

A Standard for Small Child Window Fall Protection Screen

Introduction: National Association for Child Window Safety (NACWS) has been asked by two State Code Agencies and many organizations from other states to develop a meaningful standard for screens that could prevent small child window falls. Since people will and do desire ventilation from open windows it is clear that windows that are capable in any way of being opened will, in fact, be opened more than 4 inches. For this reason ONLY, window fall devices that are in place normally (passive in nature) can be reasonably expected to prevent child falls. “Window stop devices” that can be deactivated at will do not, and will not, meet that criteria.

Rationale: With the “Laela Law” Minnesota became the first State to adopt a child window safety law. Throughout the Minnesota legislative process the screen that was looked at by Minnesota law makers in both the Senate and House, and used as a model for that law was intended to be the screen that conformed to HUD Specifications for “Light Type Security Screen”. Those security screens while originally designed to protect against objects entering from the outside of a window had shown themselves to prevent child window falls from the inside windows for over a thirty year period in some of the worst conditions possible.

Unfortunately, what was included in the final Minnesota regulation was something quite different. The old “ASTM” standard ended up as the one that was included in the final language of the regulation. That ASTM screen specification conforms to what would be “Heavy Type Security Screen” under HUD standards and is something that would be found in an institutional setting. Because of cosmetic considerations and cost, the present ASTM standard is simply not a choice that is worth considering for residential use. In simple language it is one that is not and will NOT be used. The evolution of regulations requiring seat belts in automobiles has shown that any “safety device regulation” that will not be used by the majority of people is worthless in application.

The standards developed by NACWS are purposefully intended to mirror the ASTM language and standards. The only real change is to make the standard fit the real world and to be actually implemented for its intended purpose - to save children from window falls. A large majority of child window falls occur with the victim being less than 4 years old.

1. Performance Tests

1.1 Preparing Specimen for Testing:

1.1.1 Window fall prevention devices (small child window safety screens) 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.

1.1.2 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.

1.1.3 Use the same window fall prevention device specimen for all performance tests (1.2 and 1.3). Test following the order indicated by the performance test number sequences.

1.2 **Static load Test:** Probably the most important test since the majority of falls appear to result from the victim leaning onto the screen rather than running into the screen.

1.2.1 A Load distribution device weighing 60 lb shall be used.

1.2.3 With the window screen installed as specified in 1.1.1, 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 standing on any individual part of the window screen.

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

1.2.5 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.

1.3 Pendulum test:

1.3.1 Rationale – This test is based on subjecting the window screen device to 30 ft-lbs of energy. This is slightly more than the energy which would be generated by a 42 lb child (95 percentile 4 year old) or a 5 year old at 50 percentile 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 4.52 mph (approximately 50 percentile 5 year old sprint speed; or 4.06mph for a 4 year old).

1.3.1.1 30 ft-lb is a reasonably stringent criterion. If, while bouncing on a bed for instance, the child fell against the window screen, it is not likely that all of the energy from such a fall would be directed straight into the window screen device, as it is in the testing situation. In addition, the window screen device is not intended to protect against an intentional all-out effort on the part of an older child to run through the window screen.

1.3.2 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 1.2.5. If such a space is found after the test, this will constitute failure of the device.

1.3.3 Test Procedure:

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

1.3.3.2 An impactor weighing 30lbs, is prepared and mounted to the test fixture cable so that when at rest it is not farther than 2 in. (50 mm) away from the horizontal and vertical center of the window fall prevention device.

1.3.3.3 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.

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

1.3.3.5 Once the impact is 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 position.

18.3 kilograms ...60 month old child at 50 percentile

5 year old 50th percentile weight and a 50th percentile sprint speed

Weight = 41 lbs Sprint Speed = 4.52 mph Impact = 28.00 lbf-ft

4 year old 95th percentile weight and a 50th percentile sprint speed

Weight = 42 lbs Sprint Speed = 4.06 mph Impact = 22.59 lbf-ft

4 year old 50th percentile weight and a 50th percentile sprint speed.

Weight = 36 lbs Sprint Speed = 4.06 mph Impact = 19.83 lbf-ft

This data was calculated using the CDC Growth Charts for the weight. Sprint speed was calculated using the Presidents Fitness Challenge data, and the Energy Calculator website was used to determine the impact force. In addition with the help of Minneapolis Police Officers this data was independently corroborated while testing a number of pre-school children meeting the age and weight criteria; the children's sprint speed closely mirrored that specified .using the Presidents Fitness Challenge data.

Conclusion: It is necessary to have standards that will actually be implemented for their intended purpose. In the case of protecting small children from falling from windows the “Small Child Window Fall Safety Screen” standard that NACWF has developed from 1. Using available data; 2. Confirmation of that data in actual field testing; and 3. Analyzing past window falls from news reports covering the last ten years are believed to offer the best means of protecting the thousands of small children who are victims of window falls each year. While only passive devices such as child safety bars and safety screens that allow ventilation from windows are viewed as meaningful, it is important that the

most welcomed of these the safety screen have standards that will allow it to be implemented. For that reason it is important to have standards that will not only provide safety for children, but also be ones that will actually be utilized in those children's homes.