

## ICC 500 Revisions to Public Review Draft 1 – Oct. 11, 2023

### IS-STM 01-01-23 AM; IS-STM 01-02-23 AS/AFM BC1

**104.1 Dedicated storm shelters.** Where a facility structure is designed to be occupied solely as a *storm shelter*, the designated occupancy shall be Group A-3 as defined by the *International Building Code*® for purposes of determination of applicable requirements that are not included in this standard.

#### Exceptions:

1. Where the facility storm shelter has a *design occupant capacity* of less than 50 persons the designated occupancy shall be in accordance with Section 303 of the *International Building Code*.
2. Where the facility storm shelter is a *residential storm shelter*, the designated occupancy shall be the Group R occupancy served as defined by the *International Building Code* or the facility structure shall comply with the *International Residential Code*®, as applicable.

### IS-STM 03-02-23 AM/AFM BC2

**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.

1. to 3. (no change)
4. The *storm shelter design* tornado speed,  $V_T$  or design wind speed,  $V_H$ , or both, mph (m/s).
5. The ~~tornado and~~ wind exposure category (indicate all where more than one is used).
- ~~6.8.~~ The directionality factor,  $K_d$  ~~and-or~~  $K_{dt}$  or both.
7. The topographic factor,  $K_{zt}$ .
- ~~8.6.~~ The internal pressure coefficient,  $GC_{pi}$  ~~and-or~~  $GC_{piT}$  or both.
9. to 24 (no change)

### IS-STM 01-07-23 AS/AFM BC1

**107.1 Quality assurance plan.** The construction documents for community storm shelters shall contain a quality assurance plan prepared by a registered design professional and shall identify the following:

- 1 to 5 (no change)
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 Chapter 3, such as, window assembly, door assembly, shutter assembly or louver.
- 7 to 12 (no change)

### IS-STM 01-08-23 AS /AFM BC1

**108.5.1 Changes.** The registered design professional in responsible charge shall submit to the peer reviewer changes to the main windforce-resistance system or components and cladding that occur after the peer review report, that are related to the requirements of Section ~~408.4~~ 108.2 and occur before the issuance of permits for construction. If determined to be needed by the authority having jurisdiction, an amended peer review report shall be submitted before such design changes are implemented.

### IS-STM 01-09-23 AM/AFM BC1

**109.3 Evaluation 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 and maintenance plan in accordance with Section 113.

### IS-STM 01-09-23 AM/AFM BC1

**113.1 General.** Community shelters shall be evaluated and maintained in accordance with Sections 113.2 through ~~443.4~~ 113.5.

### IS-STM 01-09-23 AM/AFM BC1

**113.2 Evaluation and maintenance plan.** The owner or the owner's authorized agent shall develop and maintain a written evaluation and maintenance plan.

### IS-STM 01-09-23 AM/AFM BC1

**113.4.3 113.3.3 Critical support systems.** Critical support systems shall be maintained and repaired in compliance with manufacturers requirements and Section 109.3. Stored supplies such as generator fuel and water supply shall be maintained at appropriate levels in accordance with Section 109.3.

IS-STM 02-02-23 AM; correlation with IS-STM 07-06-23 for order or requirements; 07-02-23 AS/AFM BC1

**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, drinking water, roof drainage systems, ventilation systems, lighting systems, standby power system, and emergency power systems.

**IS-STM 01-02-23 AS/AFM BC1**

**ON-SITE.** Either inside, immediately adjacent to, or on the same site as the designated *storm shelter facility*, and under the control of the owner or lawful tenant.

**IS-STM 03-05-23 AM; IS-STM 03-08-23 AM/AFM BC1**

**306.4.1.4 Door undercut clearance.** ~~Floor clearance for door~~ Door assemblies in the storm shelter envelope 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 306.4.1.4).

The ~~joint clearance gap~~ 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-undercut~~

**IS-STM 03-05-23 AM; IS-STM 03-11-23 AM/AFM PC1**

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

1. and 2 (no change)
3. Joints, gaps or voids that do not meet Item 1 or 2 shall comply with Section 306.4.1.4, 306.5.1 or 306.5.2.

**IS-STM 05-06-23 AM - modification replace by**

**IS-STM 05-07-23 AM/05-08-23 AM/05-09-23 AM/D for Section 504.6 (now 504.7), restore 2020 text.**

**504.7 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.

**05-09-23 AM/D for Section 504.6(now 504.7), restore 2020 text.**

~~**504.7 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.~~

**IS-STM 05-16-23 AS; IS-STM 03-02-23 AM/AFM BC4**

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

1. and 2 (no change)
3. Design tornado speed, and design wind speed, or both.
4. and 5 (no change)

**IS-STM 03-02-23 AM; IS-STM 07-02-23 AS/AFM BC1**

**702.2 Protection of tornado shelter critical support systems.** *Tornado shelter critical support systems* shall remain functional for the design storm event and a minimum period of two hours. *Tornado shelter critical support systems* located outside of the 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 wastewater system for water closets and lavatories are not required to comply with this section.~~

**IS-STM 07-02-23 AS/AFM BC1**

**702.4.4 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*.

**IS-STM 07-02-23 AS/AFM BC1**

**702.4.4.1 Storage capacity for water supply and wastewater.** In community shelters with a *design occupant capacity of 50 or greater*, the capacity of the 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 12 occupants of supply water and 1.5 gallons (5.68 L) capacity per 12 occupants 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.

IS-STM 03-02-23 AM; IS-STM 08-10 AM/AFM PC2

**802.1 Test assembly General.** All parts of the test *specimen* shall be full size...

IS-STM 08-10 AM/AFM PC2

**802.3 Test sSpecimen conditioning.** Samples .....

**IS-STM 08-02-23 AS; IS-STM 08-03-23 AS/AFM PC2**

**803.9 Impact locations and the number of impacts.** For purposes of testing, 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 that the center of the missile profile shall impact within a 2½ 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.

**IS-STM 08-03-23 AS/AFMPC1; IS-STM 08-05-23 AS/AFM BC1**

**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. See examples as detailed in Figures 803.9.1(1) and 803.9.1(2).

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. See examples 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 impact centered between studs or supports.

Interface joints used for attachment or joining at corners, at panel-to-panel sections, or at panel-to-roof shall be impacted directly on an example of each type of interface joint. See examples in Figure 803.9.1(2).

Where a section contains lapped materials, the centered impact shall be adjusted to strike impact 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. See example 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 consent of the test sponsor and *test laboratory*.

**IS-STM 08-05-23 AS/AFM BC1**

**803.9.2 Solid wall assemblies and roof assemblies of concrete or other materials.** Sections of wall assemblies and roof assemblies of solid concrete or other solid material shall be impacted in the center of the section, and at one interface corner. See examples as detailed in Figures 803.9.2(1) and 803.9.2(2). Where interface joints are used for joining at corners or panel-to-panel joints, an additional section shall be impacted directly on the interface joints. See examples as detailed in Figure 803.9.2(2).

Where an interior stud or support is present, additional impacts shall be performed within 3 inches (76 mm) of the stud and support, and directly on the stud support. See examples as detailed in Figures 803.9.2(1) and 803.9.2(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 consent of the test sponsor and *test laboratory*.

**IS-STM 08-05-23 AS/AFM BC1**

**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. See example as detailed in Figure 803.9.3(1). Mortared joints shall be impacted directly on the interface joints. See example 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 provided.

**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*.

#### IS-STM 08-05-23 AS/AFM BC1

**803.9.4.1 Side-swinging door assemblies.** Side-swinging door assemblies shall be impacted within 6 inches (152 mm) of an interface hinge joint, within 6 inches (152 mm) of an upper latch point and within 6 inches (152 mm) of center primary latches or operators. See example as shown in Figure 803.9.4.1(1).

For double door assemblies with each door leaf containing identical hardware, one door leaf shall receive the same three impacts as a single door leaf plus an additional impact on a center meeting point or mullion. See example as shown in Figure 803.9.4.1(2).

For double door assemblies where one or more hardware components differ between door leaves, each door leaf shall receive the same three impacts as a single door and an additional impact on a center meeting point or mullion. See example as shown in Figure 803.9.4.1(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 leaf in Figure 803.9.4.1(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.

#### IS-STM 08-05-23 AS/AFM BC1

**803.9.4.2 Rolling door assemblies.** For *rolling door assemblies*, the door shall be impacted at the center of the door, , centered at a point within 6 inches (152 mm) horizontally and vertically away from a bottom corner and within 6 inches (152 mm) of the primary latch or lock mechanism, plus an additional impact centered on a barrel assembly. See example as shown in Figure 803.9.4.2.

**Exception:** The barrel assembly is not subject to the additional impact where the entire barrel assembly is protected by the shelter envelope.

#### IS-STM 08-05-23 AS/AFM BC1

**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 within 6 inches (152 mm) horizontally and vertically away from a bottom corner, and within 6 inches (152 mm) of the primary latch or lock mechanism. See example in Figure 803.9.4.3.

#### IS-STM 08-06-23 AM/AFM PC1; IS-STM 08-05-23 AS/AFM BC1

**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, 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, as applicable See Example as detailed in Figure 803.9.5(1). Where interior mullions or other glazed section joints are present, the assembly shall be impacted centered on the mullion and at base of mullion. See Example as shown in Figure 803.9.5(2). Interface hinge joints and primary latches, where present, shall be impacted. See Example 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.

#### IS-STM 08-10-23 AM; IS-STM 08-06-23 AM/AFM PC2 and PC3; IS-STM 03-10-23 AM/AFM BC1

**803.9.6 Other impact-protective systems system assemblies.** All other Other impact-protective systems system assemblies shall be impacted in the center of the test specimen the worst-case section as determined by the test laboratory, and at a perimeter corner within 6 inches (152 mm) from each edge. Where a lock/latch is provided on the test *specimen*, the corner impact shall occur nearest the lock/latch. See example in Figure 803.9.6(1).

Panels and interface joints shall be additionally impacted on the same test *specimen* centered at a seam or lap and at the center of a panel element, unless previously impacted at the same location on the same test specimen. See example in Figure 803.9.6(2).

Where an interior stud or support is present, additional impacts onto the same test *specimen* shall be performed within 3 inches (76 mm) of the stud or support, and directly on the stud or support. See examples in 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 on an additional test specimen.

**Exception:** The same test specimen shall be permitted to be used to satisfy the requirements of Sections 803.9.6 and 803.9.4 by mutual consent of the test sponsor and test laboratory.

Glazed openings in other impact-protective systems shall be treated the same as glazed openings in doors and shall comply with Section 803.9.4.4.

Louvers shall be additionally impacted at the midspan of the blade's longest unsupported span, unless previously impacted at the same location on the same test specimen.

**IS-STM 08-12-23 AS; IS-STM 08-03-23 AM/AFM PC1**

**803.9.7.3 Door assemblies subject to first impact.** Where a first-~~strike impact~~ 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 meet one of the following debris impact criteria:

1. The door assembly withstands the impact of a missile ~~striking~~ impacting 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~~ impacting 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)].

**IS-STM 08-13-23 D/AFMBC2**

**803.10.1 Perforation.** Any perforation of the interior surface-of the tested 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.

**IS-STM 08-13-23 D/AFMBC2**

**803.10.5 Maximum Deflection.** The maximum deflection under impact testing shall not result in perforation of the witness screen detailed in Sections 803.10.2 and 803.10.3. For impact protective systems that are intended for installation to the exterior of a protected component, impact deflection that would result in contact with the protected component constitutes a failure.

**IS STM 08-15-23 AS/AFM PC1**

**804.3 Cyclic pressure testing after impact.** Test *specimens* requiring cyclic pressure testing shall be cyclic tested in accordance with ASTM E1886 using the loading sequence detailed in Table 1 of ASTM E1886 to the *design wind pressure*. The test *specimens* used shall be the same test specimens that received impact testing in accordance with Section 803. Cyclic pressure testing procedures shall be performed in accordance with the Air Pressure Cycling criteria as detailed in ASTM E1886.

**Exception:** The maximum allowable cycle time for specimens over 75 square feet (7 m<sup>2</sup>) in area shall be permitted to be calculated using the following equation:

$$\text{Maximum allowable cycle time in seconds} = (\text{area of specimen in sq. ft.} - 75) \times 0.06 + \underline{3-5}$$

In no case shall the maximum cycle time exceed ~~40~~ 20 seconds.

**IS-STM 08-16-23 D/AFM PC1**

**804.3.1 Maximum Deflection Measurement.** The maximum deflection of the test specimen shall be measured and recorded for each loading sequence during cyclic pressure testing. The deflection-measuring system shall comply with the requirements of Sections 6 and 9 of ASTM E330.

**IS-STM 09-01-23 AS/AFM BC1**

NFPA-70—~~1723~~ National Electrical Code.....702.5, 703.9

**IS-STM 01-02-23 AS/AFM BC1**

**A101.3 Availability.** A copy of the SSPEOP shall be maintained ~~at the facility~~ at all times. ~~The SSPEOP and~~ shall be available in the facility storm shelter for reference and review by the designated *storm shelter management team*, ~~and a~~ copy shall be provided by the owner or owner's representative for ~~maintenance by~~ the *authority having jurisdiction* or Emergency Management Agency where the shelter is designated for use by the general public.