



Designation: F2090-08 Designation: F2090 - 10

Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms¹

This standard is issued under the fixed designation F2090; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

This consumer safety specification addresses window fall prevention devices that protect against potential falls by children aged five years and under through open windows. 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.

A special study² by the U.S. Consumer Product Safety Commission (CPSC) indicates that young children are at risk of death and serious injury from falls through open windows. Children aged five and younger account for a higher percentage of window fall fatalities and injuries.³

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.⁴ The 4-in. dimension is drawn from related building codes and standards for openings in guardrail assemblies,⁵ 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.

1. Scope

1.1 This 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.

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

1.3 This specification applies to window fall prevention devices, including window opening control devices, window fall

¹ This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products 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 2001. Last previous edition approved in 2007 as F2090-01a (2007). DOI: 10.1520/F2090-08.

Current edition approved March 15, 2010. Published April 2010. Originally approved in 2001. Last previous edition approved in 2008 as F2090-08. DOI: 10.1520/F2090-10.

² U.S. Consumer Product Safety Commission, *Special Window Falls Study*, conducted in 1991.

³ 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 Andersen Corporation.

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

⁴ Consumer Product Safety Commission, "Preventing Window Falls," Document #5124.

⁵ 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).

prevention screens, and fall prevention window guards, that are to be used on any windows, including those that are designated for emergency escape (egress) and rescue (ingress).

NOTE 1—A separate safety specification, Safety Specification F2006, covers window fall prevention devices for non-emergency escape (egress) and rescue (ingress) windows in installations more than 75 ft⁶ (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.

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:⁷

F977 Consumer Safety Specification for Infant Walkers

F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

F2006 Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows

2.2 Code of Federal Regulations:⁸

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

CPSC 16 CFR Chapter 11 (1-1-87 Edition) Part 1201 Safety Standard for Architectural Glazing Materials

2.3 ANSI Standards:⁹

ANSI Z535.4 Product Safety Signs and Labels

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

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

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:¹⁰

AAMA/WDMA/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 Specific to This Standard:

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.

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*—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 *release mechanism for emergency escape (egress) and rescue (ingress) window fall prevention device*, *n*—means of opening a window fall prevention screen or fall prevention window guard or releasing a window opening control device to provide a clear opening space for the purpose of emergency escape or rescue.

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

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

3.1.7 *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

⁶ 2006 International Building Code, Section 403.1, Special Provisions for Groups B and R1, January 2000.

⁷ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

⁸ Code of Federal Regulations, available from U.S. Government Printing Office, Washington, DC 20402.

⁹ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

¹⁰ Available from American Architectural Manufacturers Association, 1827 Walden Office Square, Suite 550, Schaumburg, IL 60173, <http://www.aamanet.org/index.asp>.

window after the window has been installed.

3.1.8 *window fall prevention screen, n*—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.

3.1.9 *window opening control device, n*—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 sphere¹¹ 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.

3.1.9.1 *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 SCREENS AND FALL PREVENTION WINDOW GUARD DEVICES

4.1 Window fall prevention screens 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 sphere¹² anywhere in the window opening (as required by applicable codes for that jurisdiction), during or after testing as specified in 8.1 through 8.4, when the window fall prevention screen or fall prevention window guard 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-lbf¹³ (267-N) direct force is applied in accordance with the test method in 8.2.

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

4.4 Releasable window fall prevention screens 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 Window fall prevention screens or fall prevention window guard devices shall be designed with release mechanisms to allow for emergency escape (egress) without the need for special tools or special knowledge.

4.5.1 Operation of emergency escape (egress) mechanisms shall be accomplished with a minimum amount of effort from the inside of the building, whether the window fall prevention screen and fall prevention window guard device is mounted inside or outside the building.

4.5.2 Release of the emergency escape (egress) mechanism shall require no more than 15 lbf (66 N) of force.¹⁴

4.5.3 To protect against inadvertent operation by a young child, the emergency escape (egress) release mechanism(s) shall require two distinct actions to operate.¹⁵ Opening the window fall prevention screen or fall prevention window guard shall not count as one of these actions.

4.5.4 The emergency escape (egress) release mechanism shall operate properly in all types of weather.

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

4.5.6 Neither the window fall prevention screens or fall prevention window guard devices nor the emergency escape (egress) release mechanism shall reduce the exitable area of the window unit below what is required by applicable codes.

4.5.7 The location of the release mechanism to be used to open the window fall prevention screens or fall prevention window guard devices shall be visible.

4.6 Window fall prevention screens or fall prevention window guard devices, if hinged, shall be hinged on one side (not top or bottom) to provide easy escape (egress) and if interior mounted shall not operate outward.

4.7 Once released, window fall prevention screen or fall prevention window guard devices shall not re-engage until manually closed.

4.8 Releasable window fall prevention screen or fall prevention window guard devices shall be designed in a manner that does not accommodate the use of locking devices which require special knowledge or tools to operate, such as combination locks or

¹¹ This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products 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 2001. Last previous edition approved in 2008 as F2090–08. DOI: 10.1520/F2090-10.

¹² 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 Window Guards.

¹³ "Anthropometry of Infants, Children, and Youths to Age 18 for Product Safety Design," Highway Safety Research Institute, University of Michigan, May 31, 1977.

¹⁴ 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.

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

keyed locks, whereby the device could be locked in a closed position to some part of the building structure or to some non-moveable portion of the device itself and thereby be rendered not readily operable in the event of an emergency.

4.9 Each releasable 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.

4.10 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).

4.11 Installation instructions and safety information shall be conspicuous.

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

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

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

4.13.2 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.

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

4.13.4 Where window fall prevention screens are considered, the person specifying the window fall prevention screen(s) shall refer to this specification or Safety Specification F2006.

NOTE 2—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.

WINDOW OPENING CONTROL DEVICES

4.14 Window opening control devices shall be tested in accordance with 8.5 through 8.8.9.

4.15 Window opening control devices, when properly installed and engaged, shall prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere¹⁶ through the window opening before and immediately after testing in accordance with 8.5 through 8.8.

4.16 The window opening control device shall meet the force criteria in 8.5 through 8.8.9.

4.17 Window opening control devices shall 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.

4.17.1 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.

4.17.2 Release of the emergency escape (egress) mechanism of the window opening control device shall require no more than 15 lbf (66 N) of force.¹⁷

~~4.17.3 To protect against inadvertent operation by a young child, the emergency escape release mechanism shall be operated either by two independent single actions or one dual action. Operation of the sash shall be able to be performed independently of operation of the release mechanism.~~

4.17.3 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.

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

4.17.3.2 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.

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

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

4.17.6 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.

¹⁶ 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 Window Guards.

¹⁷ 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.

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

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

4.19 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.

4.20 Each aftermarket window opening control device shall be sold with installation and operating instructions and safety information included in the packaging. Instructions for factory installed opening control devices shall be included with the window manufacturer instructions.

4.21 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).

4.22 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 a manner that no space shall exist anywhere in the window opening (as required by applicable codes for that jurisdiction) with the 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 through an open 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 8.8.9. Installation instructions shall include the statements specified in 5.2.2 and 5.2.3.

5.2.1 Installation Instructions shall specify that building and fire codes should be consulted before installing window fall prevention devices. Contact local building code department or fire department for specific codes. <https://www.astm.org/standards/F2090-10>

5.2.1.1 Window fall prevention device shall be installed such that the release mechanism(s) is in conformance with local building and fire code requirements.

5.2.2 Where a warning¹⁸ is required by this specification 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

5.2.3 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 of the window if the window fall prevention device is not installed correctly.
 - Install the device so that a rigid 4.0-in.-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.

¹⁸ WARNING format to be written in accordance with ANSI Z535.4, "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 that the window frame is in good condition.

5.2.4 Installation instructions shall include directions to check release mechanism for operability when installation is completed and then close securely.

5.2.5 Installation instructions shall describe how to re-engage the window fall prevention device after activation of release mechanism to check for operability.

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 8.5 through 8.8.9. Installation instructions shall include the statements specified in 5.4.2 and 5.4.3.

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 warning¹⁹ 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 $\frac{5}{16}$ in. (7.9 mm) high.

△ WARNING

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

△ WARNING

Possible Fall Hazard

- Young children may fall out of the window if the opening control device is not installed correctly.

- Install the device so that a rigid 4.0-in.-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 that the window opening control device is securely attached, as directed, to the window frame.
 - Make sure that the window frame is in good condition.

5.4.4 Installation instructions shall include directions to check release mechanism for operability when installation is completed and then close securely.

5.4.5 Installation instructions shall describe how to re-engage the window opening control device after activation of release mechanism to check for operability.

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, 6.5, and 6.6. (Sample safety information is included in the Appendix.)

6.3 Safety information shall specify that window fall prevention devices, including window fall prevention screens, or fall prevention window guards (Note to manufacturers: Use whatever term applies to your device) shall be installed in such a manner

¹⁹ WARNING format to be written in accordance with ANSI Z535.4, “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.