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## Standard Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows<sup>1,2</sup>

This standard is issued under the fixed designation F2006; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### INTRODUCTION

The consumer safety specification addresses window fall prevention devices that protect against potential falls by children age five and under through open windows not designated for emergency escape or rescue in installations more than 75 ft (23 m) above ground level in multiple family dwelling buildings since windows at these heights are beyond the reach of rescue ladders currently in use. Window fall prevention devices currently available include window opening control devices, window fall prevention screens, and some types of window guards. These devices use different strategies to prevent children from falling through open windows. Window opening control devices restrict the size of the open area of the window so that it is too small for a young child to fall through. They do this by allowing the window opening to be set at a predetermined position. Window fall prevention screens and fall prevention window guards provide a barrier to prevent a child from falling through an open window. This specification does not apply to devices applied to windows installed in one and two family dwellings.

A special study<sup>3</sup> by the U.S. Consumer Product Safety Commission indicates that young children are at high risk of death and serious injury from window falls. Children age five and younger account for a higher percentage of window fall fatalities and injuries.<sup>4</sup>

Window fall prevention devices usually differ in purpose and application from security/burglar bars. The general purpose of a window fall prevention device is to prevent a child age five or younger from falling through an open window. The general purpose of a security bar is to prevent unlawful entry through a window. Generally window fall prevention devices and security bars are two separate devices. However, a security bar could be used as a fall prevention device if it meets the requirements of this specification.

The CPSC has advised caregivers to open windows less than 4 in. when children are present as one means to prevent child falls through open windows. Window opening control devices provide a means that the window, when opened in an initial operation, will satisfy the CPSC recommendation to open less than 4 in.<sup>5</sup> The 4-in. dimension is drawn from related building codes and standards for openings in guardrail assemblies,<sup>6</sup> and is universally accepted as the appropriate dimension to prevent a child from passing through balcony or guard railing systems. An additional operation is required to open the window further. The additional operation must be performed without the use of keys, tools or special knowledge. Security from forced entry is not within the scope of this standard and is not the intended function of any of the devices referred to herein.

<sup>1</sup> This safety specification is under the jurisdiction of ASTM Committee F15 and is the direct responsibility of Subcommittee F15.38 on Window Fall Prevention. Current edition approved Nov. 1, 2008. Published January 2009. Originally approved in 2000. Last previous edition approved in 2005 as F2006-00 (2005). DOI: 10.1520/F2006-08.

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<sup>2</sup> This standard replaces former Provisional Safety Specification PS 112.

<sup>3</sup> U.S. Consumer Product Safety Commission, special window falls study conducted in 1991.

<sup>4</sup> U.S. Consumer Product Safety Commission, special window falls study conducted in 1991 and "Window Safety: Data and Patterns Related to Entrapments and Accidental Falls from Windows," prepared by Anderson Corporation.

Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:F15-1002.

<sup>5</sup> Consumer Product Safety Commission, "Preventing Window Falls," Document #5124.

<sup>6</sup> See NFPA 101, 2006 Edition Section 7.2.2.4.5.3. Also see Section R312.2 Guard opening limitations in the 2006 International Residential Code (IRC).

## 1. Scope

1.1 This safety specification establishes requirements for devices intended to address the risk of injury and death associated with accidental falls through open windows by children five years old and younger.

NOTE 1—This specification is not intended to meet the unique requirements of Americans With Disabilities Act (ADA).

1.2 This safety specification applies only to window fall prevention devices, including window opening control devices, window fall prevention screens, and fall prevention window guards that are to be used on windows that are not intended for escape (egress) and rescue (ingress).

NOTE 2—Specification F2090 addresses window fall prevention devices (releasable) for windows intended for emergency escape and rescue and any other window not covered by this specification.

1.3 This safety specification applies only to devices intended to be applied to windows installed at heights of more than 75 ft<sup>7</sup> (23 m) above ground level in multiple family dwelling buildings. This safety specification is not intended to apply to windows below 75 ft (23 m) because all windows below 75 ft (23 m) that are operable could be used as a possible secondary means of escape.<sup>8</sup>

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *This standard does not purport to address all safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>9</sup>

F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

F2090 Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms

### 2.2 Code of Federal Regulations:<sup>10</sup>

16 CFR 1201 Safety Standard for Architectural Glazing Materials

16 CFR 1500.53 Test Methods for Simulating Use and Abuse of Toys and Other Articles Intended for Use by Children Over 36 But Not Over 96 Months of Age, (f)(3) Testing Procedure

16 CFR 1508.6 (b) Requirements for Full-Size Baby Cribs

### 2.3 ANSI Standard:<sup>11</sup>

ANSI Z97.1-1984 Safety Glazing Materials Used in Buildings — Safety Performance Specifications and Methods of Test (Tempered Glass Impact Test)

ANSI Z535.4 American National Standard for Product Safety Signs and Labels

ANSI Z535.6 Product Safety Instructions in Product Manuals, Instructions and Other Collateral Materials

ANSI/BHMA A156.9 American National Standard for Cabinet Hardware

ANSI/SMA 1201-2002 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors

### 2.4 AAMA Standards:<sup>12</sup>

AAMA/SDMA/CSA 101/IS.2/A440-08 North American Fenestration Standard/Specification for Windows, Doors and Skylights

AAMA 902 Voluntary Specification for Sash Balances

## 3. Terminology

### 3.1 Definitions of Terms:

3.1.1 *aftermarket*, *adj*—referring to a product or device that is manufactured separately from a window but is intended to be used in conjunction with a window. For purposes of this standard, such a device is intended to be attached to or near a window or its frame in order to prevent a young child from passing or falling through the window when the window is opened.

<sup>7</sup> 1994 Uniform Building Code Handbook, Sec. 1807. (a) and 2000 International Building Code—Section 403.1 (January 2000; Published Feb. 1, 2000) – Special provisions for Group B and R1.

<sup>8</sup> This is the intended application of the specification unless otherwise required by applicable building code.

<sup>9</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>10</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

<sup>11</sup> This safety specification is under the jurisdiction of ASTM Committee F15 and is the direct responsibility of Subcommittee F15.38 on Window Fall Prevention. Current edition approved March 15, 2010. Published April 2010. Originally approved in 2000. Last previous edition approved in 2008 as F2006–08. DOI: 10.1520/F2006-10.

<sup>12</sup> Available from American Architectural Manufacturers Association, 1827 Walden Office Square Suite 550 Schaumburg, IL 60173, <http://www.aamanet.org>.

3.1.2 *emergency escape (egress) and rescue (ingress) window, n*—a window intended for emergency escape (egress) and rescue (ingress) during an emergency situation such as fire, gas leak, etc., as defined by the prevailing applicable building and fire codes.

3.1.3 *fall prevention window guard, n*—a device designed to fit into or onto a window to prevent a child from passing or falling through an open window. Typically mounted on the interior frame of the window and includes side frames fastened to the sides of a window frame and a plurality of spaced-apart, transverse, tubular, width-adjustable crosspiece elements to form a grid pattern between the side supports to prevent passage of a child.

3.1.4 *window, n*—an opening constructed in a wall or a roof to admit light or air or both to any enclosure.

3.1.5 *window fall, n*—a fall through an open window.

3.1.6 *window fall prevention device, n*—any device intended to prevent a young child from passing or falling through an open window. Such a device may be an integral part of a window, or may be attached to the window, its frame, or the area around the window after the window has been installed.

3.1.7 *window fall prevention screen, n*—a screen device designed to fit into or onto a window to prevent a child from passing or falling through an open window. Typically mounted on the exterior surface/frame of a sliding style window and on the interior of a cranking style window and includes screening mesh or material and attachment mechanism(s) of sufficient strength to meet the performance requirements of this standard while preventing passage of a child.

3.1.8 *window opening control device, n*—a device that limits a window sash to be opened with normal operation of the sash such as to prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere<sup>13</sup> at the lowest opening portion of the window opening, with a release mechanism that shall allow the sash to be opened to a larger opening area such as that required for emergency escape and rescue, and that automatically resets when the window sash is fully closed.

3.1.8.1 *controlled open position, n*—maximum open position of a window sash, when the window opening control device(s) is engaged, that prohibits the free passage of a 4-in. (102-mm) diameter rigid sphere.

## 4. General Requirements

### WINDOW FALL PREVENTION SCREEN AND FALL PREVENTION WINDOW GUARD DEVICES

4.1 Window fall prevention screen or fall prevention window guard devices shall be constructed so as to prohibit the free passage of a 4.0 in. (102 mm) diameter rigid sphere<sup>13</sup> anywhere in the window opening (as required by applicable codes for that jurisdiction), during or after testing as specified in 8.1 through 8.3, when the window fall prevention device is installed in accordance with the manufacturer's instructions.

4.2 The distance between window fall prevention screen or fall prevention window guard device structural members or components after all testing is conducted shall not exceed 4.0 in. (102 mm) when a 60 lbf<sup>14</sup> (267 N) direct force is applied in accordance with the test method according to 8.2.

4.3 Window fall prevention screen or fall prevention window guard devices shall be free of sharp projections and edges.

4.4 Window fall prevention screen or fall prevention window guard devices shall not interfere with the operation, function or performance of the window to applicable standards, and shall not violate light, ventilation, and emergency escape and rescue requirements of the applicable building code.

4.5 Each window fall prevention screen or fall prevention window guard device shall be sold with installation instructions and safety information included in the packaging for each device.

4.6 Installation instructions shall include the statement that a copy of the safety information shall be provided to the owner of the building in which the device is installed and to the occupant in the dwelling where the device is installed (or is to be installed).

4.7 Installation instructions and safety information shall be conspicuous.

4.8 Installation instructions and safety information shall specify maximum window opening width and height for which the window fall prevention device is intended.

4.9 Additional requirements for window fall prevention screen assemblies used as window fall prevention devices.

4.9.1 Window fall prevention screen assemblies designed for exterior installation shall meet the weathering and durability requirements of ANSI/SMA 1201-2002: "Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors."

4.9.2 Attachment of window fall prevention screen assemblies to window units, framing, or surrounding materials, shall not interfere with the operation, function or performance of the window to applicable standards, and shall not violate light, ventilation, and emergency escape and rescue requirements of the applicable building code.

4.9.3 Window fall prevention screen assemblies used as window fall prevention devices shall comply with applicable standards contained in ANSI/SMA 1201-2002: "Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors."

4.9.4 Where window fall prevention screens are considered, the person specifying the window fall prevention screen(s) shall refer to this specification or Specification F2090.

NOTE 3—Insect screens are intended to provide reasonable insect control and are not intended nor designed for the purpose of providing security or to provide for the retention of objects or persons.

<sup>13</sup> CPSC Publication 362, "Safety Barrier Guidelines for Home Pools" and *New Jersey Community Affairs Division of Codes and Standards*, Cite 27 N.M.R. 3150, Subchapter 27, Child-Protection Window Guards – 5:10 – 27.4 – Specifications for Windows Guards.

<sup>14</sup> Anthropometry of Infants, Children, and Youths to Age 18 for Product Safety Design," May 31, 1977, Highway Safety Research Institute, The University of Michigan.

## WINDOW OPENING CONTROL DEVICES

**REASONING STATEMENT:** It is up to each individual opening control device manufacturer to determine whether to manufacture a child fall prevention opening control device which meets both Specification F2090 and Specification F2006 requirements. This may differ on a manufacturer by manufacturer basis. The operation and performance requirements for window fall prevention Window Opening Control Devices for this standard for application and use in installations above 75 ft above ground locations are identical to those found in Specification F2090 for fall prevention window opening control devices with emergency escape (egress) release mechanisms. This does not preclude any given window opening control device manufacturer from offering a child fall prevention window opening control device that would be non-releasable or which would be designed with a more permanent type of override mechanism, such as a keyed device or one which would require a tool to overcome, which would need to perform to the same requirements as the window fall prevention screen and fall prevention window guards need to meet this standard. If your building code or jurisdiction requires a fixed non-releasable child fall prevention device it is up to the purchaser/installer to assure that the child fall prevention device that they select meets any given criteria or requirements for their jurisdiction.

4.10 Window opening control devices shall be tested in accordance with 8.4 through 8.7.

4.11 Window opening control devices, when properly installed and engaged, shall prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere<sup>13</sup> through the window opening before and immediately after testing in accordance with 8.4 through 8.7.

4.12 The window opening control device shall meet the force criteria in 8.4 through 8.7.

4.13 Window opening control devices may be designed with release mechanisms to allow for emergency escape (egress) without the need for keys, tools or special knowledge. Window latching hardware meeting the requirements of this standard shall be permitted to serve as the release mechanism.

NOTE 4—See F2006 Reasoning Statement (above).

4.13.1 Window opening control devices shall be designed and installed so that they will function properly during normal operation of the window to limit the opening area, while maintaining structural integrity and durability.

4.13.2 Release of the emergency escape (egress) mechanism of the window opening control device shall require no more than 15 lbf (66 N) of force.<sup>15</sup>

~~4.13.3 Operation of the release mechanism required to obtain emergency escape (egress) shall be able to be obtained by either two independent single actions or one dual action. The operation of the sash shall be able to be performed independently of operation of the release mechanism.~~

4.13.3 To protect against inadvertent opening of the window sash beyond the controlled open position by a young child, the emergency escape (egress) release mechanism(s) of the window opening control device(s) shall consist of either two independent single action mechanisms or one dual action mechanism. Operation of the sash shall be able to be performed independently of operation of the release mechanism.

4.13.3.1 *Single Action Mechanisms*—Operation of the two independent single action emergency escape (egress) release mechanisms shall be able to be performed consecutively.

4.13.3.2 *Dual Action Mechanism*—The dual action emergency escape (egress) release mechanism shall require two separate, distinct, and consecutive actions to release the mechanism. Maintaining the first action while performing the second action, such as pushing and then turning, shall be permitted for a dual action device, as long as the two actions are separate, distinct and consecutive.

4.13.4 The emergency escape (egress) release mechanism shall operate properly within all reasonably foreseeable operating conditions, including weather.

4.13.5 Emergency escape (egress) releases shall have their operating mechanisms clearly identified for proper use in an emergency.

4.13.6 The window opening control device and emergency escape (egress) release mechanism shall not reduce the open area of the window unit beyond applicable code requirements for minimum opening size.

4.13.7 The emergency escape (egress) release mechanism shall be readily visible.

~~4.14 Once released, the window opening control device shall automatically reset when the window sash is fully closed.~~

4.14 Once released, when the window sash is returned to a fully closed position, the window opening control device(s) release mechanism(s) shall automatically reset. Resetting shall occur at any position between the controlled open position and the fully closed position.

4.15 Window opening control devices shall not interfere with the operation, function or performance of the window to applicable standards, and shall not violate light, ventilation, and emergency escape and rescue requirements of the applicable building code.

4.16 Each aftermarket window opening control device shall be sold with installation and operating instructions and safety

<sup>15</sup> 16 CFR 1500.53, Test Methods for Simulating Use and Abuse of Toys and Other Articles Intended for Use by Children Over 36 But Not Over 96 Months of Age, (f)(3) Testing Procedure.

information included in the packaging. Instructions for factory installed opening control devices shall be included with the window manufacturers instructions.

4.17 Installation instructions shall include the statement that a copy of the safety information shall be provided to the owner of the building in which the opening control device is installed and to the occupant in the dwelling where the opening control device is installed (or is to be installed.)

4.18 Installation instructions and safety information shall specify any applicable design limitations, including maximum window width and height for which the window opening control device is intended.

## 5. Installation Instructions

### WINDOW FALL PREVENTION SCREENS, FALL PREVENTION WINDOW GUARDS AND FACTORY APPLIED/ INSTALLED WINDOW OPENING CONTROL DEVICES

5.1 Installation instructions for window fall prevention screens and fall prevention window guards shall specify that window fall prevention devices shall be installed in such manner that no space shall exist anywhere in the window opening (as required by applicable codes for that jurisdiction) with window fall prevention device installed that would permit the passage of a rigid sphere measuring 4.0 in. (102 mm) in diameter. Installation instructions shall state that failure to follow these instructions may result in the window fall prevention device's being ineffective in preventing falls from the window.

5.1.1 Installation instructions for opening control devices shall specify that when the window opening control device is properly installed and engaged, that no space shall exist at the lowest opening portion of the window opening, that would permit the passage of a rigid sphere measuring 4.0 in. (102 mm) in diameter. Installation instructions shall state that failure to follow these instructions may result in the window opening control device's being ineffective in preventing falls through an open window.

5.2 Installation instructions shall specify application to specific window type. The installation instructions shall include all details of recommended attachment materials and techniques of installation that will provide for support equal to or greater than the attachment methods and materials used to meet the test requirements as described in 8.1 through 8.7. Installation instructions shall include the statements specified in 5.2.2 and 5.2.3.

5.2.1 Where a warning<sup>16</sup> is required by this specification within the installation instructions, a signal word panel which contains the word "WARNING" in upper case letters, preceded by a safety alert symbol consisting of an exclamation mark inside a solid equilateral triangle background with the point of the triangle oriented upward shall head the information. The word "WARNING" and the safety alert symbol shall be centered on one line and shall be in letters at least 5/16 in. (8 mm) high.

5.2.2 Within the installation instructions a warning message shall include the statement of the hazard: "Blocks Escape in Fire and Emergency" and shall contain the following information:

**△ WARNING**

**Blocks Escape in Fire and Emergency**

- **DO NOT INSTALL** window fall prevention device on:
  - Emergency escape and rescue windows.
  - Fire escape windows.
  - Windows at or below 75 feet above ground level.  
(Unless approved by applicable building and/or fire codes.)
- Use of this window fall prevention device on escape and rescue windows may **result in death by entrapment** during fire or emergency.
- **Check building and fire codes** before installing window fall prevention devices. Contact local building code department or fire department for specific codes.

5.2.3 Within the installation instructions a warning message shall include the statement of the hazard: "Possible Fall Hazard" and shall contain the following information:

**△ WARNING**  
**Possible Fall Hazard**

- Young children may fall out the window if the window fall prevention device is not installed correctly.
  - Install the device so that a rigid 4 inch diameter sphere does not pass through any space in the window opening after the window fall prevention device is in place.
- Young children may fall out the window if all installation instructions are not followed:
  - Use recommended materials and techniques.

<sup>16</sup> 16 CFR 1508.6 (b), Requirements for Full-Size Baby Cribs.

<sup>16</sup> WARNING format to be written per ANSI Z535.4-2007, "Product Safety Signs and Labels," and ANSI Z535.6, "Product Safety Instructions in Product Manuals, Instructions and Other Collateral Materials," requirements unless otherwise approved by applicable building codes or fire codes, or both.

- Make sure the fall prevention device is securely attached to the window frame.
- Make sure the window frame is in good condition.

### **WINDOW OPENING CONTROL DEVICES DESIGNED FOR AFTERMARKET APPLICATIONS**

5.3 Installation instructions shall specify that when the window opening control device is properly installed and engaged, that no space shall exist at the lowest opening portion of the window opening, that would permit the passage of a rigid sphere measuring 4.0 in. (102 mm) in diameter. Installation instructions shall state that failure to follow these instructions may result in the window opening control device's being ineffective in preventing falls through an open window.

5.4 Installation instructions shall specify application to specific window type. The installation instructions shall include all details of recommended attachment materials and techniques of installation that will provide for support equal to or greater than the attachment methods and materials used to meet the test requirements as described in 8.4 through 8.7. Installation instructions shall include the statements specified in 5.4.2, 5.4.3, and 5.4.4.

5.4.1 Installation instructions shall specify that building and fire codes shall be consulted before installing window opening control devices. Contact local building code department or fire department for specific applicable codes.

5.4.1.1 Window opening control devices shall be installed such that the release mechanism(s) is in conformance with local building and fire code requirements.

5.4.2 Where a warning<sup>17</sup> is provided within the installation instructions, a signal word panel (see below) that contains the word "WARNING" in upper case letters, preceded by a safety alert symbol consisting of an exclamation mark inside a solid equilateral triangle background with the point of the triangle oriented upward shall head the information. The word "WARNING" and the safety alert symbol shall be centered on one line and shall be in letters at least 5/16 in. (7.9 mm) high.

#### **△WARNING**

5.4.3 Within the installation instructions a warning message shall include the statement of the hazard: "Blocks Escape in Fire and Emergency" and shall contain the following information:

#### **△ WARNING**

#### **Blocks Escape in Fire and Emergency**

- **DO NOT INSTALL** window fall prevention device on:
  - Emergency escape and rescue windows.
  - Fire escape windows.
  - Windows at or below 75 feet above ground level.  
(Unless approved by applicable building and/or fire codes.)
- Use of this window fall prevention device on escape and rescue windows may **result in death by entrapment** during fire or emergency.
- **Check building and fire codes** before installing window fall prevention devices. Contact local building code department or fire department for specific codes.

5.4.4 Within the installation instructions a warning message shall include the statement of the hazard: "Possible Fall Hazard" and shall contain the following information:

#### **△ WARNING**

#### **Possible Fall Hazard**

- Young children may fall out the window if the opening control device is not installed correctly.
  - Install the device so that a rigid 4 inch diameter sphere does not pass through any space in the window opening after the window fall prevention device is in place.
- Young children may fall out the window if all installation instructions are not followed:
  - Use recommended materials and techniques.
  - Make sure the opening control device is securely attached, as directed, to the window frame.
  - Make sure the window frame is in good condition.

## **6. Safety Information**

6.1 Safety information shall be distinct from the Installation Instructions. Safety information shall be headed "IMPORTANT SAFETY INFORMATION" and shall contain a note of attention to the installer to leave the safety information behind for the occupant.

6.2 Safety information shall include at least the information, signal word panels, and graphics contained in 6.4 and 6.5 (sample safety information is included in Appendix X2).

<sup>17</sup> WARNING format to be written per ANSI Z535.4-2007; "Product Safety Signs and Labels," and ANSI Z535.6, "Product Safety Instructions in Product Manuals, Instructions and Other Collateral Materials," requirements unless otherwise approved by applicable building codes or fire codes, or both.