



Standard Design and Performance Specification for Removable Mesh Fencing for Swimming Pools, Hot Tubs, and Spas¹

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1. Scope

1.1 This specification outlines the performance and design requirements for removable mesh safety barriers used for barriers for swimming pools, hot tubs, and spas to reduce the incidence of injuries or death for infants and children up to and including five years of age.

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

1.3 *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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D3787 Test Method for Bursting Strength of Textiles—Constant-Rate-of-Traverse (CRT) Ball Burst Test
- D5034 Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- F1908 Guide for Fences for Residential Outdoor Swimming Pools, Hot Tubs, and Spas
- G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

2.2 ANSI Standards:³

- ANSI Z97.1 Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test
- ANSI Z535.4 Product Safety Signs and Labels

¹ This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.49 on Pool Safety Standards.

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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.

2.3 ANSI/NSPI Standard:³

ANSI/NSPI-8 Standard for Model Barrier Code for Residential Swimming Pools

3. Terminology

3.1 Definitions:

3.1.1 See ANSI/NSPI-8 and Guide F1908 for specific terms.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *grade, n*—surfaces including concrete, brick, tile, wood, metal, or similar rigid surface used as foundation for mesh safety barriers.

3.2.2 *mesh safety barrier, n*—barrier composed of fabric mesh, support posts, hardware, and other assembly components.

4. Design and Performance Requirements

4.1 The top of a fence or wall used as a barrier shall be a minimum of 48 in. (1.2 m) above the grade adjacent to the exterior side of the barrier.

4.2 Distance between vertical support poles and attached mesh, along with other manufactured factors, shall be so designed and fabricated to hinder children's ability to climb.

4.3 Decorative details, if provided or added, shall not afford the ability of children to climb the mesh safety barrier.

4.4 When a hinged gate is used in addition to, or as part of the mesh safety barrier, the gate shall be self-closing, self-latching, accommodate a locking device and open outward from the pool, spa, or hot tub. The self-latching and lockable devices for gates shall be located at a minimum height of 54 in. (1.37 m) above grade and be mounted on the outside of the gate. An additional support or plate may be necessary to raise the device to 54 in. (1.37 m).

NOTE 1—Hinged gates in accordance with 4.4 are recommended for use with removable mesh fencing for swimming pools, hot tubs, and spas.

4.5 There shall be a clear zone of at least 20 in. (50 cm) between the barrier and pool/spa/hot tub.

4.6 The fence shall have at least 40 % open space to allow visibility from outside to inside of the pool area.

NOTE 2—The "open space" is calculated by using total area and subtracting the area of opaque supports and mesh.

4.7 The mesh safety barrier shall be removable when desired.

4.8 The removable mesh safety barrier, when properly installed, shall provide continuous and constant protection of the pool/hot tub/spa. When used on an outdoor or unenclosed pool, the mesh safety barrier may provide complete 360° protection or may be attached to another existing property or perimeter fence in such a manner as to prevent unsupervised access to the pool. When used in a screen enclosure, the terminus of the mesh safety barrier shall be fastened to an upright or vertical member of the enclosure and installed in such a location that the barrier prevents unsupervised access to the pool.

4.9 Vertical posts of the mesh safety barrier shall extend a minimum of 3 in. (7.5 cm) below grade level and shall be spaced no greater than 40 in. (1.016 m) apart.

4.10 The mesh used in the barrier shall have a minimum tensile strength according to Test Method **D5034** of 100 lbf (449 N) and a minimum burst strength in accordance with Test Method **D3787** of 150 lbf (667 N).

4.11 The mesh shall receive a descriptive performance rating of no less than “trace discoloration” or no greater than “slight discoloration” or a numerical rating of 4 or 5 on a scale of 1 to 5 (1 indicating a severe color change and 5 indicating no color change) when tested in accordance with Practice **G154** (weatherability, 1000 h).

4.12 When using a molding strip to attach the mesh to the vertical posts, this strip shall contain, at a minimum, #8 × ½-in. screws with a minimum of two screws at the top and two at the bottom with the remaining screws spaced a maximum of 6 in. (15 cm) apart on center.

4.13 Patio deck sleeves (vertical post receptacles) placed inside the patio surface shall be of a nonconductive material.

4.14 A latching device shall attach each barrier section at a height no lower than 45 in. (1.14 m) above grade. Common latching devices may include, but are not limited to, devices that provide the security equal to or greater than that of a hook-and-eye-type latch incorporating a spring-actuated retaining lever (commonly referred to as a safety gate hook).

4.15 The bottom of the mesh safety barrier shall not be more than 1 in. (25 mm) above the deck or installed surface (grade).

4.16 The mesh safety barrier shall be constructed to prohibit the free passage of a 4.0-in. (102-mm) diameter rigid sphere^{4,5} at any point, after testing in accordance with Section 5 when the fence is installed in accordance with the manufacturer’s instructions.

5. Performance Tests

5.1 Vertical Load Test:

⁴ CPSC Publication 362, “Safety Barrier Guidelines for Home Pools,” U.S. Consumer Product Safety Commission, Washington, DC 20207-0001 and New Jersey Community Affairs Division of Codes and Standards Cite 27.

⁵ N.M.R. 3150, Subchapter 2, “Child-Protection Window Guards, 5:10, 27:4, Specifications for Window Guards.”

5.1.1 A ⅛-in. (0.3-cm) diameter steel wire is looped through the mesh at a height of 36 in. (0.91 m) from grade.

5.1.2 A steady vertical force of 20 lb (9.07 kg) (as measured by any force gauge, that is, fish weight scale) shall be exerted steadily upward on the wire.

5.1.3 The force shall be maintained for 1 min.

5.1.4 The mesh safety barrier shall be tested at each 5-ft (1.5-m) increment of the perimeter, including any gate.

5.1.5 Once the load is removed, the mesh safety barrier shall be inspected to determine that no opening exists that would allow passage of a 4.0-in. (102-mm) diameter rigid sphere.

5.1.6 The latching and locking device shall remain engaged after testing.

5.2 Impact Test:

5.2.1 The impactor (52 lb (23.58 kg)), such as in Figs. 2 and 3 from ANSI Z97.1 (see Appendix XI), is prepared and mounted to a 12-in. (30.48-cm) fixture cable so that when at rest it is no farther than 2 in. (50 mm) away from the fence at a height of 36 in. (0.91 m) from grade.

5.2.2 The impactor is swung sideways and upward from the mesh safety barrier until the bottom of the impactor is extended sideways and at a vertical distance of 6 in. (150 mm) above the “at rest” position. The bottom of the impactor will be at 42 in. (1.066 m) above grade for this test.

5.2.3 When all motion has stopped, the impactor is released and allowed to impact once into the mesh safety barrier.

5.2.4 The impactor test shall be used to test the fence at each 5-ft (1.5-m) increment of the perimeter of the fence including any gate.

5.2.5 Once the impact is completed and the test weight is withdrawn, the tested mesh safety barrier shall prohibit the free passage of a 4.00-in. (102-mm) diameter rigid sphere through or around it at any point.

5.2.6 The latching device shall remain engaged after testing.

6. Instructions

6.1 Instructions shall specify all requirements for proper assembly, installation, and use of the mesh safety barrier.

6.2 Instructions shall address all warning signs and safe use. Use ANSI Z535.4 for guide to details.

6.3 Instructions shall include name, address, and phone number of manufacturer.

7. Product Marking

7.1 Mesh safety barrier, meeting all requirements of this specification shall be labeled “Meets ASTM Standard F2286.”

7.2 Instructions shall include where the label of compliance is to be placed.

7.3 Manufacturer’s name.

NOTE 3—Suggested location is poolside on first pole of panel (on left side of completed panel facing pool).

8. Keywords

8.1 children safety; fences; hot tubs; mesh safety barriers; portable fences; spas; swimming pools

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