



Designation: F 2006 – 00

## 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 F 2006; 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 from windows not designated for emergency escape or rescue in installations more than 75 ft (23 m) above ground level in multiple family dwelling buildings. 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 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.

### 1. Scope

1.1 This safety 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 safety specification applies only to window fall prevention devices that are to be used on windows that are not intended for escape (egress) and rescue (ingress).

NOTE 1—Provisional Safety Specification PS120 addresses window fall prevention devices (releasable) for windows intended for emergency escape and rescue and any other window not covered by this standard.

1.3 This safety specification applies only to devices intended to be applied to windows installed at heights of more

than 75 ft<sup>5</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>6</sup>

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:

PS 120 Specification for Window Fall Prevention Devices

<sup>1</sup> This safety 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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<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. (Research Report F15-1002 available through ASTM.)

<sup>5</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>6</sup> This is the intended application of the specification unless otherwise required by applicable building code.

with Emergency Escape (Egress) Release Mechanisms<sup>7</sup>

## 2.2 ANSI Standard:

ANSI Z97.1-1984 Safety Glazing Materials Used in Buildings — Safety Performance Specifications and Methods of Test (Tempered Glass Impact Test)<sup>8</sup>

## 3. Terminology

### 3.1 Definitions of Terms:

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

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

3.1.3 *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.

3.1.4 *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.

## 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<sup>9</sup> 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<sup>10</sup> (267 N) direct force is applied in accordance with the test method according to 8.2.

4.3 Window fall prevention devices shall be free of sharp projections and edges.

4.4 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 or air infiltration or both, and shall not violate light and ventilation requirements of the applicable building code.

4.5 Each window fall prevention 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.

## 5. Installation Instructions

5.1 Installation instructions shall specify that window fall prevention devices shall be installed in such 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. 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 Where a warning<sup>11</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.

### △ WARNING

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:

<sup>11</sup> WARNING format to be written per ANSI Z535.4 - 1998 requirements unless otherwise approved by applicable building or fire codes or both.

<sup>7</sup> Annual Book of ASTM Standards, Vol 15.07.

<sup>8</sup> Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

<sup>9</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>10</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.

**△ 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 doesnot 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 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 "IMPOR-TANT 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).

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 and 6.5 shall be headed by a signal word panel and shall contain the word "WARN-ING" 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; "Blocks Escape in Fire and Emergency" and shall contain the following information:

**△ WARNING**

**Blocks Escape in Fire and Emergency**

- Do NOT install this window fall prevention device on:
  - Emergency escape and rescue windows.
  - Fire escape windows.
  - Windows at or below 75 feet above ground level.

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

**△ WARNING**

**Possible Fall Hazard**

- If window fall prevention device is too small for the window opening, accidental falls can result.
- Follow manufacturer's assembly and installation instructions carefully. Failure to do so may result in 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.

**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.

**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 in accordance with 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 sequences.

**8.2 Static Load (Hang) Test:<sup>12</sup>**

8.2.1 A load distribution device weighing 60 lb 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 any point.

<sup>12</sup> Test procedure based upon data found in ASTM F 1487-95 "Standard Consumer Safety Performance Specification for Playground Equipment for Public Use" - 12. Structural Integrity, 12.4.1.1 and 12.4.1.2.

### 8.3 Pendulum Test.<sup>13</sup>

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 which would be generated by a 50 lb (22.7 kg) child (95 percentile 5 year old) falling directly onto the window fall prevention device from a height of 2 ft or running directly into the window fall prevention at a speed of 11.4 ft/s (3.48 m/s) (approximately 50 percentile 6 year old sprint speed; 6 year old is the youngest age for which data is available<sup>14</sup>).

8.3.1.1 100 ft-lb (136 J) 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 energy from such a fall would be directed straight into the window fall prevention device, as it is in the testing situation. In addition, the window fall prevention device is not intended to protect against an intentional all-out effort on the part of the child to run through the window fall prevention device.

8.3.2 *Test Objective*— The test determines the fall prevention device's resistance to allowing an opening to develop that

would permit a child to pass through after being impacted. The fall prevention device shall not have an opening larger than the maximum space in accordance with 4.1. If such a space is found after the test, this will constitute failure of the device.

#### 8.3.3 *Test Procedure:*

8.3.3.1 The fall prevention device is mounted into the test fixture utilizing the manufacturers written installation instructions.

8.3.3.2 An impactor (100 lb) (45.3 kg), such as in Figures 2 and 3 from ANSI Z97.1-1984 (see Appendix X1), is prepared and mounted to the test fixture cable so that when at rest is it not farther than 2 in. (50 mm) away from the horizontal and vertical center of the window fall prevention device.

8.3.3.3 The impactor is pulled away from the specimen until the bottom of the impactor rises to the vertical distance of 12 in. (300 mm) above the rest position.

8.3.3.4 When all motion has stopped, the impactor is released and allowed to impact once into the test specimen.

8.3.3.5 This procedure is repeated twice more for a total of three impacts.

8.3.3.6 Once the three impacts are completed and the test weight is removed, the tested specimen shall prohibit the free passage of a 4.0 in. (102 mm) diameter rigid sphere through or around it at any point.

<sup>13</sup> Test procedure based upon data found in CPSC 16 CFR Ch. 11 (1-1-87 Edition) Part 1201 - "Safety Standard for Architectural Glazing Materials" and ANSI Z97.1-1984 "American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test" - (Tempered Glass Impact Test)

<sup>14</sup> Maximum Running Speed 167 in Childdata 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

## 9. Keywords

9.1 falls; safety standard; windows; window fall prevention devices