Designation: E1748 – 95 (Reapproved 2009)

Standard Test Method for Evaluating the Engagement Between Windows and Insect Screens as an Integral System[1]

This standard is issued under the fixed designation E1748; 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.

1. Scope

1.1 This test method covers the evaluation of the static load resistance of an insect screen in its functional position in a window under load conditions prescribed by appropriate specifying authorities.

1.2 This test method is applicable to insect screens larger than 12 in. (300 mm) in least dimension that can be accessed from both the interior and exterior direction when the insect screen is in the functional position.

1.3 This test method evaluates both the interior and exterior static load resistance of the insect screen attachment to the window frame.

1.4 This test method describes the apparatus and the procedure to be used for applying static loads to specimens.

1.5 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.

1.6 *This standard does not purport to address all of the 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 determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E631 Terminology of Building Constructions

2.2 *ANSI Standard:*[3]

ANSI/SMA 6001 Specifications for Metal Protection Screens

2.3 *SMA Standard:*[4]

SMA/SMT 31 Testing Procedures and Equipment Bulletin for Attachment of Screening to Frame

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology E631, unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *engagement*—the physical state of clearances or interferences of an insect screen attached to or contained within a window unit.

3.2.2 *insect screen*—a frame holding a woven netting of sufficient strand diameter and spacing to allow ventilation while providing some degree of protection against insects.

4. Summary of Test Method

4.1 This test method consists of installing a window unit with its insect screen(s) in the functional position into a test frame and then applying a specified static load to the insect screen for a duration of 60 s in both the interior and exterior directions.

5. Significance and Use

5.1 This test method is a design tool to evaluate the engagement between the window and insect screen under static loading. The ability of insect screens to remain engaged depends on the magnitude, duration, repetition of loads, and the method of engagement. The platen size and shape were chosen to prevent screen cloth damage during static loading. The 60-s duration was arbitrarily chosen to standardize this test method.

5.2 This test method is not intended for evaluating retention of woven screen mesh to a screen frame.

NOTE 1—The procedure described in SMA/SMT 31 is one method that has been developed for such evaluation.

5.3 This test method is not intended for evaluating retention of security or protection screens used as a deterrent against vandalism or forced entry.

[1] This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.51 on Performance of Windows, Doors, Skylights and Curtain Walls.

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[2] 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.

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

[4] Available from Screen Manufacturers Association (SMA), 3950 N. Lakeshore Dr., Chicago, IL 60613-3431, http://www.smainfo.org.

NOTE 2—The procedure described in ANSI/SMA 6001 is one method that has been developed for such evaluation.

5.4 This test method is not intended for evaluating the retention of insect screens being used as a restraint of occupants within the building as a means of preventing accidental falls.

5.5 This test method is not intended for evaluating retention of insect screens for their ability to withstand impacts from windborne debris as might develop during hurricanes or other windstorm events.

6. Apparatus

6.1 *Test Frame*—A reaction frame or box constructed to accept and rigidly position the test specimen to permit application of load from both the interior and exterior directions with sufficient clearances so as not to interfere with the deflection or displacement of the test specimen under load. Test frames shall be constructed to permit vertical installation of the test specimen. Test frames are permitted to be rotated to the horizontal position after the test specimen is installed to facilitate testing using dead weights.

6.2 *Static Loading Device*—A load application device or dead weights capable of applying the specified static load to the test specimen through a rigid circular platen 12 ± ½ in. (300 ± 15 mm) in diameter. The bottom edge of the platen shall be rounded to a radius between 1/32 to ¼ in. (1 to 6 mm) to prevent cutting the insect screening during load application. The applied static load shall be measured to an accuracy of ±1 lb (4.5 N) of the total load applied to include, if appropriate, the mass of the insect screen and applied mass of the platen.

7. Test Specimens

7.1 The test specimen shall consist of the entire assembled insect screen and its engagement into a window unit. Insect screens shall be positioned in their functional position for all tests.

7.1.1 Operating glazed sash or storm inserts, if present, shall be in an open position such that they will not interfere with deflections of the screen and frame under loading or removed from the test specimen assembly.

7.1.2 When a test specimen contains more than one insect screen that is not identical in construction and design engagement, each insect screen shall be tested separately.

7.2 Test specimens shall be of the greatest dimension in both directions for which conformance is desired, unless otherwise prescribed by the specifying authority.

NOTE 3—Test specimen performance is likely to be a function of size and geometry.

8. Information Required

8.1 In specifying this test method, the specifying authority shall supply the following information:

8.1.1 The interior and exterior static load, and

8.1.2 The number and location of deflection or displacement measurements required during and after removal of load, if any.

9. Procedure

9.1 *Preparation*—Remove any sealing or packing material that is not normally part of the assembly as installed. Fit the test specimen into the test frame in accordance with the manufacturer's installation instructions. Position all operating glazed sash or panels in an open position such that they will not interfere with deflections of the screen and frame under loading or remove them from the test specimen. Place all insect screens in their functional position.

9.2 Operate the insect screen (except as noted in 9.2.3) five times prior to testing. After operation, position the test apparatus so that one side of the test specimen faces the static loading device.

9.2.1 Fixed removable insect screens shall be removed and installed five times.

9.2.2 Operating insect screens shall be moved to their fully opened and then fully closed positions, (or moved from their functional to stored positions and then back again) five times.

9.2.3 Fixed, nonremovable insect screens shall require no operation prior to testing.

9.3 Apply the specified static load perpendicular to the test specimen with the platen centered on the insect screen, that is, that point where diagonal lines drawn through the screen corners intersect. No dynamic forces are to be introduced into the test during the loading of the specimen. After the load is at rest, it shall remain in position for a period of 60 ± 5 s.

9.4 Remove load.

9.5 Observe and report (see 10.1) any disengagement or deformation.

9.6 Inspect the insect screen for damage if disengagement or distortion occurs and allow for the use of a new insect screen prior to testing in the reverse direction, if appropriate.

9.7 Reposition the test apparatus or specimen so that the opposite side of the test specimen faces the static loading device.

9.8 Repeat 9.3-9.5.

9.9 If multiple insect screens are to be tested, it is permissible to use the same window unit with a new insect screen providing no damage to the window is found upon inspection.

10. Report

10.1 Report the following information:

10.1.1 Date of the test and the report,

10.1.2 Identification of the specimen (manufacturer, source of supply, dimensions, model types, material, and other pertinent information),

10.1.3 Detailed drawings of the specimen, showing dimensioned vertical and horizontal cross sections of the insect screen engagement into the window, anchorage, and any other pertinent construction details. Include a description of the type, quantity, and location(s) of the locking and operating hardware. Any deviation from the drawings or any modifications made to the specimen (including removal of the sash when necessary,

and if this would be likely to affect the results of the test) to obtain the reported values shall be noted on the drawings and in the report,

10.1.4 The load in pounds (newtons) exerted on the specimen,

10.1.5 If disengagements occur, report the location and degree of any permanent deformations or other signs of damage for each specimen tested,

10.1.6 When the tests are made to check conformity of the specimen to a particular specification, identify or describe that specification,

10.1.7 A statement that the tests were or were not conducted in accordance with this test method, along with a full description of any deviations from this test method,

10.1.8 The name of the author of the report,

10.1.9 The names and addresses of both the testing agency that conducted the tests and the requester of the tests,

10.1.10 Ambient conditions, including temperature, before and during tests, and

10.1.11 Signatures of persons responsible for supervision of the tests and a list of official observers.

11. Precision and Bias

11.1 Due to the subjective nature of the test method failure mode (engagement or extent of engagement), it is not possible to determine the precision or bias of this test method.

12. Keywords

12.1 engagement; insect screen; window