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Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms[1]

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INTRODUCTION

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

A special study[2] 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 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 from a 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.

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1. Scope

1.1 This specification establishes requirements for devices intended to address the risk of injury and death associated with accidental falls from 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 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 F 2006, covers window fall prevention devices for non-emergency escape (egress) and rescue (ingress) windows in installations more than 75 feet[4] (23 m) above ground level in multiple family dwelling buildings.

1.4 *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.*

1.5 The values stated in inch–pound units are to be regarded as the standard. The SI values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:* [5]

F 977 Consumer Safety Specification for Infant Walkers

F 1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

F 2006 Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows

2.2 *Code of Federal Regualtions:*[6]

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

[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.

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[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.

Research Report F15-1002 available through ASTM

[4] *1994 Uniform Building Code Handbook*, Section 1807(a) and *2000 International Building Code*, Section 403.1, Special Provisions for Groups B and R1, January 2000.

[5] 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.

[6] *Code of Federal Regulations*, available from U.S. Government Printing Office, Washington, DC 20402.

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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:*[7]

ANSI Z535.4 Product Safety Signs and Labels

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

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *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.

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

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

3.1.4 *window fall prevention device*, *n*—a product installed into an existing window opening, and in conjunction with the properly functioning window unit, for the purpose of preventing children five years old or younger from falling from or out of an open window.

3.1.5 *window falls*, *n*—a fall from or out of a window.

4. General Requirements

4.1 Window fall prevention devices shall be constructed so as to prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere[8] at any point, during or after testing as specified in Section 8, when the window fall prevention device is installed in accordance with the manufacturer's instructions.

4.2 The distance between window fall prevention device structural members or components after all testing is conducted shall not exceed 4.0 in. (102 mm) when a 60-lbf[9] (267-N) direct force is applied in accordance with the test method in 8.2.

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

4.3.1 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 device is mounted inside or outside the building.

4.3.2 Release of the emergency escape (egress) mechanism shall require no more than 15 lbf (66 N) of force.[10]

4.3.3 The emergency escape (egress) release mechanism shall consist of a double-action device requiring two distinct actions to operate.[11] Opening the window fall prevention device shall not be counted as one of the two required actions.

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

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

4.3.6 Neither the window fall prevention device nor the emergency escape (egress) release mechanism shall reduce the exitable area of the window unit below what is required by applicable codes.

4.3.7 The location of the release mechanism to be used to open the window fall prevention device shall be visible.

4.4 Window fall prevention 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.

4.5 Once released, window fall prevention device shall not re-engage until manually closed.

4.6 Releasable window fall prevention devices shall be free of sharp projections and edges.

4.7 Releasable window fall prevention devices shall not interfere with the design, operation, and function of the window; shall not alter the window in a manner that causes water and/or air infiltration; and shall not violate light, ventilation, and egress requirements of the applicable building code.

4.8 Releasable window fall prevention 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 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 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.

5. Installation Instructions

5.1 Installation instructions shall specify that window fall prevention devices shall be installed in such a manner that no

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

[8] *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.

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

[10] 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

[11] 16Cfr 1508.6 (b) Requirements for Full-Size Baby Cribs

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space shall exist anywhere in the window opening 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.

5.2 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 Section 8. 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.

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 warning[12] 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.
  –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.

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 shall be installed in such a manner that no space shall exist anywhere in the window opening with window fall prevention device installed that would permit the passage of a rigid sphere measuring 4.0 in. (102 mm) in diameter.

6.3.1 The safety information in 6.4, 6.5 and 6.6 shall be headed by a signal word panel (see below) and shall contain 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. 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

6.4 The safety information shall include the statement of the hazard, "No Window Rescue Above 75 ft (6th Floor)," and shall contain the following information:

⚠ WARNING
No Window Rescue Above 75 ft (6th Floor)

• Fire rescue ladder may not reach beyond 75 ft (6th floor).
• Do not rely on being rescued from windows above 75 ft (6th floor). Follow building fire escape plan.

6.5 The safety information shall include the statement of the hazard, "Blocks Escape in Fire and Emergency Unless Released," and shall contain the following information:

⚠ WARNING
Blocks Escape in Fire and Emergency Unless Released

• Need to properly operate release mechanism to open window fall prevention device by:
  -Note to manufacturer: Give instruction on how to correctly operate the release mechanism on your particular window fall prevention device.
• Never apply padlocks or devices that require a key or tool to unlock them to the release mechanism and/or window fall prevention device.

6.6 The safety information shall include the statement of the hazard; "Possible Fall Hazard" and shall contain the following information:

[12] WARNING format to be written in accordance with ANSI Z535.4 requirements unless otherwise approved by applicable building and/or fire codes.

⚠ WARNING
Possible Fall Hazard

• If window fall prevention device is too small for the window opening, accidental window falls can result.
• Follow manufacturer's assembly and installation instructions carefully. Failure to do so may result in accidental window falls.
• This window fall prevention device is designed to protect against accidental window falls by children five years and younger.
• This window fall prevention device is not a substitute for careful supervision of all young children.
• Keep window fall prevention device closed securely unless needed for use in an emergency.

6.7 Safety information shall describe how to re-engage the window fall prevention device after activation of device to check for operability.

6.8 Safety information shall include directions on how to operate the release mechanism and provide an explanation for the need to activate the release mechanism.

6.9 Safety information shall include recommendations that release mechanism and releasable window fall prevention device be maintained and tested on a monthly basis (once a month) and after testing be closed securely.

6.10 Safety information shall include recommendations that all household members six years old and older should know how to operate the release mechanism in case of an emergency.

7. Labeling Requirements

7.1 The window fall prevention device shall identify the name, city, and state of either the manufacturer, retailer, or distributor.

7.2 The packaging for the window fall prevention device shall specify appropriate application and maximum window opening width and height for which the window fall prevention device is intended.

7.3 No more than one year after the effective date of this standard, window fall prevention devices meeting this standard shall be so labeled on their packaging.

7.4 To explain the function of the window fall prevention device and how to operate the release mechanism, the window fall prevention device shall be permanently labeled in close proximity to the release device with the following:

Child Fall Guard
In Emergency
Do XXXXX to Escape

7.4.1 "Do XXXXX" is a brief description of how to operate the release mechanism. This label may be in pictorial form. The label shall be permanently printed or embossed on a permanent hang tag or on some other type of permanent label such as a sleeve.

8. Performance Tests

8.1 *Preparing Specimen for Testing*:

8.1.1 Window fall prevention devices shall be extended to the maximum width and height as specified by the manufacturer and mounted in a test frame or holder materials using installation techniques that are representative of the same mounting devices and techniques as recommended in the manufacturer's installation instructions. All testing shall be done with the window fall prevention device placed so that its inside (exposed) surfaces are subjected to the applied forces under 8.2 and 8.3.3.

8.1.2 The test supports shall be located in such a manner that they are contacting only the test frame and not providing any support directly to the installed window fall prevention device.

8.1.3 Use the same window fall prevention device specimen for all Performance Tests (8.2 and 8.3). Test following the order indicated by the Performance Test number sequencing.

8.2 *Static Load (Hang) Test*:

8.2.1 A load distribution device[13] capable of exerting a 60 lb force shall be used.

8.2.2 This test shall be performed for each different type of component in the window fall prevention device (vertical bars, horizontal bars, webbing, etc.).

8.2.3 With the window fall prevention device installed as specified in 8.1.1, suspend the load distribution device from each of the individual component part members of the window fall prevention device (for example, hang the weight from a horizontal bar component or from a member or opening of webbing) in a manner that simulates the anticipated load representative of a child hanging from any individual part of the window fall prevention device.

8.2.4 Apply a vertical force of 60 lb on the component at any point.

8.2.5 Once the test weight is removed, the tested specimen is inspected to determine that the window fall prevention device shall prohibit the free passage of a 4.0 in (102 mm) diameter rigid sphere through or around it at any point.

8.2.6 The latching or locking device of release mechanism shall remain engaged and operative after testing.

8.3 *Pendulum Test*: [14]

8.3.1 *Rationale*—This test is based on subjecting the window fall prevention device to 100 ft-lb (136 J) of energy. This is the energy that would be generated by a 50-lb (22.7-kg) child (95th percentile 5-year-old) falling directly onto the window fall prevention device from a height of two feet or running directly into the window fall prevention device at a speed of 11.4 ft/sec (3.48 m/sec) (approximately 50th percentile 6-year-old sprint speed; 6 years is the youngest age for which data are available[15]).

100 ft-lb is a reasonably stringent criterion. If, while bouncing on a bed for instance, the child fell against the window fall prevention device, it is not likely that all of the

[13] Such as Fig. 36 of Consumer Safety Performance Specification F 1487–95.
[14] Test procedure based upon data found in CPSC 16 CFR Chapter 11 (1-1-87 Edition) Part 1201 and ANSI Z97.1-1984.
[15] Maximum Running Speed 167, *Childata The Handbook of Child Measurements and Capabilities – Data for Design Safety*, Department of Trade and Industry, UK, June 1995, Beverley Norris and John R. Wilson, Eds., Institute for Occupational Ergonomics, Department of Manufacturing Engineering and Operations Management, University of Nottingham, University Park, Nottingham NG7 2RD, UK.

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