

702.8.2 ~~**702.5.2**~~ **Duration.** The standby power system shall be designed to provide continuously the required output capacity for a minimum of 2 hours.

702.8.3 ~~**702.5.3**~~ **Protection of components.** Standby power supply, transformers, distribution panels, cabling, fuel supply storage tanks, fuel lines and power supply to *storm shelter critical support system* components shall be protected in accordance with Section 701.2.

702.9 First aid kit. (no change to text)

SECTION 703
HURRICANE SHELTERS

703.6 Ventilation. (no change to text)

703.6.1 Natural ventilation. (no change to text)

TABLE 703.6.1
VENTING AREA REQUIREMENTS FOR HURRICANE SHELTERS

(no change to table)

703.6.1.1 Location of ventilation openings. (no change to text)

703.6.1.2 Mechanical vents. Mechanical vents, louvers or dampers used to operate *ventilation* openings shall be connected to a standby power system.

703.6.2 Mechanical ventilation. The minimum mechanical ventilation rate of required outdoor air shall be determined at a minimum rate of 5 cubic feet per minute per occupant for the *design occupant capacity*. The mechanical ventilation system shall be connected to a standby power system.

703.6.3 Intake openings. (no change to text)

703.6.4 Opening protection. (no change to text)

703.7 ~~**703.8**~~ **Electrical grounding and bonding of hurricane shelters.** (no change to text)

703.8 ~~**703.9**~~ **Exit signs and emergency lighting.** (no change to text)

703.9 ~~**703.10**~~ **Standby lighting.** *Community hurricane shelters* shall be provided with a standby lighting system. The standby lighting system shall provide illumination levels of not less than 1 foot-candle (11 lux) at the walking surface in *occupied storm shelter areas*, and *occupant support areas*. The standby lighting system shall be connected to a standby power system.

Exception: Personal-use lighting devices such as flashlights with a minimum of 150 lumens or *approved* equivalent lighting devices shall be permitted for *hurricane shelters* with a *design occupant capacity* less than 50. Lighting devices, shall be provided at a quantity not less than one per 10 occupants and readily available within the *storm shelter*.

703.10 ~~**703.7**~~ **Standby power.** Where required by Section 703.6 or 703.9 ~~703.10~~, *community hurricane shelters* shall be provided with a standby electrical power system. The standby power system shall support *occupied storm shelter areas* and *occupant support areas*.

703.10.1 ~~**703.7.1**~~ **Capacity.** The standby power system shall have adequate capacity and rating to supply all required systems and circuits for standby lighting and any mechanical ventilation systems intended to be operated at one time.

703.10.2 ~~**703.7.2**~~ **Duration.** The standby power system shall be designed to provide continuously the required output capacity for a minimum of 24 hours.

703.10.3 ~~**703.7.3**~~ **Independence.** The standby power supply shall be located on-site, and shall be independent of off-site sources of fuel or water.

703.10.4 ~~**703.7.4**~~ **Protection of components.** Standby power supply, transformers, distribution panels, cabling, fuel supply storage tanks, fuel lines and power supply to *storm shelter critical support system* components shall be protected in accordance with Section 701.2.

703.10.5 ~~**703.7.5**~~ **Location.** Standby power supply shall be accessible by a protected access route. The access route shall be located within the *hurricane shelter* or shall meet the provisions for exterior wall and roof *impact-protective systems* in accordance with this standard.

703.11 First aid kit. (no change to text).

Reason: It is more logical to have standby power after where it is required for ventilation and lighting.

Committee Action: Approval as Submitted (Vote:12-0-0)

Modification (if any):

Committee Reason: It is more logical to have standby power after where it is required for ventilation and lighting.

Report for *07-06– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: It is more logical to have standby power after where it is required for ventilation and lighting.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION:		

Report for *07-06– 23*
Modification (if any):
Committee Reason:

IS-STM 07-07-23

703.3.4.1

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.3.4.1 Storage capacity for water supply and wastewater. In community shelters with a design occupant capacity of 50 or greater, the capacity of plumbing and waste disposal systems to supply water and contain or dispose of wastewater or solid wastes shall be 1 gallon (3.8 L) per occupant of supply water in addition to the drinking water required in Section 703.4 and 1.5 gallons (5.68 L) capacity per occupant for containment of wastewater.

> **Exception:** Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and wastewater storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

Reason: Adds clarity

Committee Action: Approval as submitted (Vote:12-0-0)

Modification (if any):

Committee Reason: Add clarity to the requirements. 'Waste water' should be one word (staff to check throughout standard.

Report for *07-07– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Add clarity to the requirements. 'Waste water' should be one word (staff to check throughout standard.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-08-23

703.3.4.1, 703.4

Proponent: ICC Work Group 7

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *hurricane shelter.*

703.3.4.1 Storage capacity for water supply and waste water. In community shelters with a design occupant capacity of 50 or greater, the capacity of plumbing and waste disposal systems to supply water and contain or dispose of waste water or solid wastes shall be 1 gallon (3.8 L) per occupant of supply water ~~in addition to the drinking water required in Section 703.4~~ and 1.5 gallons (5.68 L) per occupant for of waste water .

Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and waste water storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

703.4 Drinking water. For *community hurricane shelters* at least 1 gallon (3.8 L) of drinking water shall be provided for each occupant in addition to the supply water requirements in Section 703.3.4.1.

Reason: The current reference in Section 703.3.4.1 appears to indicate that the there has to be storage for 1.5 gallons for waste water plus the 1 gallon of drinking water. The current requirements for waste containment already considers normal consumption of food and drink and the waste generated in the 1.5 gallons.

Committee Action: Disapproval (Vote:11-0-0)

Modification (if any):

Committee Reason: - The current text is easier to understand than the proposed relocation.

Report for *07-08– 23*		
Committee decision: D	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The current text is easier to understand than the proposed relocation.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		

Report for *07-08– 23*		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-09-23
703.6

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.6 Ventilation. Occupied spaces in hurricane shelters shall be provided with natural ventilation in accordance with Section 703.6.1. ~~Occupied space in community hurricane shelters with a~~ Where the design occupant capacity is ~~of~~ 50 or greater the storm shelter shall also be ventilated ~~by~~ with mechanical means in accordance with Section 703.6.2. Ventilation openings for natural and mechanical ventilation shall comply with Sections 703.6.3 and 703.6.4.

Reason: Text here sounds like shelters under 50 are required to be natural and 50 or greater are required to be mechanical. If the intent is when the occupant capacity is 50 or greater than both natural and mechanical are required then this should be stated more explicitly.

Committee Action: Approval as Submitted (Vote:12-0-0)
Modification (if any):
Committee Reason: This is a clarification for shelters with occupants of 50 or greater. This is coordinated with commentary.

Report for *07-09– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This is a clarification for shelters with occupants of 50 or greater. This is coordinated with commentary.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-10-23
703.6

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.6 Ventilation. Occupied spaces in hurricane shelters shall be provided with natural ventilation in accordance with Section 703.6.1~~. Occupied space in community hurricane shelters with a design occupant capacity of 50~~ or ~~greater shall be ventilated by~~ with mechanical means in accordance with Section 703.6.2. Ventilation openings for natural and mechanical ventilation shall comply with Sections 703.6.3 and 703.6.4.

Reason: There is no reason to provide both natural and mechanical ventilation and a standby power system. This is double redundancy.

Committee Action: Disapproval (Vote:8-2-2)
Modification (if any):
Committee Reason: This redundancy is needed in a hurricane shelter to address the possibility of an extended time or loss of power.

Report for *07-10– 23*		
Committee decision: D	***Committee Vote at Meeting: 8-2-2***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This redundancy is needed in a hurricane shelter to address the possibility of an extended time or loss of power.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-11-23

703.3.4.1, Table 703.4.1(New)

Proponent: Dan Dain, representing NSSA

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.3.4 Sanitation support method. A sanitation support method for the water closets or lavatories shall be capable of supplying water and containing waste for the *design occupant capacity* of the *hurricane shelter.*

703.3.4.1 Storage capacity for water supply and waste water. Provide water supply and waste water storage in accordance with Table 703.3. ~~In community shelters with a *design occupant capacity* of 50 or greater, the capacity of plumbing and waste disposal systems to supply water and contain or dispose of waste water or solid wastes shall be 1 gallon (3.8 L) per occupant of supply water in addition to the drinking water required in Section 703.4 and 1.5 gallons (5.68 L) per occupant for waste water.~~

Exception: Where temporary water closets or lavatories are provided that do not require water, the requirement for supply and waste water storage shall be permitted to be reduced proportional to the total required water closets and lavatories.

TABLE 703.4.1
WATER SUPPLY AND WASTE WATER STORAGE HURRICANE SHELTERS

STORAGE SHELTER TYPE	POTABLE WATER	WASTE WATER
Residential, one- and two-family dwellings	Not required	Not required
Residential, other	Not required	Not required
Community with <= occupants	Not required	Not required
Community with > 50 occupants	1 gallon per occupant	1.5 gallons per occupant

Reason: Bring back the water and supply storage table in 703.

Committee Action: Disapproval (Vote:12-0-0)

Modification (if any):

Committee Reason: This adds confusion with potable water - gray water does not need to be potable; drinking water gets lost. Table is mostly to say not required instead of one statement saying where.

Report for *07-11– 23*		
Committee decision: D	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This adds confusion with potable water - gray water does not need to be potable; drinking water gets lost. Table is mostly to say not required instead of one statement saying where.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 07-12-23

703.7.3

Proponent: ICC Work Group 7

Revise as follows:

SECTION 703
HURRICANE SHELTERS

703.7.3 Independence. ~~The~~ Where the standby power supply ~~shall be~~ is located on-site, ~~and~~ the standby power supply shall be independent of off-site sources of fuel or water.

Reason: Some states that have community hurricane shelters have generators in one central location and move them to the shelter that are being opened in anticipation of the hurricane hitting that location.

IS-STM 07-12-23 replacement

703.7.3, 703.7.5

Proponent: ICC Work Group 7

Revise as follows:

703.7.3 Independence. The standby power supply shall be ~~–~~located on-site, and the standby power supply shall be independent of ~~off-site~~ municipal sources of fuel or water.

Exception: A standby power supply is not required on-site where the standby power supply is to be brought in as part of an approved emergency operations plan.

703.7.4 Protection of components. Standby power supply, transformers, distribution panels, cabling, fuel supply storage tanks, fuel lines and power supply to *storm shelter critical support system* components shall be protected in accordance with Section 701.2.

~~**703.7.5 Location.** Standby power supply shall be accessible by a protected access route. The access route shall be located within the *hurricane shelter* or shall meet the provisions for exterior wall and roof *impact-protective systems* in accordance with this standard.~~

Reason: Some states that have community hurricane shelters have generators in one central location and move them to the shelter that are being opened in anticipation of the hurricane hitting that location.

RE: Hurricane Shelter Protected Generator Paths:
Just had a conversation with three electrical engineers with ICC500 (tornado) design experience. (I'm currently at the Texas Society of Professional Engineers Conference.)
Their recommendation was to not require the wind-protected path, but possibly to require a generator annunciator panel within the shelter area, which would provide feedback on generator status, low fuel levels, or other issues - like if transfer switch has been placed in maintenance mode (the most likely 'unplugged' condition) from within the shelter.
Without tools and parts on site, there are limited repair options during the event for a general occupant.

Committee Action: As Modified (Vote10-0-1)

Modification (if any):

Replace with the following:

~~**703.7.5 Location.** Standby power supply shall be accessible by a protected access route. The access route shall be located within the *hurricane shelter* or shall meet the provisions for exterior wall and roof *impact-protective systems* in accordance with this standard.~~

Committee Reason: Without tools and parts on site, or trained personnel, there are limited repair options during the event for a general occupant. There is also a concern with the fumes from the generator coming from the generator through this connection.

Notes 5-18-2023: Send back to work group 7. On-site can be temporary and permanent. Look at title.

Report for *07-12– 23*		
Committee decision: AM	***Committee Vote at Meeting: 10-0-1***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace with the following:** ~~**703.7.5 Location.** Standby power supply shall be accessible by a protected access route. The access route shall be located within the *hurricane shelter* or shall meet the provisions for exterior wall and roof *impact-protective systems* in accordance with this standard.~~		
Committee Reason: Without tools and parts on site, or trained personnel, there are limited repair options during the event for a general occupant. There is also a concern with the fumes from the generator coming from the generator through this connection.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 8
TEST METHODS FOR IMPACT AND PRESSURE TESTING

IS-STM 08-01-23
802.5

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 802
TEST SPECIMENS

802.5 Fire, pressure, and impact testing ~~Testing for fire-resistance rating~~. ~~Materials, elements or assemblies required to have testing for compliance with the fire-resistance ratings or fire-protection ratings required by Section 603, and~~ Wall or ceiling assemblies and impact-protective systems located in walls or horizontal assemblies required to have a fire-resistance rating or fire-protection rating, and required to have pressure and impact testing conducted in accordance with Chapter 8, shall be subjected to fire testing separately from the pressure and impact testing. Fire testing shall be permitted on separate specimens from the pressure and impact testing.

Reason:

1) Main point of this section is to separate fire testing from pressure/impact tests
2) Modified language allows for Section 306 criteria to determine performance reqmt's
3) Change of Title describes all 3 performance aspects

Committee Action: Approval as Modified (Vote:12-0-0)
Modification (if any):

Replace with the following

802.5 Fire, pressure, and impact testing ~~Testing for fire-resistance rating~~. ~~Materials, elements or assemblies~~ Wall assemblies, roof assemblies and impact protective systems required to have ~~testing for compliance with the~~ a fire-~~resistance~~ ratings ~~or fire-protection ratings required~~ by Section 603, and required to have pressure and impact testing conducted in accordance with Chapter 8, shall be subjected to fire testing separately from the pressure and impact testing. Fire testing shall be permitted on separate specimens from the pressure and impact testing.

Committee Reason: The modification uses the same terminology as Sections 802.1 and the subsections in Section 803.9. 'Fire protection rating' is not needed and is not used in Section 603 – simplify by saying fire rating.

Staff question: Section 603 uses 'wall or horizontal assemblies…fire-resistance rating'. Section 802.1 and 803.9 use 'wall and roof assemblies or impact protective systems…impact and pressure testing.".

The following are defined terms –

HORIZONTAL ASSEMBLY. A fire-resistance-rated floor or *roof assembly* of materials designed to restrict the spread of fire in which continuity is maintained.

IMPACT-PROTECTIVE SYSTEM. An assembly or device, subject to static or cyclic pressure and impact testing as detailed in this standard, installed to protect an opening in the *storm shelter envelope*.

To have consistent terminology throughout, can the modification be as follows:

Replace with the following

802.5 Fire, pressure, and impact testing ~~Testing for fire-resistance rating~~. ~~Materials, elements or assemblies~~ Wall assemblies, roof assemblies and impact protective systems required to have ~~testing for compliance with the~~ a fire-resistance ratings ~~or fire-protection ratings required~~ by Section 603, and required to have pressure and impact testing conducted in accordance with Chapter 8, shall be subjected to fire testing separately from the pressure and impact testing. Fire testing shall be permitted on separate specimens from the pressure and impact testing.

Committee reason: Consistency with Section 603 terms. Perhaps 'fire protection rating' should be mentioned in 603 in the future. Vote: As modified (10-0-1)

Report for *08-01– 23*		
Committee decision: AM	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Replace with the following** **802.5 Fire, pressure, and impact testing ~~Testing for fire-resistance rating~~.** ~~Materials, elements or assemblies~~ Wall assemblies, roof assemblies and impact protective systems required to have ~~testing for compliance with the~~ a fire-resistance ratings ~~or fire-protection ratings required~~ by Section 603, and required to have pressure and impact testing conducted in accordance with Chapter 8, shall be subjected to fire testing separately from the pressure and impact testing. Fire testing shall be permitted on separate specimens from the pressure and impact testing.		
Committee Reason: The modification uses the same terminology as Sections 802.1 and the subsections in Section 803.9. 'Fire protection rating' is not needed and is not used in Section 603.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-02-23

803.9

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 803
IMPACT TESTING

803.9 Impact locations and the number of impacts. For purposes of testing ~~*impact-protective systems*~~, impact locations and quantities shall be as indicated in Sections 803.9.1 through 803.9.7.3, as applicable. The tolerance for impact locations shall be within a $2^1/_2$ inch (64 mm) radius circle, with the center of the circle located as indicated in Sections 803.9.1 through 803.9.7.3, as applicable.

Reason: Section 803.9 contains impact locations for items beyond those classified as Impact Protective Systems (i.e. wall/roof assemblies). The shelter envelope is defined as being comprised of wall/roof/floor assemblies as well as IPS, while IPS is defined to be protecting openings in the shelter envelope. Deleting 'impact protective systems' will fix this.

Committee Action: Approval as Submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: Section 803.9 contains impact locations for items beyond those classified as Impact Protective Systems (i.e. wall/roof assemblies). The shelter envelope is defined as being comprised of wall/roof/floor assemblies as well as IPS, while IPS is defined to be protecting openings in the shelter envelope. Deleting 'impact protective systems' will fix this.

Report for *08-02– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Section 803.9 contains impact locations for items beyond those classified as Impact Protective Systems (i.e. wall/roof assemblies). The shelter envelope is defined as being comprised of wall/roof/floor assemblies as well as IPS, while IPS is defined to be protecting openings in the shelter envelope. Deleting 'impact protective systems' will fix this.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		

Report for *08-02– 23*
Committee Reason:

IS-STM 08-03-23

803.9.1

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 803
IMPACT TESTING

803.9.1 Panel or framed wall assemblies and roof assemblies. Sections of panel or framed wall assemblies and roof assemblies shall be impacted in the center of the section, and at one interface corner as detailed in Figures 803.9.1(1) and 803.9.1(2). Where an interior stud or support is present at the center of the wall section, the center wall impact shall be adjusted to strike centered between studs or supports.

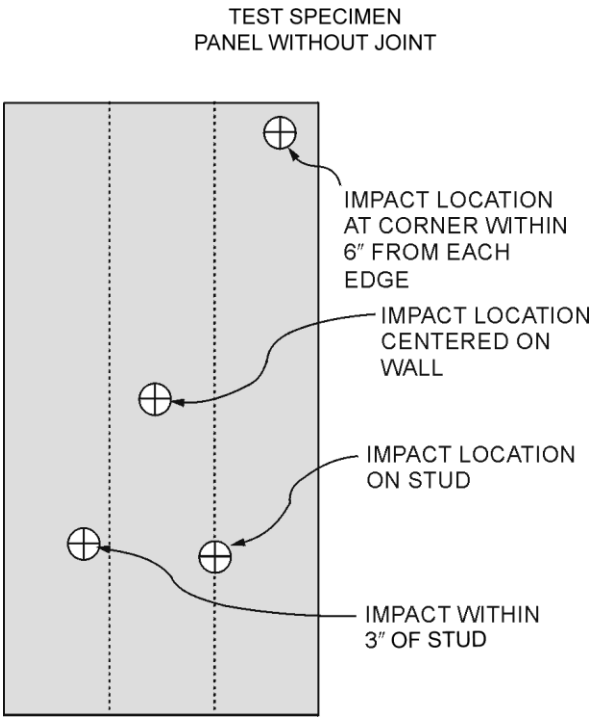
Where an interior stud or support is present, additional impacts shall be performed within 3 inches (76 mm) of the stud or support, and directly on a stud support, as detailed in Figures 803.9.1(1) and 803.9.1(2).

Interface joints used for attachment or joining at corners, at panel-to-panel sections, or at panel-to-roof shall be impacted directly on the interface joints as detailed in Figure 803.9.1(2) for each type of joint.

Where a section contains lapped materials, the centered impact shall be adjusted to strike the center of any lap, and an additional impact shall be performed within 3 inches (76 mm) of the lap on the panel that laps behind the seam as detailed in Figure 803.9.1(2).

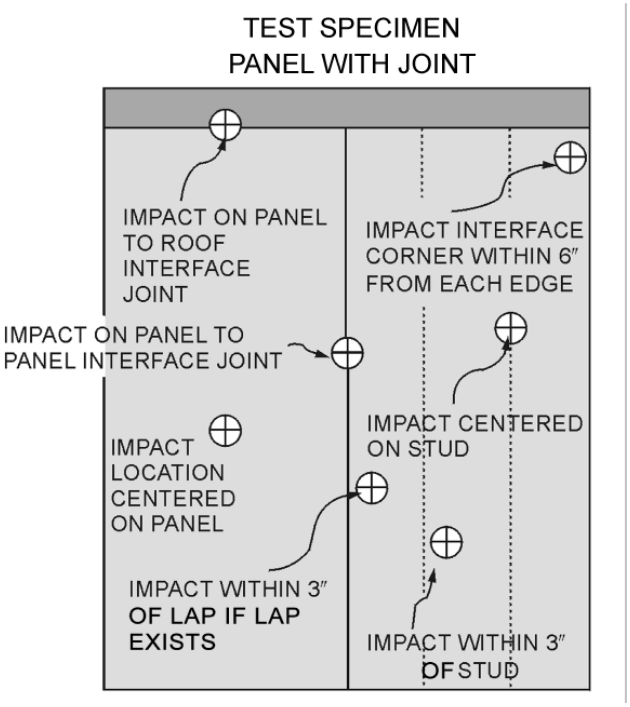
No more than three impacts shall be made on one *specimen*. Where more than three impacts are required, multiple identical test *specimens* shall be provided.

> **Exception:** More than three impacts shall be permitted to be made on the same test *specimen* by mutual con- sent of the test sponsor and *test laboratory*.



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.1(1)
PANEL OR FRAMED WALL ASSEMBLIES AND ROOF ASSEMBLIES



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.1(2)

PANEL OR FRAMED WALL ASSEMBLIES AND ROOF ASSEMBLIES

Staff Note: Direction is needed for any changes to the graphics.

Reason: Framed wall and roof assemblies may have an interior stud or support present at the center of the wall section (e.g. a 4-foot-wide wall with 24 inch on-center stud spacing). In this case, it is necessary to move the wall's center impact to a section of the wall without interior studs or supports so that this thinnest section of the assembly may be evaluated. The impact on the stud is covered by the following paragraph, which is not being revised.

Committee Action: Approval as submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: Framed wall and roof assemblies may have an interior stud or support present at the center of the wall section (e.g. a 4-foot-wide wall with 24 inch on-center stud spacing). In this case, it is necessary to move the wall's center impact to a section of the wall without interior studs or supports so that this thinnest section of the assembly may be evaluated. The impact on the stud is covered by the following paragraph, which is not being revised.
No change to graphics.

Report for *08-03– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Framed wall and roof assemblies may have an interior stud or support present at the center of the wall section (e.g. a 4-foot-wide wall with 24 inch on-center stud spacing). In this case, it is necessary to move the wall's center impact to a section of the wall without interior studs or supports so that this thinnest section of the assembly may be evaluated. The impact on the stud is covered by the following paragraph, which is not being revised. No change to graphics.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-04-23
Figure 803.9.3(2)

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 803
IMPACT TESTING

803.9.3 Masonry unit wall assemblies and roof assemblies. Sections of wall assemblies and roof assemblies constructed of masonry units shall be impacted in the center of the section, and at one interface corner or joint as detailed in Figure 803.9.3(1). Mortared joints shall be impacted directly on the interface joints as detailed in Figure 803.9.3(2).

No more than three impacts shall be made on one *specimen* or specimen panel. Where more than three impacts are required, multiple identical test *specimens* shall be pro- vided.

Exception: More than three impacts shall be permitted to be made on the same test *specimen* by mutual consent of the test sponsor and *test laboratory*.

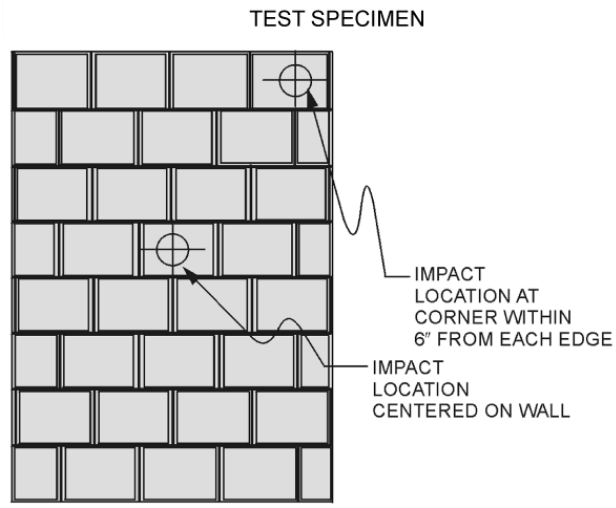


FIGURE 803.9.3(1)
MASONRY UNIT WALL ASSEMBLIES AND ROOF ASSEMBLIES

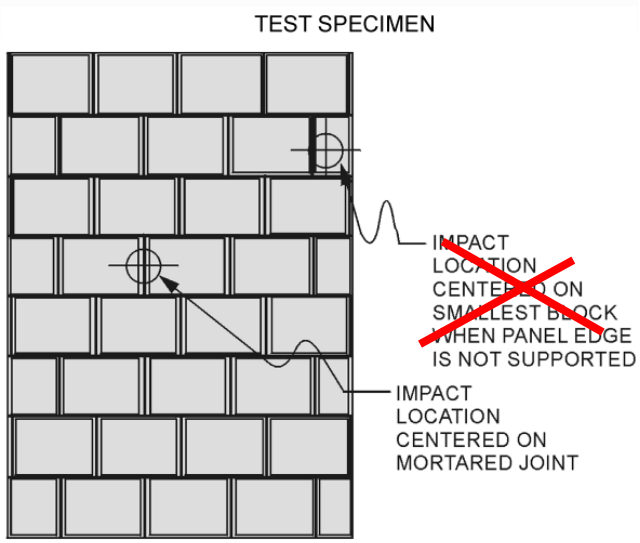


FIGURE 803.9.3(2)
MASONRY UNIT WALL ASSEMBLIES AND ROOF ASSEMBLIES

Reason: The smallest block impact does not appear in the text requirements. As the figures are informational only, the figure should be revised to match the text requirements.

Committee Action: Approval as Submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: The smallest block impact does not appear in the text requirements. As the figures are informational only, the figure should be revised to match the text requirements. Consider combining graphics.

Report for *08-04– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The smallest block impact does not appear in the text requirements. As the figures are informational only, the figure should be revised to match the text requirements. Consider combining graphics.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-05-23

803.9.4.3, Figure 803.9.4.3

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 803
IMPACT TESTING

803.9.4.3 Sectional door assemblies. For sectional door assemblies, the door shall be impacted centered on a section joint at a hinge location nearest the midpoint of the test specimen, equidistant between the lower two section joints and centered between two vertical stiles, centered at a point 6 inches horizontally and vertically away from a ~~at one~~ bottom corner, and within 6 inches (152 mm) of the primary latch or lock mechanism ~~as shown~~.See example in Figure 803.9.4.3.

EXISTING FIGURE

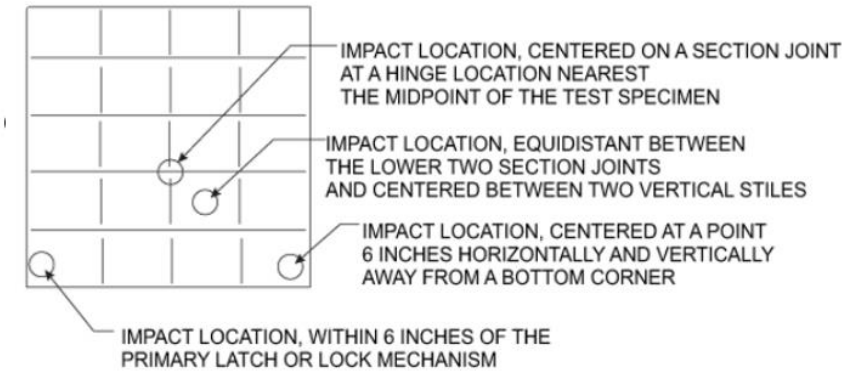


FIGURE 803.9.4.3SECTIONAL DOOR ASSEMBLIES

PROPOSED NEW FIGURE

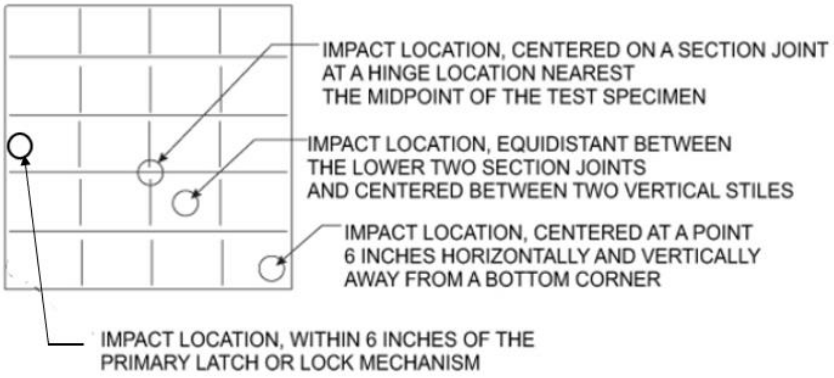


FIGURE 803.9.4.3SECTIONAL DOOR ASSEMBLIES

Reason: Cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure.
Modifications allow for clarity between figures and text.
Current figure shows lock in bottom corner – where it never is for sectional doors. Move to mid-sectional as shown

Committee Action: Approval as Submitted (Vote:11-0-0)

Modification (if any):

Committee Reason: Agree with reason and new figure.

Report for *08-05– 23*		
Committee decision: AS	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure. Modifications allow for clarity between figures and text. Current figure shows lock in bottom corner – where it never is for sectional doors. Move to mid-sectional as shown		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-06-23

202, 803.9.5

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 202
DEFINITIONS

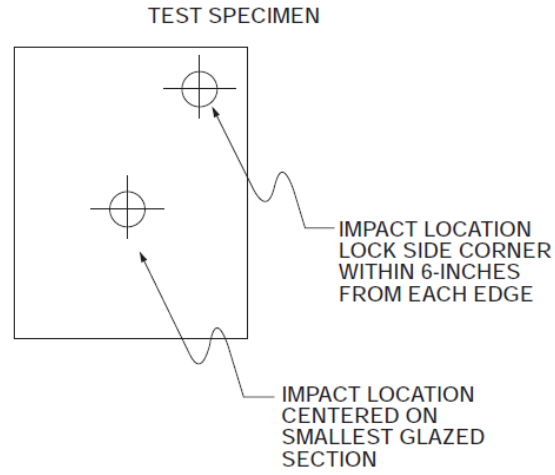
MULLION. A structural member used to connect or divide impact protective systems or individual elements within an impact protective systems.

SECTION 803
IMPACT TESTING

803.9.5 Window assemblies and other glazed openings. All window assemblies and other glazed openings shall be impacted in the center of the smallest glazed section, and at the lock side corner, or one interface corner, within 6 inches from each edge as applicable ~~one interface corner~~ as detailed in Figure 803.9.5(1). Where interior mullions or other glazed section joints ~~and/or latches~~ are present, the assembly shall be impacted centered on the mullion and at base of mullion ~~additional impacts shall be applied on these features~~ as shown in Figure 803.9.5(2). Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen.

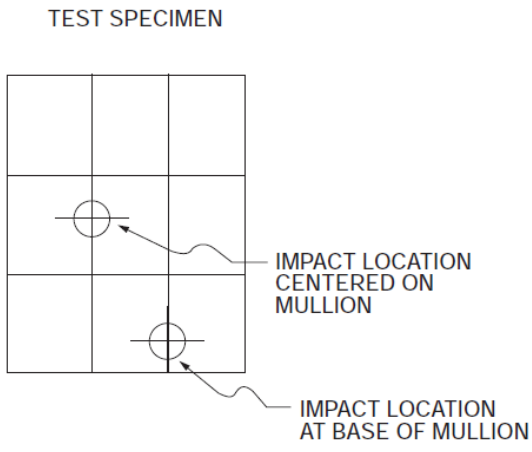
No more than two impacts shall be made on one *specimen*. Where more than two impacts are required, multiple identical test *specimens* shall be provided.

Exception: More than two impacts shall be permitted to be made on the same test specimen by mutual consent of the test sponsor and *test laboratory*.



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.5(1)
WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.5(2)
WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS

Reason: Cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure.
There is no illustration for latches, only lock - add same text from 803.9.6.
Addition of "Mullion" definition to support Section 803.9.5 revisions.
Modified language allows for clarifying language of 'lock/latch corner' impact location
Addition of Section 803.9.5.2 to evaluate performance of different mullion designs and connections.
New Section 803.9.5.3 to qualify performance for operable windows separate from fixed windows.

Committee Action: Approval as Modified (Vote: 12-0-0)

Modification (if any):

Further modify as follows:

SECTION 202
DEFINITIONS

~~**MULLION.** A structural member used to connect or divide impact protective systems or individual elements within an impact protective systems.~~

Modify figure 803.9.5(1) to include 'one interface corner' in note

Committee Reason: The definition is deleted as this will be dealt with in a different change. Change graphic to match change for fixed windows – add 'interface corner to note on right side of 803.9.5(1). This proposal is a cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure.

Report for *08-06– 23*		
Committee decision: AM	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***

Report for *08-06– 23*		
REPORT OF HEARING: Modification (if any): **SECTION 202** **DEFINITIONS** ~~**MULLION.** A structural member used to connect or divide impact protective systems or individual elements within an impact protective systems.~~ Modify figure 803.9.5(1) to include 'one interface corner' in note		
Committee Reason: The definition is deleted as this will be dealt with in a different change. Change graphic to match change for fixed windows – add 'interface corner to note on right side of 803.9.5(1). This proposal is a cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-07-23

202, 803.9.5, 803.9.5.1(New), 803.9.5.2(New), 803.9.5.3(New), Figure 803.9.5.3(1)(New), Figure 803.9.5.3(2)(New)

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 202
DEFINITIONS

MULLION. A structural member used to connect or divide impact protective systems or individual elements within an impact protective systems.

SECTION 803
IMPACT TESTING

803.9.5 Window assemblies and other glazed openings. All window assemblies and other glazed openings shall comply with Sections 803.9.5.1 and 803.9.5.2. Operable window assemblies shall also comply with Section 803.9.5.3.

803.9.5.1 Glazed openings. Glazed openings shall be impacted in the center of the smallest glazed section, and at one lock/latch side corner where a lock/latch is provided, or one interface corner where no lock/latch is provided, within 6 inches from each edge. See example ~~as detailed~~ in Figure ~~803.9.5(1)~~ 803.9.5.1.

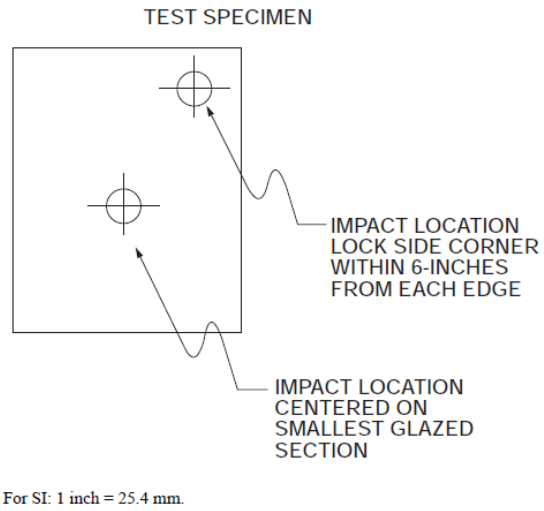


Figure ~~803.9.5(1)~~ 803.9.5.1
WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS
(Note: Change 'lock' to 'lock/latch' in note)

803.9.5.2 Mullions and mullion connections. Where ~~interior~~ mullions or other glazed section joints ~~and/or latches~~ are present~~, the assembly~~ each *mullion* design and *mullion* connection design shall be impacted ~~centered on~~ at the center of the mullion ~~and at base of mullion additional impacts shall be applied on these features~~ , and at the end of the *mullion* within 6 inches of the *mullion* joint. See example ~~as shown~~ in Figure ~~803.9.5(2)~~ 803.9.5.2. Where multiple identical instances of a *mullion* design or *mullion* connection design are present, the worst-case instances shall be selected by the test laboratory for impact testing.

No more than two impacts shall be made on one *specimen*. Where more than two impacts are required, multiple identical test *specimens* shall be provided.

Exception: More than two impacts shall be permitted to be made on the same test specimen by mutual consent of the test sponsor and *test laboratory*.

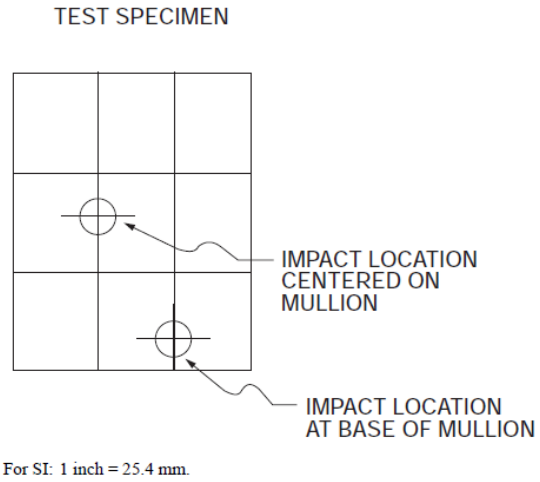


Figure ~~803.9.5(2)~~ 803.9.5.2
WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS WITH MULLIONS

803.9.5.3 Operable window assemblies: Operable window assemblies shall be impacted on the operable panel within 6 inches (152 mm) of an interface hinge joint, within 6 inches (152 mm) of a lock/latch point, and within 6 inches (152 mm) of an operator, plus additional impacts on a center meeting point and end meeting point, where applicable. See example in Figure 803.9.5.3(1).

Where a window assembly contains multiple panels, the operable panel innermost to the *protected occupant area* shall be targeted for impact. Where the multiple panels contain different hardware components, each panel with a unique hardware configuration shall be targeted for impact. See example in Figure 803.9.5.3(2).

No more than four impacts shall be made on one *specimen*. Where more than four impacts are required, multiple identical test *specimens* shall be utilized. Impacts

shown on the same panel in Figure 803.9.5.3(2), shall occur on the same test *specimen*.

Exception: More than four impacts shall be permitted to be made on the same test *specimen* by mutual consent of the test sponsor and *test laboratory*.

(Figure will be developed when proposal is approved based on text)
Figure 803.9.5.3(1)
OPERABLE WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS

(Figure will be developed when proposal is approved based on text)
Figure 803.9.5.3(2)
OPERABLE WINDOW ASSEMBLIES AND OTHER GLAZED OPENINGS WITH MULTIPLE PANELS

Reason: The purpose of this proposal is to clarify the impact requirements for different types of window assemblies.

IS-STM 08-07-23 Modification

202, 803.9.5, 803.9.5.1(New), 803.9.5.2(New), 803.9.5.3(New), Figure 803.9.5.3(1)(New), Figure 803.9.5.3(2)(New)

Proponent: ICC 500 Work Group 8

Further modify as follows:

803.9.6 Other Impact protective systems. All other *impact-protective systems* shall be impacted in the center of the test *specimen,* and at one interface corner as detailed in Figure 803.9.6(1). Panels and interface joints shall be additionally impacted onto the same unit as shown in Figure 803.9.6(2). Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional *specimen*. All *impact-protective systems* that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.

Where an interior stud or support is present, additional impacts onto the same unit shall be performed within 3 inches (76 mm) of the stud and support, and directly on the stud support, as detailed in Figure 803.9.2(1) or 803.9.2(2).

Where mullions are present, additional impacts shall be performed in accordance with Section 803.9.5.2.

Reason: This modification is coordinated with the changes to 08-10-2023.

Committee Action: Disapproval (Vote:8-0-0)

Modification (if any):

Committee Reason: Work on Section 803.9.5.2 is not ready yet.

Report for *08-07– 23*		
Committee decision: D	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Work on Section 803.9.5.2 is not ready yet.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-08-23

803.9.6(New)

Proponent: ICC 500 Work Group 8

Revise as follows:

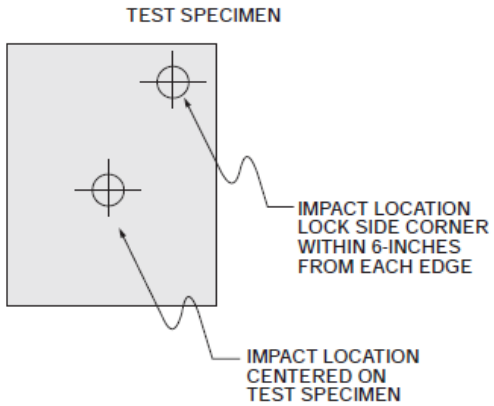
SECTION 803
IMPACT TESTING

803.9.6 Louver assemblies. Louver assembly test specimens shall be impacted at the center of the unsupported span on each unique louver section, and at one interface corner of each unique louver section. See example in Figure 803.9.6(1). The exterior edge of the louver blade shall be impacted by a portion of the leading face of the test missile. See example in Figure 803.9.6(2).

Where an interior stiffener or support is present, additional impacts onto the same test *specimen* shall be performed within 3 inches (76 mm) of stiffener or support, and directly on the stiffener or support. See examples in Figure 803.9.2(1) or 803.9.2(2).

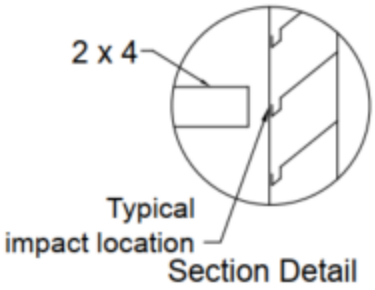
Where mullions are present, additional impacts shall be performed in accordance with Section 803.9.5.2.

(Note: See IS-STM 08-07-23 for Section 803.9.5.2 reference)



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(1)
LOUVER ASSEMBLIES



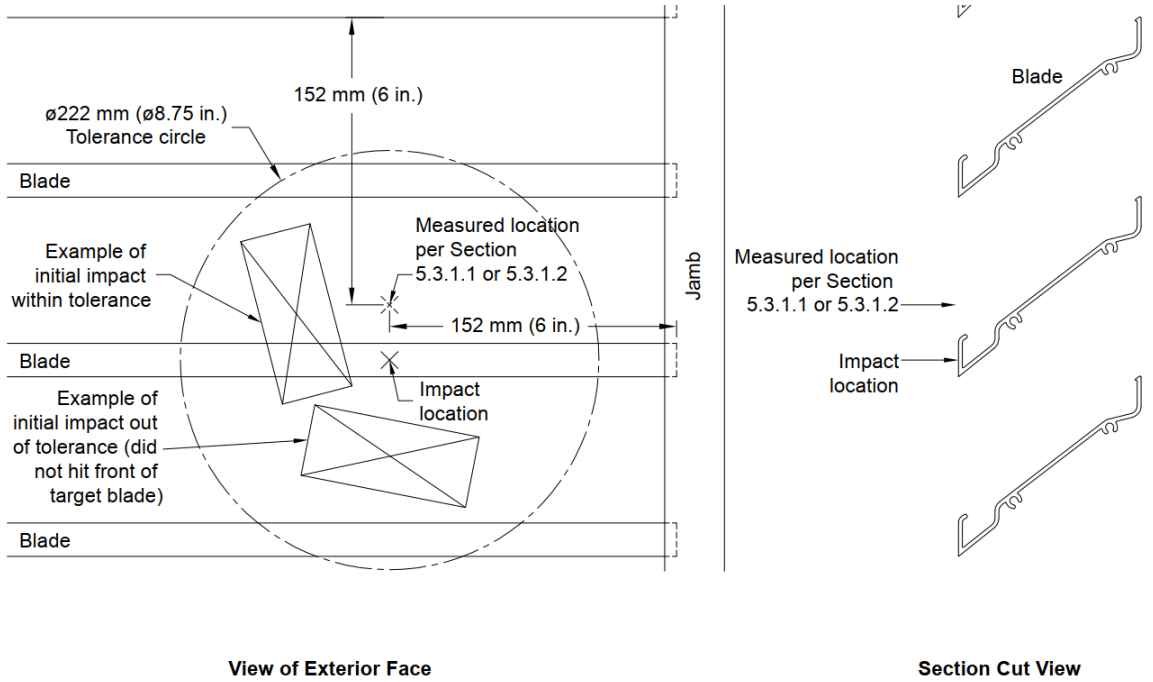


FIGURE 803.9.6(2)
LOUVER ASSEMBLIES

Reason: Specifics are needed for louvers.

Committee Action: Disapproval (Vote: 8-0-0)

Modification (if any):

Committee Reason: Additional review is needed for complete requirements.

Report for *08-08– 23*		
Committee decision: D	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Additional review is needed for complete requirements.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		

Report for *08-08– 23*		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT:		
Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION:		
Modification (if any):		
Committee Reason:		

IS-STM 08-09-23
803.9.6

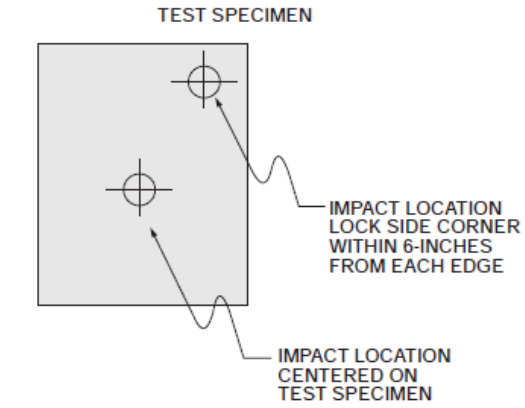
Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 803
IMPACT TESTING

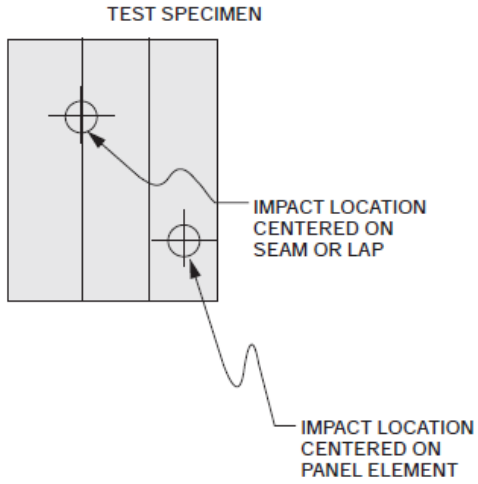
803.9.6 Other impact-protective systems. All other impact-protective systems shall be impacted in the center of the test specimen, and at the lock side corner within 6 inches from each edge ~~one interface corner~~ as detailed in Figure 803.9.6(1). Panels and interface joints shall be additionally impacted onto the same unit centered on seam or lap and centered on panel element as shown in Figure 803.9.6(2). Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen. All impact-protective systems that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.

Where an interior stud or support is present, additional impacts onto the same unit shall be performed within 3 inches (76 mm) of the stud and support, and directly on the stud support, as detailed in Figure 803.9.2(1) or 803.9.2(2).



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(1)
OTHER IMPACT-PROTECTIVE SYSTEMS



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(2)
OTHER IMPACT-PROTECTIVE SYSTEMS

Reason: This is a proposal to coordinate the requirements with the figures. The work group also submitted a proposal with suggested additional language.

Cleanup and clarity of text to align with Figure. There should not be variation in the text between the section language and the figure.
1)This Section to address all other IPS

2) Includes "Mullion" testing from revised Windows Section 803.9.5 (if approved- See IS-STM 08-07-23 and 08-10-23 modification)
3) Includes language to address hinged or pivoted assemblies that perform as a door

All figures to be updated after full committee approval of proposals…

Committee Action: Disapproval (Vote: 10-0-0)

Modification (if any):

Committee Reason: This issue is addressed in 08-10-2023

Report for *08-09– 23*		
Committee decision: D	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: This issue is addressed in 08-10-2023		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-10-23
803.9.6

Proponent: ICC 500 Work Group 8

Revise as follows:

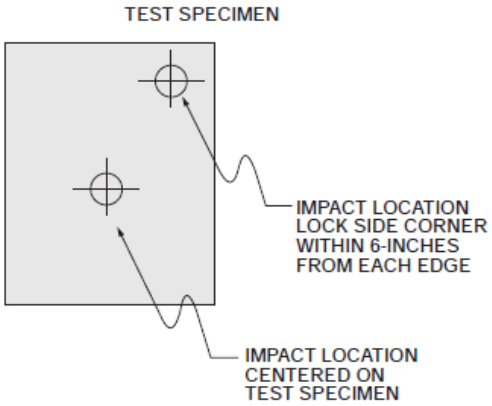
SECTION 803
IMPACT TESTING

803.9.6 Other impact-protective systems. All other impact-protective systems shall be impacted in the center of the test specimen, and one lock/latch side corner where a lock/latch is provided, or one interface corner where no lock/latch is provided, within 6 inches from each edge. ~~one interface corner~~ ~~as detailed~~ See example in Figure 803.9.6(1). Panels and interface joints shall be additionally impacted ~~onto~~ on the same ~~unit~~ test specimen centered at a seam or lap and at the center of a panel element. ~~as shown~~ See example in Figure 803.9.6(2). ~~Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen. All impact-protective systems that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.~~

Where an interior stud or support is present, additional impacts onto the same ~~unit~~ test specimen shall be performed within 3 inches (76 mm) of the stud ~~and~~ or support, and directly on the stud or support~~., as detailed~~ See examples in ~~Figure~~ Figures 803.9.2(1) or 803.9.2(2).

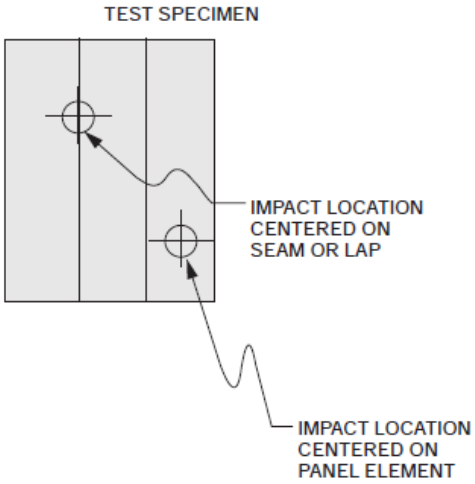
Where mullions are present, additional impacts shall be performed in accordance with Section 803.9.5.2.

All impact-protective systems that include hinged or pivoted assemblies shall be tested in accordance with the applicable requirements of Section 803.9.4.



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(1)
OTHER IMPACT-PROTECTIVE SYSTEMS



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(2)
OTHER IMPACT-PROTECTIVE SYSTEMS

(Note: Change 'lock' to 'lock/latch' in the note)

Reason: This is a proposal for additional information for other impact systems. The work group also submitted a proposal for coordination with the figure only.

IS-STM 08-10-23 Replacement

803.9.6

Proponent: ICC 500 Work Group 8

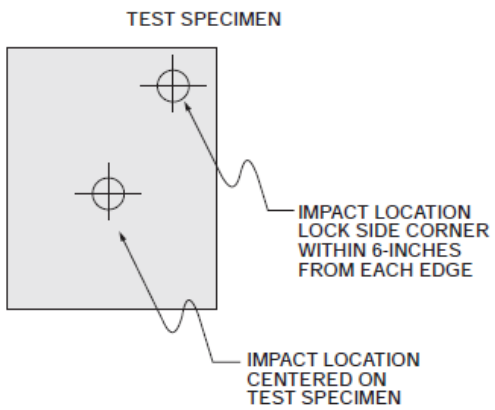
Replace with the following:

803.9.6 Other impact-protective systems.
All operable impact-protective systems shall be tested in accordance with the applicable requirements of Section 803.9.4 or 803.9.5.

All other impact-protective systems shall be impacted in the center of the test specimen, and at a corner within 6 inches from each edge. Where a lock/latch is provided on the test specimen, the corner impact shall occur nearest the lock/latch. ~~and at one interface corner as detailed~~ See example in Figure 803.9.6(1).

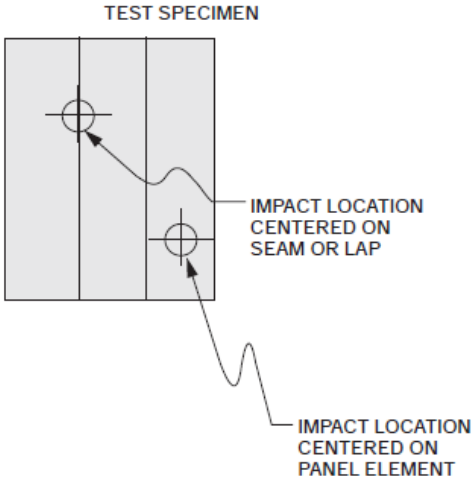
Panels and interface joints shall be additionally impacted ~~onto~~ on the same ~~unit~~ test specimen centered on a seam or lap and centered on a panel element. ~~as shown~~ See example in Figure 803.9.6(2). ~~Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen. All impact-protective systems that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.~~

Where an interior stud or support is present, additional impacts on ~~onto~~ the same ~~unit~~ test specimen shall be performed within 3 inches (76 mm) of the stud ~~and~~ or support, and directly on the stud or support.~~, as detailed~~ See examples in ~~Figure~~ Figures 803.9.2(1) or 803.9.2(2).



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(1)
OTHER IMPACT-PROTECTIVE SYSTEMS



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(2)
OTHER IMPACT-PROTECTIVE SYSTEMS

(Note: Change note for corner to 'impact location within 6 inches from each edge – lock/latch side where lock/latch is provided')

Reason: In progress

Committee Action: Approval as Modified (Vote:10-0-0)

Modification (if any):

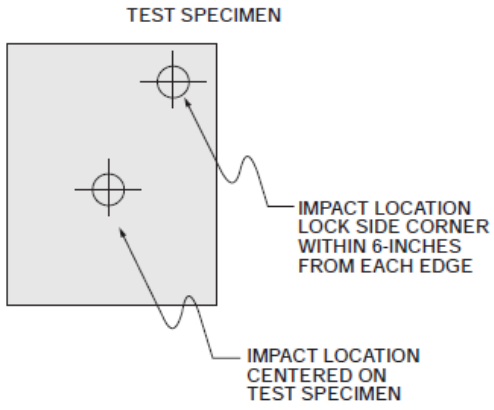
Replace with the following:

803.9.6 Other impact-protective systems. All other impact-protective systems shall be impacted in the center of the test specimen, and at a corner within 6 inches from each edge. Where a lock/latch is provided on the test specimen, the corner impact shall occur nearest the lock/latch. ~~and at one interface corner as detailed~~ See example in Figure 803.9.6(1).

Panels and interface joints shall be additionally impacted ~~onto~~ on the same ~~unit~~ test specimen centered at a seam or lap and at the center of a panel element. ~~as shown~~ See example in Figure 803.9.6(2). ~~Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen. All impact-protective systems that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.~~

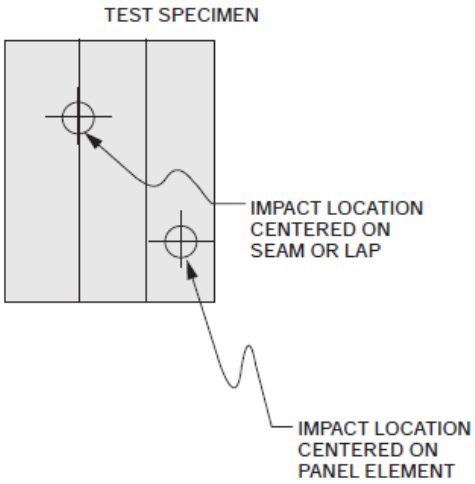
Where an interior stud or support is present, additional impacts onto the same ~~unit~~ test specimen shall be performed within 3 inches (76 mm) of the stud ~~and~~ or support, and directly on the stud or support.~~, as detailed~~ See examples in ~~Figure~~ Figures 803.9.2(1) or 803.9.2(2).

All impact-protective systems that include hinged or pivoted assemblies shall be tested in accordance with the applicable requirements of Section 803.9.4.



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(1)
OTHER IMPACT-PROTECTIVE SYSTEMS



For SI: 1 inch = 25.4 mm.

FIGURE 803.9.6(2)
OTHER IMPACT-PROTECTIVE SYSTEMS

(Note: Change note for corner to 'impact location within 6 inches from each edge – lock/latch side where lock/latch is provided')

Committee Reason: Remove new text on mullions because Work Group 8 is still working on a complete package. This is a clean up of the current language.

Report for *08-10– 23*		
Committee decision: AM	***Committee Vote at Meeting: 10-0-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Replace with the following:

803.9.6 Other impact-protective systems. All other impact-protective systems shall be impacted in the center of the test specimen, and at a corner within 6 inches from each edge. Where a lock/latch is provided on the test specimen, the corner impact shall occur nearest the lock/latch. ~~and at one interface corner as detailed~~ See example in Figure 803.9.6(1).

Panels and interface joints shall be additionally impacted ~~onto~~ on the same ~~unit~~ test specimen centered at a seam or lap and at the center of a panel element. ~~as shown~~ See example in Figure 803.9.6(2). ~~Interface hinge joints and primary latches, where present, shall be impacted as shown in Figure 803.9.4.1(2) on an additional specimen. All impact-protective systems that include swinging door assemblies with latching hardware shall be tested in accordance with Section 803.9.4.~~

Where an interior stud or support is present, additional impacts onto the same ~~unit~~ test specimen shall be performed within 3 inches (76 mm) of the stud ~~and~~ or support, and directly on the stud or support.~~, as detailed~~ See examples in ~~Figure~~ Figures 803.9.2(1) or 803.9.2(2).

All impact-protective systems that include hinged or pivoted assemblies shall be tested in accordance with the applicable requirements of Section 803.9.4.

Report for *08-10– 23*		
Committee Reason: Remove new text on mullions because Work Group 8 is still working on a complete package. This is a clean up of the current language.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-11-23
803.9.7

Proponent: ICC 500 Work Group 8

Revise as follows:

SECTION 803
IMPACT TESTING

803.9.7 Alcove or baffled storm shelter entry systems. Impact testing described in this section required for alcove or baffled *storm shelter entry systems* shall meet the requirements of Sections 304 and 305. See Figure 803.9.7 for an example of an alcove or baffle *storm shelter entry system*. Impact test requirements are presented for systems that comply with one of the following:

1. The missile impacts at least twice on wall or roof assemblies meeting the requirements of Section 306.3 prior to entering the *protected occupant area*. Straight missile paths and elastic impacts are assumed in determining missile trajectories. Test requirements for this type of system are presented in Section 803.9.7.1. Examples of this type of system are shown in Figure 803.9.7.1. The boundary between the *protected occupant area* and the unprotected occupant area shall be clearly marked on the floor and walls of the *storm shelter*.
2. The missile impacts initially a wall or roof assembly meeting the requirements of Section 306.3 and possibly rebounds to impact a door assembly. Straight missile paths and elastic impacts are assumed in determining missile trajectories. The impact test requirements for this type of system are presented in Section 803.9.7.2. Examples of this type of system are shown in Figure~~s 803.9.7.1 and~~ 803.9.7.2.
3. The missile impact on a door assembly is limited to an angle less than 90 degrees (1.57 rad) by *impact-protective systems*. The impact test requirements for this type of system are presented in Section 803.9.7.3. Examples of this type of system are shown in Figure 803.9.7.3.

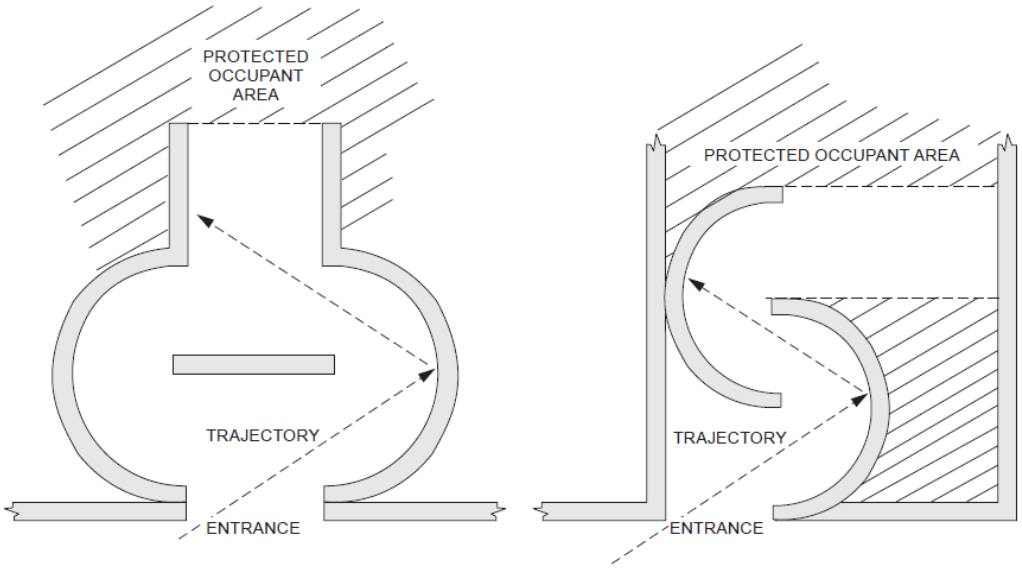


FIGURE 803.9.7.1
ALCOVE OR BAFFLED STORM SHELTER ENTRY SYSTEMS FOR WHICH TESTING IS REQUIRED

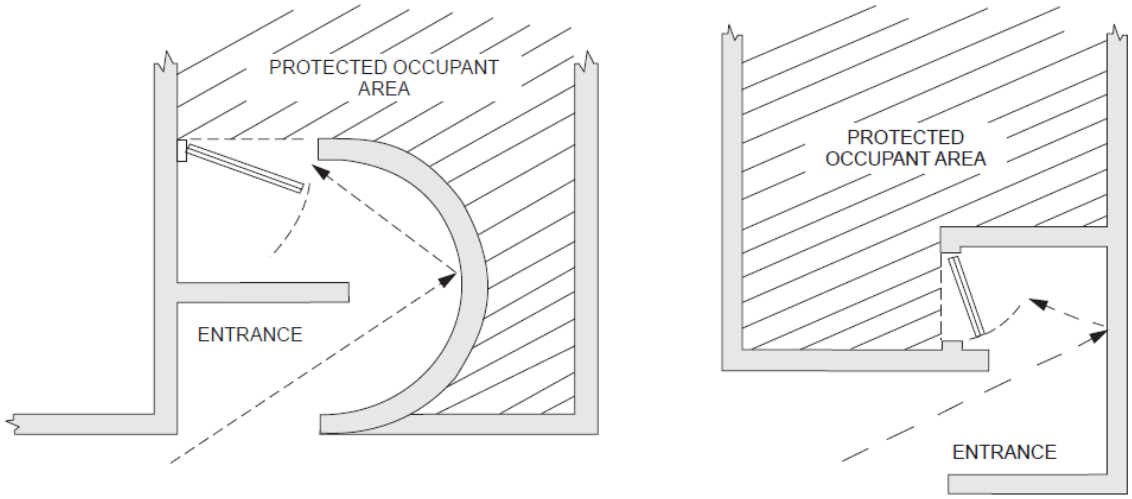


FIGURE 803.9.7.2
DOOR ASSEMBLIES SUBJECT TO REBOUND IMPACT

Reason: Figure 803.9.7.1 does not depict a rebound impact on a door, which is the scope of item 2 and Section 803.9.7.2.

Committee Action: Approval as Submitted (Vote: 12-0-0)

Modification (if any):

Committee Reason: Figure 803.9.7.1 does not depict a rebound impact on a door, which is the scope of item 2 and Section 803.9.7.2.

Report for *08-11– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING:		

Report for *08-11– 23*		
Modification (if any):		
Committee Reason: Figure 803.9.7.1 does not depict a rebound impact on a door, which is the scope of item 2 and Section 803.9.7.2.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-12-23
803.9.7.3

Proponent: ICC Work Group 8

Revise as follows:

SECTION 803
IMPACT TESTING

803.9.7.3 Door assemblies subject to first impact. Where a first-strike angle missile will impact on the door assembly (see Figure 803.9.7.3 for an example) the door assembly shall meet the wind load requirements of Section 306.3, the fire-resistance requirements of Section 603, and ~~meets~~ meet one of the following debris impact criteria:

1. The door assembly withstands the impact of a missile striking the door assembly at an angle closest to perpendicular to the plane of the door.
2. The door assembly withstands missile impacts by the design missile striking perpendicular to the surface with speed equal to or greater than the *storm shelter* design missile's velocity component perpendicular to the door assembly for the most critical angle that can occur in the application.

The minimum debris impact criterion for the door assembly shall be an impact perpendicular to the door assembly of a 9-pound sawn lumber 2 by 4 traveling at 50 feet per second [34 mph (15.2 m/s)].

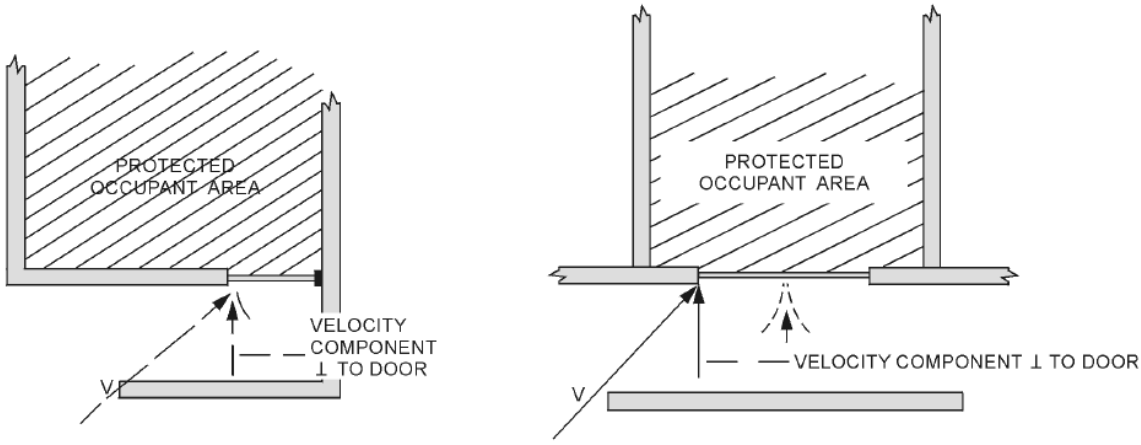


FIGURE 803.9.7.3
DOOR ASSEMBLIES SUBJECT TO REBOUND IMPACT

Reason: Consistency with other sections.

Committee Action: Approval as submitted (Vote:12-0-0)
Modification (if any):

Committee Reason: Consistency with other sections.

Report for *08-12– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Consistency with other sections.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-13-23
803.10.1, 803.10.4

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 803
IMPACT TESTING

803.10.1 Perforation. Any perforation of the interior surface of <u>any component of</u> the tested <u>assembly</u> ~~component of the storm shelter envelope~~ by the design missile shall constitute a failure. ~~For impact-protective systems, perforation or deflection that would result in impact of the protected component constitutes a failure.~~ <u>For pre-existing joint openings, the creation of a through opening in the tested assembly allowing the complete passage of a 3/8 inch (9.5 mm) rod at any angle shall constitute a failure.</u>

<u>**Exception:** Joints, gaps, or voids permitted by Section 306.5 to be greater than 3/8 inches (9.5 mm) shall not exceed their permitted size after testing.</u>

803.10.4 Permanent deformation. Permanent deformation of an interior surface of the test specimen shall be determined by measuring the distance from a straight edge held between two undeformed points on the specimen. The maximum permanent deformation shall be measured to the nearest 1/8 inch (3.2 mm) and shall not exceed 3 inches (76 mm). <u>For impact-protective systems, deflection that would result in impact of the protected component constitutes a failure.</u>

Reason: 1) Additional guidance is required on what constitutes perforation by the missile. If an existing joint/gap is expanded due to the impact, is this considered to be perforation? The current language is subjective, which has led to varying applications at different labs. This revision establishes an objective metric to evaluate perforation to ensure consistency across labs. The exception recognizes that some joints and gaps are permitted by Section 306.5 to be larger than 3/8" (i.e. door undercut) and in those cases the permitted dimension is not intended to be reduced by this requirement.

2) The pass/fail criteria of deflection for impact-protective systems does not belong in the perforation section and should be relocated to the more closely related Permanent Deformation section.

Committee Action: Disapproval (Vote: 7-1-0)
Modification (if any):
Committee Reason: Further work is needed on this issue for a complete package.

Report for *08-13– 23*		
Committee decision: D	***Committee Vote at Meeting: 7-1-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Further work is needed on this issue for a complete package		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		

Report for *08-13– 23*		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 08-14-23

803.11(New)

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 803
IMPACT TESTING

803.11 Minimum Reporting Requirements. At a minimum, the test report shall include the following items:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, when used.
7. The ambient temperature at the time of testing.
8. The weight of each impact test missile measured within 2 hours of use.
9. The launch speed of each impact test missile.
10. A statement of observations after each missile impact including permanent deformation and details of any damage, disengagement, dislodgement, spall, or other pertinent observations.
11. A statement that testing was conducted in accordance with ICC 500, including the edition.
12. A statement of compliance or non-compliance with each of the requirements in Section 803.10.
13. A sketch or photograph indicating the locations of impact on each tested assembly.
14. Photos of the interior and exterior of the tested assembly, before and after impact.

Reason: Minimum reporting requirements are required in the standard to ensure consistency across test laboratories and to ensure that pertinent information is being reported to allow determination of compliance with standard requirements. Requirements in this section have been taken from ASTM E1886 and other sections of ICC 500. Some additional requirements have been added to aid in the interpretation of assembly performance.

IS-STM 08-14-23 Modification

803.11(New)

Proponent: Work Group 8

Further revise as follows:

SECTION 803
IMPACT TESTING

803.11 Minimum Reporting Requirements. At a minimum, the ~~test report~~ reporting for impact testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, ~~when~~ where used.
7. The ambient temperature at the time of testing.
8. The weight of each impact test missile measured within 2 hours of use.
9. The launch speed of each impact test missile.
10. A statement of observations after each missile impact including permanent deformation and details of any damage, disengagement, dislodgement, spall, or other pertinent observations.
11. A statement that testing was conducted in accordance with ICC 500, including the edition.
12. A statement of compliance or non-compliance with each of the requirements in Section 803.10.
13. A sketch or photograph indicating the locations of impact on each tested assembly.
14. Photos of the interior and exterior of the tested assembly, before and after impact.

Reason: Adding ‘impact testing’ adds specificity. Not all items apply to all tested specimens, so ‘as applicable’ was added. ‘Where’ is better code language than ‘when’. ‘When’ is a function of time.

IS-STM 08-14-23 reconsideration

803.11(New)

Proponent: Work Group 8

Further revise as follows:

803.11 Minimum Reporting Requirements. At a minimum, the reporting for impact testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, where used.
7. The ambient temperature at the time of testing.
8. The weight of each impact test missile measured within 2 hours of use.
9. The launch speed of each impact test missile.
10. The location of the kraft paper witness screen, including identification of the component deemed most susceptible to disengagement, dislodgement, or spall in accordance with Sections 803.10.2 and 803.10.3.
11. A statement of observations after each missile impact including permanent deformation and details of any damage, disengagement, dislodgement, spall, or other pertinent observations.
12. A statement that testing was conducted in accordance with ICC 500, including the edition.
13. A statement of compliance or non-compliance with each of the requirements in Section 803.10.
14. A sketch or photograph indicating the locations of impact on each tested assembly.
15. Photos of the interior and exterior of the tested assembly, before and after impact.

Reason: In 2020, the placement of the kraft paper witness screen in Section 803.10.2 (Dislodgement and disengagement) was modified to be “not more than 5 inches (127 mm) from the innermost component deemed by the *test laboratory* to be most susceptible to disengagement or dislodgement.” A similar change was made to Section 803.10.3 (Spall). The creation of a subjective witness screen placement means that its location is not immediately known to the reader of test reporting without a statement of the component/surface that the test laboratory deemed to be most susceptible and therefore used to establish the 5-inch offset. Adding this reporting requirement would ensure that the location of the kraft paper witness screen is documented and available to readers of the test reporting.

Reconsideration: Vote: 11-0-0

Committee Action: Approval as Modified (Vote: 8-0-0)

Modification (if any):

Further revise as follows:

SECTION 803
IMPACT TESTING

803.11 Minimum Reporting Requirements. At a minimum, the ~~test report~~ reporting for impact testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, ~~when~~ where used.
7. The ambient temperature at the time of testing.
8. The weight of each impact test missile measured within 2 hours of use.
9. The launch speed of each impact test missile.
10. The location of the kraft paper witness screen, including identification of the component deemed most susceptible to disengagement, dislodgement, or spall in accordance with Sections 803.10.2 and 803.10.3.
11. A statement of observations after each missile impact including permanent deformation and details of any damage, disengagement, dislodgement, spall, or other pertinent observations.
12. A statement that testing was conducted in accordance with ICC 500, including the edition.
13. A statement of compliance or non-compliance with each of the requirements in Section 803.10.
14. A sketch or photograph indicating the locations of impact on each tested assembly.
15. Photos of the interior and exterior of the tested assembly, before and after impact.

Committee Reason: Adding ‘impact testing’ adds specificity. Not all items apply to all tested specimens, so ‘as applicable’ was added. ‘Where’ is better code language than ‘when’. ‘When’ is a function of time.
Overall, the reporting requirements allow for data collection without an actual test report being required. The list will improve consistency between test labs.

Report for *08-14– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0 Reconsideration 11-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): **Further revise as follows:** **SECTION 803** **IMPACT TESTING**		

Report for *08-14– 23*

803.11 Minimum Reporting Requirements. At a minimum, the ~~test report~~ reporting for impact testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, ~~when~~ where used.
7. The ambient temperature at the time of testing.
8. The weight of each impact test missile measured within 2 hours of use.
9. The launch speed of each impact test missile.
10. The location of the kraft paper witness screen, including identification of the component deemed most susceptible to disengagement, dislodgement, or spall in accordance with Sections 803.10.2 and 803.10.3.
11. A statement of observations after each missile impact including permanent deformation and details of any damage, disengagement, dislodgement, spall, or other pertinent observations.
12. A statement that testing was conducted in accordance with ICC 500, including the edition.
13. A statement of compliance or non-compliance with each of the requirements in Section 803.10.
14. A sketch or photograph indicating the locations of impact on each tested assembly.
15. Photos of the interior and exterior of the tested assembly, before and after impact.

Committee Reason: Adding 'impact testing' adds specificity. Not all items apply to all tested specimens, so 'as applicable' was added. 'Where' is better code language than 'when'. 'When' is a function of time.
Overall, the reporting requirements allow for data collection without an actual test report being required. The list will improve consistency between test labs.
Reconsideration: In 2020, the placement of the kraft paper witness screen in Section 803.10.2 (Dislodgement and disengagement) was modified to be "not more than 5 inches (127 mm) from the innermost component deemed by the *test laboratory* to be most susceptible to disengagement or dislodgement." A similar change was made to Section 803.10.3 (Spall). The creation of a subjective witness screen placement means that its location is not immediately known to the reader of test reporting without a statement of the component/surface that the test laboratory deemed to be most susceptible and therefore used to establish the 5-inch offset. Adding this reporting requirement would ensure that the location of the kraft paper witness screen is documented and available to readers of the test reporting.

PUBLIC COMMENT- FIRST DRAFT:

Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

REPORT OF HEARING – FIRST DRAFT

Modification (if any):

Committee Reason:

PUBLIC COMMENT- SECOND DRAFT:

Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

FINAL ACTION:

Modification (if any):

Committee Reason:

IS-STM 08-15-23

805.3.2

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.3.2 Hurricane Shelters. Impact-protective systems for use in hurricane shelters shall be static pressure tested to a pressure of 1.2 times the design wind pressure or greater in accordance with ASTM E330 and subjected to cyclic pressure testing in accordance with ASTM E1886. Cyclic pressure testing shall follow the impact testing required in Section 803.

Exception: Cyclic pressure testing is not required for side-swinging door assemblies without glazing where such assemblies are static pressure tested to a pressure of 1.5 times the design wind pressure or greater in accordance with ASTM E330.

Reason: With the 2020 addition of rolling and sectional doors, the "door assemblies" referenced in the exception should be clarified. The exception was originally added at a time when "door assemblies" in the standard meant side-hinged door assemblies. Rolling or sectional door assemblies could be susceptible to fatigue-related failure and should be subjected to the standard cyclic pressure testing when use in hurricane shelters is desired.

Committee Action: Approval as submitted (Vote:12-0-0)

Modification (if any):

Committee Reason: The exception is only applicable to side swinging doors, not rolling or sectional doors.

Report for *08-15– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: The exception is only applicable to side swinging doors, not rolling or sectional doors.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

Report for *08-15– 23*
FINAL ACTION: Modification (if any): Committee Reason:

IS-STM 08-16-23

805.4(New), 805.4.1(New), 805.4.2(New), 805.4.3(New)

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.4 Pass or Fail. The pass or fail criteria for static or cyclic pressure testing shall be in accordance with Sections 805.4.1 through 805.4.3.

805.4.1 Loss of Pressure Resistance. Inability of the tested component to withstand the applied static or cyclic pressure for the required duration shall constitute a failure.

805.4.2 Permanent Deformation. Permanent deformation of an interior surface of the test specimen shall be determined by measuring the distance from a straight edge held between two undeformed points on the specimen. The maximum permanent deformation after static or cyclic loading shall be measured to the nearest 1/8 inch (3.2 mm) and shall not exceed 3 inches (76 mm).

805.4.3 Maximum Deflection. The maximum deflection under static pressure shall not exceed 5 inches.

Exception: Deflections in excess of 5 inches are permissible when the minimum setback distance determined through testing is clearly indicated in the certification listing and accommodated in the shelter design. Accommodation in the shelter design shall include either of the following:

1. Signage on the interior surface of the component indicating the safe setback distance as well as indication of the safe setback distance on the shelter floor and walls.
2. Other methods of indicating safe setback distance suitable to the shelter designer, shelter owner, and authority having jurisdiction.

Reason:

805.4 - No pass or fail criteria currently exist for static and cyclic pressure testing. Clear pass or fail criteria should be added to ensure uniform application of the standard across test laboratories.

805.4.1 - A loss of structural resistance to the applied loading signifies that the tested component can no longer protect shelter occupants. This should be considered a failure.

805.4.2 - The permanent deformation requirement for impact testing has been repeated here. If the standard deems 3 inches of permanent set to be unacceptable after impact testing, it stands to reason that this level of permanent set would be unacceptable after pressure testing as well.

805.4.3 - The maximum deflection under the applied pressure should not exceed the assumed safe set-back distance established by the placement of the kraft paper witness screen 5 inches from the interior

component surface during impact testing. An exception is provided for assemblies that do not meet this criteria, but the shelter designer must then consider this greater deflection and address it in their shelter design via signage and setback marking or another method acceptable to the building owner and AHJ. Deflection measurement is not addressed in ASTM E1886, so this requirement does not apply to cyclic pressure loading.

IS-STM 08-16-23 Modification

805.4(New), 805.4.1(New), 805.4.2(New), 805.4.3(New)

Proponent: Work Group 8

Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.4 Pass or Fail. The pass or fail criteria for static or cyclic pressure testing shall be in accordance with Sections 805.4.1 through 805.4.3.

805.4.1 ~~Loss of~~ Pressure Resistance. ~~Inability of the tested component to withstand the applied static or cyclic pressure for the required duration shall constitute a failure.~~ The test specimen shall sustain the applied static or cyclic pressure for the required duration.

805.4.2 Permanent Deformation. Permanent deformation of an interior surface of the test specimen shall be determined by measuring the distance from a straight edge held between two undeformed points on the specimen. The maximum permanent deformation after static or cyclic loading shall be measured to the nearest 1/8 inch (3.2 mm) and shall not exceed 3 inches (76 mm).

805.4.3 Maximum Deflection. The maximum deflection under static or cyclic design pressure shall not exceed 5 inches. For *impact protective systems* that are intended for installation to the exterior of a protected component, deflection that would result in contact with the protected component constitutes a failure.

~~Exceptions~~ Exception: Deflections in excess of 5 inches are permitted where the maximum deflection under design pressure is indicated in the certification listing. ~~Deflections in excess of 5 inches are permissible when the minimum setback distance determined through testing is clearly indicated in the certification listing and accommodated in the shelter design. Accommodation in the shelter design shall include either of the following:~~

1. ~~Signage on the interior surface of the component indicating the safe setback distance as well as indication of the safe setback distance on the shelter floor and walls.~~
2. ~~Other methods of indicating safe setback distance suitable to the shelter designer, shelter owner, and authority having jurisdiction.~~

Reason: 805.4.1 was changed to a positive statement.
805.4.3 – some overhead doors cannot meet the 5 inch deflection. A setback for safety would be indicated in the listing, and the items in the proposed exception could be utilized. However, this cannot be part of the testing of the sample. If desired, this a requirement for this could possibly be located in Chapter 7.

Committee Action: Approval as Modified (Vote:11-0-0) w/ electronic vote

Modification (if any):

Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.4 Pass or Fail. The pass or fail criteria for static or cyclic pressure testing shall be in accordance with Sections 805.4.1 through 805.4.3.

805.4.1 ~~Loss of~~ Pressure Resistance. ~~Inability of the tested component to withstand the applied static or cyclic pressure for the required duration shall constitute a failure.~~ The test specimen shall sustain the applied static or cyclic pressure for the required duration.

805.4.2 Permanent Deformation. Permanent deformation of an interior surface of the test specimen shall be determined by measuring the distance from a straight edge held between two undeformed points on the specimen. The maximum permanent deformation after static or cyclic loading shall be measured to the nearest 1/8 inch (3.2 mm) and shall not exceed 3 inches (76 mm).

805.4.3 Maximum Deflection. The maximum deflection under static or cyclic design pressure shall not exceed 5 inches. For *impact protective systems* that are intended for installation to the exterior of a protected component, deflection that would result in contact with the protected component constitutes a failure.

~~Exceptions~~ Exception: Deflections in excess of 5 inches are permitted where the maximum deflection under design pressure is indicated in the certification listing. ~~Deflections in excess of 5 inches are permissible when the minimum setback distance determined through testing is clearly indicated in the certification listing and accommodated in the shelter design. Accommodation in the shelter design shall include either of the following:~~

~~3. Signage on the interior surface of the component indicating the safe setback distance as well as indication of the safe setback distance on the shelter floor and walls.~~

~~Other methods of indicating safe setback distance suitable to the shelter designer, shelter owner, and authority having jurisdiction.~~

Committee Reason:

805.4.1 was changed to a positive statement.
805.4.3 – clarification of protection components and deflection criteria
Overall – the current text does not include pass fail criteria for static and cyclic structural testing. This would address that gap and work with 08-17-23.

Report for *08-16– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.4 Pass or Fail. The pass or fail criteria for static or cyclic pressure testing shall be in accordance with Sections 805.4.1 through 805.4.3.

805.4.1 ~~Loss of~~ Pressure Resistance. ~~Inability of the tested component to withstand the applied static or cyclic pressure for the required duration shall constitute a failure.~~ The test specimen shall sustain the applied static or cyclic pressure for the required duration.

805.4.2 Permanent Deformation. Permanent deformation of an interior surface of the test specimen shall be determined by measuring the distance from a straight edge held between two undeformed points on the specimen. The maximum permanent deformation after static or cyclic loading shall be measured to the nearest 1/8 inch (3.2 mm) and shall not exceed 3 inches (76 mm).

805.4.3 Maximum Deflection. The maximum deflection under static or cyclic design pressure shall not exceed 5 inches. For *impact protective systems* that are intended for installation to the exterior of a protected component, deflection that would result in contact with the protected component constitutes a failure.

~~Exceptions~~ Exception: Deflections in excess of 5 inches are permitted where the maximum deflection under design pressure is indicated in the certification listing.

~~Deflections in excess of 5 inches are permissible when the minimum setback distance determined through testing is clearly indicated in the certification listing and accommodated in the shelter design. Accommodation in the shelter design shall include either of the following:~~

~~4. Signage on the interior surface of the component indicating the safe setback distance as well as indication of the safe setback distance on the shelter floor and walls.~~

~~5. Other methods of indicating safe setback distance suitable to the shelter designer, shelter owner, and authority having jurisdiction.~~

Committee Reason: 805.4.1 was changed to a positive statement.
805.4.3 – clarification of protection components and deflection criteria
Overall – the current text does not include pass fail criteria for static and cyclic structural testing. This would address that gap and work with 08-17-23.

PUBLIC COMMENT- FIRST DRAFT:
Proponent:
Desired Action:
Modification:
Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

REPORT OF HEARING – FIRST DRAFT
Modification (if any):
Committee Reason:

PUBLIC COMMENT- SECOND DRAFT:
Proponent:
Desired Action:
Modification:
Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

FINAL ACTION:
Modification (if any):
Committee Reason:

IS-STM 08-17-23

805.5(New)

Proponent: Andrew Holstein, Ph.D., P.E., representing Intertek

Revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.5 Minimum Reporting Requirements. At a minimum, the test report shall include the following items:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, when used.
7. The ambient temperature at the time of testing.
8. When static pressure testing is conducted, a tabulation of applied pressure differences, their duration, and resulting deflection.
9. When cyclic pressure testing is conducted, a tabulation of the applied pressure differences, their average cycle times, and the number of cycles.
10. A statement of observations after testing including permanent deformation and details of any damage or other pertinent information.
11. A statement that testing was conducted in accordance with ICC 500, including the edition.
12. A statement of compliance or non-compliance with each of the requirements in Section 805.4.
13. Photos of the interior and exterior of the tested assembly, before and after testing.

Reason: Minimum reporting requirements are required in the standard to ensure consistency across test laboratories and to ensure that pertinent information is being reported to allow determination of compliance with standard requirements. Requirements in this section have been taken from ASTM E330, ASTM E1886, and other sections of ICC 500. Some additional requirements have been added to aid in the interpretation of assembly performance.

IS-STM 08-17-23 Modification

805.5(New)

Proponent: Work group 8

Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.5 Minimum Reporting Requirements. At a minimum, ~~the~~ ~~test report~~ reporting for static and cyclic pressure testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, ~~when~~ where used.
7. The ambient temperature at the time of testing.
8. When static pressure testing is conducted, a tabulation of applied pressure differences, their duration, and the maximum resulting deflection.
9. When cyclic pressure testing is conducted, a tabulation of the applied pressure differences, their average cycle times, ~~and~~ the number of cycles and the maximum resulting deflection.
10. A statement of observations after testing including permanent deformation and details of any damage or other pertinent information.
11. A statement that testing was conducted in accordance with ICC 500, including the edition.
12. A statement of compliance or non-compliance with each of the requirements in Section 805.4.
13. Photos of the interior and exterior of the tested assembly, before and after testing.

Reason: Adding ‘static and cyclic’ adds specificity. Not all items apply to all tested specimens, so ‘as applicable’ was added. ‘Where’ is better code language than ‘when’. ‘When’ is a function of time. The deflection discussed in the IS-STM 08-16-23 are addressed in Item 9.

Staff note: Item 12 is based on the approval of IS-STME 08-16-23.

Committee Action: Approval as Modified (Vote:1-0-0)w/ electronic vote

Modification (if any):

Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.5 Minimum Reporting Requirements. At a minimum, ~~the~~ ~~test report~~ reporting for static and cyclic pressure testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details.
6. A description of the test chamber mounting, ~~when~~ where used.
7. The ambient temperature at the time of testing.
8. When static pressure testing is conducted, a tabulation of applied pressure differences, their duration, and the maximum resulting deflection.
9. When cyclic pressure testing is conducted, a tabulation of the applied pressure differences, their average cycle times, ~~and~~ the number of cycles and the maximum resulting deflection.
10. A statement of observations after testing including permanent deformation and details of any damage or other pertinent information.
11. A statement that testing was conducted in accordance with ICC 500, including the edition.
12. A statement of compliance or non-compliance with each of the requirements in Section 805.4.
13. Photos of the interior and exterior of the tested assembly, before and after testing.

Committee Reason: This coordinates with the new pass fail criteria in 08-16-23. Overall, the reporting requirements allow for data collection without an actual test report being required. The list will improve consistency between test labs.

Report for *08-17– 23*		
Committee decision: AM	***Committee Vote at Meeting: 11-0-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Further revise as follows:

SECTION 805
STATIC AND CYCLIC PRESSURE TESTING PROCEDURES

805.5 Minimum Reporting Requirements. At a minimum, ~~the~~ ~~test report~~ reporting for static and cyclic pressure testing shall include the following items as applicable:

1. The dates of testing and report issuance.
2. The names and addresses of the test sponsor and test laboratory.
3. The product name and model number.
4. A description of the tested specimens, including all parts and components, and the number of specimens tested.

Report for *08-17– 23*		
5. Dimensioned drawings, verified by the test laboratory as representative of the tested assembly, including: section profiles; framing layout; type and spacing of anchorage; hardware make, model, and location; and any other pertinent construction details. 6. A description of the test chamber mounting, ~~when~~ where used. 7. The ambient temperature at the time of testing. 8. When static pressure testing is conducted, a tabulation of applied pressure differences, their duration, and the maximum resulting deflection. 9. When cyclic pressure testing is conducted, a tabulation of the applied pressure differences, their average cycle times, ~~and~~ the number of cycles and the maximum resulting deflection. 10. A statement of observations after testing including permanent deformation and details of any damage or other pertinent information. 11. A statement that testing was conducted in accordance with ICC 500, including the edition. 12. A statement of compliance or non-compliance with each of the requirements in Section 805.4. 13. Photos of the interior and exterior of the tested assembly, before and after testing.		
Committee Reason: This coordinates with the new pass fail criteria in 08-16-23. Overall, the reporting requirements allow for data collection without an actual test report being required. The list will improve consistency between test labs.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Chapter 9
REFERENCED STANDARDS

IS-STM 09-01-23
Chapter 9

Proponent: ICC 500 committee

Revise as follows:

ACI 318-19 Building Code Requirements for Structural Concrete
ACI 332-19 Residential Code Requirements for Structural Concrete

ASCE 7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures ~~with Supplement No. 1~~
ASCE 24-14 Flood Resistant Design and Construction

ASTM C920—18 Standard Specification for Elastomeric Joint Sealants
ASTM E330/E330M—14 (2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E1592—05 (Reapproved 2017) Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
ASTM E1886—19 Standard Test Method for the Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

DOC PS 20—20 American Softwood Lumber Standard

FM 4474—~~2011~~ 2020 American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

ICC IBC—~~21~~ 24 International Building Code
ICC A117.1—~~17~~ 23 Accessible and Usable Buildings and Facilities
ICC IPC—~~21~~ 24 International Plumbing Code
ICC IRC—~~21~~ 24 International Residential Code

ISEA ANSI/ISEA Z308.1—2015 Minimum Requirements for Workplace First Aid Kits and Supplies

NFPA-10—~~18~~ 22 Portable Fire Extinguishers
NFPA-70—17 National Electrical Code

TMS 602—~~2016~~ 2022 Specification for Masonry Structures

UL1897—15 Standard for Safety for Uplift Tests for Roof Covering Systems -with revisions through September 2020

Reason: Update to coordinate with 2024 I-codes per ADM52-22

Committee Action: Approval as Submitted (Vote: 8-0-0)

Modification (if any):

Committee Reason: Coordination with the 2024 IBC.

Report for *09-01– 23*		
Committee decision: AS	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Coordination with the 2024 IBC.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM 09-02-23
Chapter 9

Proponent: Marc Levitan, representing NIST

Revise as follows:

CHAPTER 9
REFERENCED STANDARDS

ASCE 7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No.~~3~~ 1 and 2.

Staff Note: The following items in the ICC 500 may be addressed with a change in flood provisions.

SECTION 202
DEFINITIONS

500-YEAR FLOOD. The flood having a 0.2 percent chance of being equaled or exceeded in any given year.
500-YEAR FLOOD ELEVATION. The elevation of the *500-year flood*, including wave height.
500-YEAR FLOOD HAZARD AREA. The area subject to the *500-year flood*.
BASE FLOOD. The flood having a 1-percent chance of being equaled or exceeded in any given year.
BASE FLOOD ELEVATION. The elevation of the *base flood*, including wave height,
COASTAL A ZONE. Area within a special *flood hazard area*, landward of a V zone or landward of an open coast without mapped *coastal high-hazard areas*. In a *coastal A zone*, the principal source of flooding is astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During the *base flood* conditions, the potential for breaking wave height is greater than or equal to $1^1/_2$ feet (457 mm). The inland limit of the *coastal A zone* is one of the following:

1. The Limit of Moderate Wave Action if delineated on a FIRM.
2. Designated by the *authority having jurisdiction*.

COASTAL HIGH-HAZARD AREA. Area within the special *flood hazard area* extending from offshore to the inland limit of a primary dune along an open coast and any other area that is subject to high-velocity wave action from storms or seismic sources, and shown on a Flood Insurance Rate Map (FIRM) or other flood hazard map as velocity Zone V, VO, VE or V1-30.
FLOOD ELEVATION. The *base flood elevation, 500-year flood elevation* or *storm surge flood elevation* applicable for the design and construction of a *storm shelter*.
FLOOD ELEVATION STUDY. An examination, evaluation and determination of flood hazard and, where appropriate, corresponding water surface elevations, or an examination, evaluation and determination of storm surge inundation, including coastal wave effects, associated with the maximum intensity hurricane.

FLOOD HAZARD AREA. The greater of the following two areas:

1. The area in a floodplain subject to the base flood.
2. The area designated as a *flood hazard area* on a community's flood hazard map, or otherwise legally designated.

STORM SURGE FLOOD. The flooding associated with the maximum storm surge inundation associated with the maximum intensity hurricane modeled using an *approved* source such as the National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH).

STORM SURGE FLOOD ELEVATION. The elevation corresponding to the *storm surge flood*, including coastal wave effects

STORM SURGE FLOOD HAZARD AREA. The area subject to the *storm surge flood*

SECTION 203
SYMBOLS AND NOMENCLATURE

F_{aH} = flood load on *hurricane shelters* in accordance with Section 303.5.

SECTION 302
LOAD COMBINATIONS

302.2 Strength design. Where strength design or load and resistance factor design (LRFD) is used, *storm shelters* and portions thereof shall be designed to resist the most critical effects resulting from the following combinations of factored loads. Each load combination shall also be investigated with one or more of the variable loads set to zero.

For *tornado shelters*:

$1.4D$ **(Equation 3-1)**

$1.2D + 1.6L_T + 0.5L_{rT}$ **(Equation 3-2)**

$1.2D + 1.6L_{rT} + (L_T \text{ or } 0.5W_T)$ **(Equation 3-3)**

$1.2D + 1.0W_T + L_T + 0.5L_{rT}$ **(Equation 3-4)**

$0.9D + 1.0W_T$ **(Equation 3-5)**

For *hurricane shelters*:

$1.4D$ **(Equation 3-6)**

$1.2D + 1.6L + 0.5(L_{rH} \text{ or } R_H)$ **(Equation 3-7)**

$1.2D + 1.6(L_{rH} \text{ or } R_H) + (L \text{ or } 0.5W_H)$ **(Equation 3-8)**

$1.2D + 1.0W_H + L + 0.5(L_{rH} \text{ or } R_H)$ **(Equation 3-9)**

$0.9D + 1.0W_H$ **(Equation 3-10)**

In addition, for *hurricane shelters* subject to the requirements of Section 402.1 and located in:

Coastal high-hazard area or a *Coastal A Zone:*

$1.2D + 1.0W_H + 2.0F_{aH} + L + 0.5(L_{rH} \text{ or } R_H)$ **(Equation 3-11)**

$0.9D + 1.0W_H + 2.0F_{aH}$ **(Equation 3-12)**

All other locations:

$1.2D + 0.5W_H + 1.0F_{aH} + L + 0.5(L_{rH} \text{ or } R_H)$ **(Equation 3-13)**

$0.9D + 0.5W_H + 1.0F_{aH}$ **(Equation 3-14)**

302.3 Allowable stress design. Where allowable stress design (ASD, working stress design) is used, *storm shelters* and portions thereof shall be designed to resist the most

critical effects resulting from the following combinations of loads. Each load combination shall also be investigated with one or more of the variable loads set to zero.

For *tornado shelters*:

$D + L_T$ **(Equation 3-15)**

$D + L_{rT}$ **(Equation 3-16)**

$D + 0.75L_T + 0.75L_{rT}$ **(Equation 3-17)**

$D + 0.6W_T$ **(Equation 3-18)**

$D + 0.75L_T + 0.75(0.6W_T) + 0.75L_{rT}$ **(Equation 3-19)**

$0.6D + 0.6W_T$ **(Equation 3-20)**

For *hurricane shelters*:

$D + L$ **(Equation 3-21)**

$D + (L_{rH}$ or $R_H)$ **(Equation 3-22)**

$D + 0.75L + 0.75(L_{rH}$ or $R_H)$ **(Equation 3-23)**

$D + 0.6W_H$ **(Equation 3-24)**

$D + 0.75L + 0.75(0.6W_H) + 0.75(L_{rH}$ or $R_H)$ **(Equation 3-25)**

$0.6D + 0.6W_H$ **(Equation 3-26)**

In addition, for *hurricane shelters* subject to the requirements of Section 402.1 and located in:

Coastal high-hazard area or a *Coastal A Zone:*

$D + 0.6W_H + 1.5F_{aH}$ **(Equation 3-27)**

$D + 0.75L + 0.75(0.6W_H) + 0.75(L_{rH}$ or $R_H) + 1.5F_{aH}$ **(Equation 3-28)**

$0.6D + 0.6W_H + 1.5F_{aH}$ **(Equation 3-29)**

All other locations:

$D + 0.75L + 0.75(0.6W_H) + 0.75(L_{rH}$ or $R_H) + 0.75F_{aH}$ **(Equation 3-30)**

$0.6D + 0.6W_H + 0.75F_{aH}$ **(Equation 3-31)**

SECTION 303
LOADS

303.5 Flood loads. Where subject to the requirements of Section 402.1, *flood loads*, including wave action, shall be determined using a flood elevation not less than the minimum floor elevation in Section 402.6.

SECTION 402
FLOOD CRITERIA

402.1 General. Flood criteria shall apply to *storm shelters* in accordance with Table 402.1. *Storm shelters* shall be sited and elevated in accordance with Sections 402.2 through 402.6.4 and shall be designed and constructed to resist the effects of flood hazards and flood loads in accordance with Section 303.5.

TABLE 402.1
STORM SHELTERS REQUIRED TO COMPLY WITH SECTION 402

	Location of Shelter

Type of Shelter	Flood hazard area	500-year flood hazard area	Storm surge flood hazard area
Community tornado shelter	All	Risk Category IV facilities or serving Risk Category IV facilities[a]	NA
Community hurricane shelter	All	All	All
Residential tornado shelter	All	NA	NA
Residential hurricane shelter	All	All [b]	All

NA = not applicable

a. Risk categories are determined in accordance with Table 1604.5 of the *International Building Code*.

b. Where the *500-year flood hazard area* is mapped and the *500-year flood elevation* is available in the *flood elevation study* adopted by the *authority having jurisdiction*.

402.2 Design criteria. The design and construction of *storm shelters* or portions thereof located in the areas indicated in Table 402.1, including *coastal high-hazard areas* and *coastal A zones* shall be in accordance with the provisions of this chapter, and ASCE 24 except for the floor elevations for *storm shelters* required in Section 402.6.

402.3 Determining flood elevations and floodway. The *flood elevation* and floodway shall be determined using the flood hazard map adopted by the applicable governing authority. Where *flood elevations* and floodway are not included in the flood hazard map, or where a *flood elevation study* is not adopted by the applicable governing authority, the *flood elevation* and floodway shall be determined in accordance with one of the following:

1. Utilize a *flood elevation* and floodway data available from federal, state or other *approved* source.
2. Determine the flood elevation and floodway in accordance with the accepted hydrologic and hydraulic engineering practices used to prepare a *flood elevation study*. Determination shall be undertaken by a registered design professional who shall document that the technical methods used reflect currently accepted engineering practice.

402.4 Flood information. Flood information shall be provided on the construction documents in accordance with Section 106.2.1.

402.5 Storm shelter siting. *Storm shelters* shall be located outside of the following high-risk areas:

1. *Coastal high-hazard areas* and *coastal A zones*
2. Floodways

.

Exception: *Storm shelters* shall be permitted in *coastal high-hazard areas* and *coastal A zones* where permitted by the Board of Appeals in accordance with the provisions of the *International Building Code* or *International Residential Code*.

402.6 Minimum floor elevation of storm shelters. Where *storm shelters* are located in the areas indicated in Table 402.1, the minimum floor elevations of *storm shelters* shall be determined in accordance with Sections 402.6.1, 402.6.2, 402.6.3 and 402.6.4, as applicable.

402.6.1 Minimum floor elevation of community tornado shelters. The lowest floor used for the *occupied storm shelter areas* and *occupant support areas* of a *community tornado shelter* shall be elevated to or above the highest of the elevations determined by all of the following:

1.–The minimum elevation of the lowest floor required by the *authority having jurisdiction*.
2.–One foot (305 mm) above the *base flood elevation*.
3.–For *storm shelters* that are Risk Category IV facilities or serving Risk Category IV facilities:
   3.1. The *500-year flood elevation*.
   3.2. Two feet (6610 mm) above the *base flood elevation*.

Exceptions:

1. A *community tornado shelter* is not required to be elevated to the level required by Items 1 through 3, where all of the following are met:
   1.1. The *storm shelter* is completely within a *host building* that is dry floodproofed in accordance with ASCE 24 to the elevation prescribed in Items 1 through 3; or the *storm shelter* is dry floodproofed in accordance with ASCE 24 to the elevation prescribed in Items 1 through 3.
   1.2. The *storm shelter* has at least one door, emergency escape opening or hatch complying with Chapter 5 that has the bottom of the opening located above the dry floodproofing elevation.
   1.3. The elevation of the floor of the *storm shelter* is not more than 36 inches (914 mm) below the elevation required by Items 1 through 3.
2. Where a *community tornado shelter* is constructed within an existing *host building*, only Item 1 shall apply.

402.6.2 Minimum floor elevation of community hurricane shelters. The lowest floor used for the *occupied storm shelter areas* and *occupant support areas* of a *community hurricane shelter* shall be elevated to or above the highest of the elevations determined by all of the following:

1. The minimum elevation of the lowest floor required by the *authority having jurisdiction*.

2. Two feet (610 mm) above the *base flood elevation*.
3. –The *500-year flood elevation*.
4. –The *storm surge flood elevation*

402.6.3 Minimum floor elevation of residential tornado shelters. The lowest floor of a *residential tornado shelter* shall be elevated to or above the highest of the elevations determined by all of the following:

1. The minimum elevation of the lowest floor required by the *authority having jurisdiction*.
2. One foot (305 mm) above the *base flood elevation*.

Exception: Where a *residential tornado shelter* is constructed within an existing *host building,* only Item 1 shall apply.

402.6.4 Minimum floor elevation of residential hurricane shelters. The lowest floor of a *residential hurricane shelter* shall be elevated to or above the highest of the elevations determined by all of the following:

1. –The minimum elevation of the lowest floor required by the *authority having jurisdiction*.
2. The *500-year flood elevation.*
3. The *storm surge flood elevation.*

Reason:
Proposal
As a follow-on to other proposal to update the reference edition from ASCE 7-16 to ASCE 7-22, further revise the reference edition to ASCE 7-22 with Supplements, which will be published later this spring. These supplements include 1) update various reference standards and 2) completely overhaul of the flood load provisions in ASCE 7 Chapter 5.

Rationale
The ASCE 7 flood load provision have not been updated for many years. The flood load subcommittee integrated the latest science and engineering on flood loads and addressed many longstanding challenges with the chapter, including moving to a reliability-based approach more consistent with the direction of seismic and wind loads. The Flood Load Subcommittee chair, Dr. Dan Cox from Oregon State University, presented a special webinar for the ICC 500 Committee on Feb 28 from 3:00-4:30 eastern time. He reviewed the changes to Chapter 5 and answer questions. The webinar will be recorded for those who cannot attend during that time slot.

Staff Note: The ICC has received question on this criteria related to requirements for determining elevation of storm surge for coastal areas similar to Section 402.3.

Committee Action: Approval as Modified (Vote: 8-0-0)
Modification (if any):

Replace with the following:

ASCE 7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other

Structures with Supplement No. ~~3~~ 1.

Committee Reason: The information in Supplement 2 is too extensive to address at this time. Supplement 1 is just an update to the referenced standards.

Report for *09-02– 23*		
Committee decision: AM	***Committee Vote at Meeting: 8-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any): Replace with the following: ASCE 7-~~16~~ 22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement No. ~~3~~ 1.		
Committee Reason: The information in Supplement 2 is too extensive to address at this time. Supplement 1 is just an update to the referenced standards.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

Appendix
STORM SHELTER PREPAREDNESS AND EMERGENCY OPERATIONS PLAN (SSPEOP)

IS-STM A-01-23
A104.4.1

Proponent: ICC 500 Appendix Work Group

Revise as follows:

SECTION A104
SSPEOP BASIC INFORMATION REQUIREMENTS

A104.4.1 Storm shelter floor plans. A storm shelter floor plan shall be provided. The plan shall indicate the following:

1. Access and means of egress doors.
2. Emergency escape openings and overhead hatches, where provided.
3. *Impact-protective systems* that need to be secured in place.
4. Layout and function of *occupant support areas*.
5. Mechanical vents or mechanical ventilation systems that need to be activated, where provided.
6. Water closet and lavatory locations, including locations for set up of temporary water closets and lavatories, where provided.
7. Emergency and Standby power supply, where provided.
8. Storage of required supplies such as first aid kits and flashlights.
9. Location of fire extinguishers.

Reason: This list should be coordinated with Work Group 3 call regarding external 'critical support systems' w/ respect to effective plan area. Term isn't used in the appendix, but systems are listed to be identified on floor plans (here) and to be evaluated (A105.6.1).

Committee Action: Approval as submitted (Vote: 12-0-0)
Modification (if any):
Committee Reason: Coordination with other sections in the standard.

Report for *A-01– 23*		
Committee decision: AS	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***
REPORT OF HEARING: Modification (if any):		
Committee Reason: Coordination with other sections in the standard.		
PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		

Report for *A-01– 23*		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		

IS-STM A-02-23

A105.1, A105.2, A105.2.1, A105.2.2

Proponent: ICC 500 Appendix Work Group

Revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.1 General. An *approved* SSPEOP shall include preparedness requirements ~~as required~~ in accordance with Sections A105.2 through 105.6.4.1. The purpose of the plan's preparedness components is to verify that the *storm shelter* is ready and maintained for use and will be fully operational during the storm.

A105.2 Storm shelter management team. The SSPEOP shall include *storm shelter management team* roles and duties. At a minimum, the roles and duties of storm shelter manager, storm shelter assistant manager ~~and general staff~~ shall be identified.

A105.2.1 Back up roles. The SSPEOP shall identify the primary individual currently assigned to each storm shelter management team role and shall identify back-up staff ~~for management roles and for general staff roles that are assigned duties considered critical to shelter emergency operations.~~

~~**A105.2.2 Duties.** The SSPEOP shall identify the *storm shelter management team* primary and back-up roles~~ charged with the following critical duties:

1. Authorization to issue an order to activate the *storm shelter*.
2. ~~Authorization to issue an all clear for *storm shelter* deactivation.~~
2.~~3.~~ ~~Unlocking~~ Opening the *storm shelter* to admit occupants ~~, where applicable, and~~
3.~~4.~~ Securing and locking down all *impact-protective systems* prior to the storm.
4. Authorization to issue an all clear for *storm shelter* deactivation.

~~**A105.2.1**~~ **A105.2.2 Contact information.** Current contact information for all identified primary and back-up shelter management team roles shall include phone numbers and email addresses. Contact information shall be updated no less than one time per year or as needed.

Reason:
A105.2 – deleted 'and general staff' - Seems overly generic and 'general staff' isn't really a role. Also, if 2 or 3 individuals are listed under 'general staff', then confusion could arise over whom performs specific duties.
A105.2.1 (New) – delete redundant language

A105.2.2 (current) - Item 3 – unlocking changed to 'opening shelter for activation' (modified for clarity); Move Item 2 to bottom so the list is in order of events – renumber remaining items.

IS-STM A-02-23 Replacement
A105.1, A105.2, A105.2.1, A105.2.2

Proponent: ICC 500 Appendix Work Group

Replace and revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.1 General. An *approved* SSPEOP shall include preparedness requirements ~~as required~~ in accordance with Sections A105.2 through 105.6.4.1. The purpose of the plan's preparedness components is to verify that the *storm shelter* is ready and maintained for use and will be fully operational during the storm.

A105.2 Storm shelter management team. The SSPEOP shall include *storm shelter management team* roles and duties. At a minimum, the roles and duties of storm shelter manager, storm shelter assistant manager ~~and general staff~~ shall be identified.

A105.2.1 Management roles and duties. The SSPEOP shall identify the primary individual currently assigned to each storm shelter management team role and shall identify back-up staff ~~for management roles and for general staff roles that are assigned duties considered critical to shelter emergency operations.~~

~~**A105.2.2 Duties.** The SSPEOP shall identify the *storm shelter management team* primary and back-up roles~~ charged with the following critical duties:

1. Monitoring storm conditions and alerting the storm shelter management team
2. Activating the storm shelter management team
1. ~~Authorization to issue an order to activate the *storm shelter*.~~
2. ~~Authorization to issue an all clear for *storm shelter* deactivation.~~
3. ~~Unlocking~~ Opening the *storm shelter* to admit occupants ~~, where applicable, and~~
4. Notifying intended storm shelter occupants of current status, such as activation of the *storm shelter* or the need to move to the *storm shelter*.
5. ~~4.~~ Securing and locking down all *impact-protective systems* and activating critical support systems.
6. Issuing an all clear for occupants to leave the *storm shelter*.
7. Deactivating the *storm shelter*.

~~**A105.2.1**~~ **A105.2.2 Contact information.** Current contact information for all identified primary and back-up shelter management team roles shall include phone numbers and

email addresses. Contact information shall be updated no less than one time per year or as needed.

Reason: This modification would coordinate with Section 106.2
This section identify who in charge of the important steps in the process for the management team and shelter operation

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Committee Action: Approval as Modified (Vote:12-0-0)

Modification (if any):

Further modify as follows:

A105.2.1 Management roles and duties. The SSPEOP shall identify the primary individual currently assigned to each storm shelter management team role and shall identify back-up staff charged with the following critical duties:

1. Monitoring storm conditions and alerting the storm shelter management team
2. Activating the storm shelter management team
3. Opening the *storm shelter* to admit occupants
4. Notifying intended storm shelter occupants of current status, such as activation of the *storm shelter* or the need to move to the *storm shelter*.
5. Securing and locking down all *impact-protective systems* and activating critical support systems.
6. ~~Issuing an~~ Notifying occupants of an all clear to allow for occupants to leave the *storm shelter*.
7. Deactivating the *storm shelter*.

Committee Reason: The modification was because the weather service offers the all clear, not the management team. This replacement would coordinate with Section 106.2
This section identify who in charge of the important steps in the process for the management team and shelter operation.

Report forA-*02– 23*		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Replace and revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.1 General. An *approved* SSPEOP shall include preparedness requirements ~~as required~~ in accordance with Sections A105.2 through 105.6.4.1. The purpose of the plan's preparedness components is to verify that the *storm shelter* is ready and maintained for use and will be fully operational during the storm.

A105.2 Storm shelter management team. The SSPEOP shall include *storm shelter management team* roles and duties. At a minimum, the roles and duties of storm shelter manager, storm shelter assistant manager ~~and general staff~~ shall be identified.

A105.2.1 Management roles and duties. The SSPEOP shall identify the primary individual currently assigned to each storm shelter management team role and shall identify back-up staff ~~for management roles and for general staff roles that are assigned duties considered critical to shelter emergency operations.~~

Report forA-*02– 23*

~~**A105.2.2 Duties.** The SSPEOP shall identify the *storm shelter management team* primary and back-up roles~~ charged with the following critical duties:

1. Monitoring storm conditions and alerting the storm shelter management team
2. Activating the storm shelter management team
1. ~~Authorization to issue an order to activate the *storm shelter*.~~
2. ~~Authorization to issue an all clear for *storm shelter* deactivation.~~
3. ~~Unlocking~~ Opening the *storm shelter* to admit occupants ~~, where applicable, and~~
4. Notifying intended storm shelter occupants of current status, such as activation of the *storm shelter* or the need to move to the *storm shelter*.
5. ~~4.~~ Securing and locking down all *impact-protective systems* and activating critical support systems.
6. Notifying occupants of an all clear to allow for occupants to leave the *storm shelter*.
7. Deactivating the *storm shelter*.

~~**A105.2.1**~~ **A105.2.2 Contact information.** Current contact information for all identified primary and back-up shelter management team roles shall include phone numbers and email addresses. Contact information shall be updated no less than one time per year or as needed.

Committee Reason: The modification was because the weather service offers the all clear, not the management team. This replacement would coordinate with Section 106.2
This section identify who in charge of the important steps in the process for the management team and shelter operation

PUBLIC COMMENT- FIRST DRAFT:
Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

REPORT OF HEARING – FIRST DRAFT

Modification (if any):

Committee Reason:

PUBLIC COMMENT- SECOND DRAFT:
Proponent:

Desired Action:

Modification:

Reason:

Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***

FINAL ACTION:
Modification (if any):

Committee Reason:

IS-STM A-03-23
A105.3

Proponent: ICC 500 Appendix Work Group

Revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.3 Community outreach and notification. The SSPEOP shall include the methods and procedures chosen to contact, notify and update the intended occupants of the *storm shelter*. Notifications shall include ~~regarding~~ the following information:

1. Days and hours when the *storm shelter* will be operational, including expectation of *storm shelter* use during off-hours, where applicable.
2. Activation signals ~~and drills~~. The preferred and any alternative means of notifying the general public or intended occupants of the need to move to the *storm shelter*. The notification methods shall be distinct from other hazard warning signals. Where provided, a description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages shall be included.
3. Accessing the *storm shelter,* including location of entrances and parking where applicable.
4. Policies and procedures regarding:
   - 4.1. Public health and infectious disease.
   - 4.2. Pets.
   - 4.3. ~~Occupancy~~ Storm shelter occupant rules.
   - 4.4. Deactivation.
5. Shelter contact information.

Reason:
Recommendation on ways to notify public:
As currently written, the requirement for specific information is only implied.
Item 2: separate activation from drills – remove ‘and drills’
Item 4.3 is a clarification

IS-STM A-03-23 Modification
A105.3

Proponent: ICC 500 Appendix Work Group

Further revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.3 Community outreach and notification. The SSPEOP shall include the methods and procedures chosen to contact, notify and update the intended occupants of the *storm shelter.* Notifications shall include the following information:

1. Days and hours when the *storm shelter* will be operational, including expectation of *storm shelter* use during off-hours, where applicable.
2. Activation signals. The preferred and any alternative means of notifying the general public or intended occupants of the need to move to the *storm shelter*. The notification methods shall be distinct from other hazard warning signals. Where provided, a description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages shall be included.
3. Accessing the *storm shelter,* including location of entrances and parking where applicable.
4. Policies and procedures regarding:
   - 4.1. Public health and infectious disease.
   - 4.2. Pets.
   - 4.3. Storm shelter occupant ~~rules~~ regulations.
   - 4.4. Deactivation.
5. Shelter contact information.

Reason: The modification to allow for expansion to address other questions where applicable.

Committee Action: Approval as Modified (Vote:12-0-0)

Modification (if any):

Committee Reason: The modification to allow for expansion to address other questions where applicable.
Recommendation on ways to notify public:
As currently written, the requirement for specific information is only implied.
Item 2: separate activation from drills – remove 'and drills'
Item 4.3 is a clarification

Report for A-*03– 23*		
Committee decision: AM	***Committee Vote at Meeting: 12-0-0***	***Committee Vote on Ballot:***

REPORT OF HEARING:
Modification (if any):
Further revise as follows:

SECTION A105
SSPEOP PREPAREDNESS REQUIREMENTS

A105.3 Community outreach and notification. The SSPEOP shall include the methods and procedures chosen to contact, notify and update the intended occupants of the *storm shelter.* Notifications shall include the following information:

Report for A-*03– 23*

1. Days and hours when the *storm shelter* will be operational, including expectation of *storm shelter* use during off-hours, where applicable.
2. Activation signals. The preferred and any alternative means of notifying the general public or intended occupants of the need to move to the *storm shelter*. The notification methods shall be distinct from other hazard warning signals. Where provided, a description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages shall be included.
3. Accessing the *storm shelter,* including location of entrances and parking where applicable.
4. Policies and procedures regarding:
   - 4.1. Public health and infectious disease.
   - 4.2. Pets.
   - 4.3. Storm shelter occupant ~~rules~~ regulations.
   - 4.4. Deactivation.
5. Shelter contact information.

Committee Reason: The modification to allow for expansion to address other questions where applicable.
Recommendation on ways to notify public:
As currently written, the requirement for specific information is only implied.
Item 2: separate activation from drills – remove 'and drills'
Item 4.3 is a clarification

PUBLIC COMMENT- FIRST DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
REPORT OF HEARING – FIRST DRAFT		
Modification (if any):		
Committee Reason:		
PUBLIC COMMENT- SECOND DRAFT: Proponent:		
Desired Action:		
Modification:		
Reason:		
Committee decision: AS/AM/D	***Committee Vote at Meeting:***	***Committee Vote on Ballot:***
FINAL ACTION: Modification (if any):		
Committee Reason:		