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Standard Safety Specification for Residential Pool Alarms[1]

This standard is issued under the fixed designation F2208; 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.

INTRODUCTION

According to Consumer Product Safety Commission (CPSC) data, it is estimated that each year on average 256 children under 5 years of age drown in swimming pools, with most deaths occurring in residential settings. Additionally, each year on average over 2000 children under 5 years of age are treated in hospital emergency rooms for pool submersion injuries.

1. Scope

1.1 This safety specification covers safety and performance requirements for pool alarms for residential swimming pools and spas.

1.2 This safety specification describes devices intended to improve personal safety and reduce injuries or deaths.

1.3 This safety specification covers devices that provide for rapid and automatic detection and alarm in cases of unintentional, unsupervised or accidental entry of a child one year of age or older into the water of swimming pools or spas.

1.4 This safety specification is not intended to replace other standard safety requirements that should be in place, that is, adult supervision, fences, gates, locks, and so forth.

1.5 This safety specification covers four different types of alarms.

1.6 The detection criteria for this safety specification is for a child one year of age and older.

1.7 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.

1.8 *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 *ANSI Standards:*[2]

ANSI Z535.4 Product Safety Signs and Labels

ANSI Z535.6 Product Safety Information and Product Manuals, Instructions, and Other Collateral Materials

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *lot, n*—normal production run or in the case of imports, a shipment of items produced in the same time frame.

3.1.2 *pool alarm, n*—device designed to provide a rapid detection and automatic alarm in incidents of accidental, unintentional or unsupervised entry of a child one year of age or older into the water of a swimming pool or spa.

4. Classification

4.1 *Types:*

4.1.1 *Type A, Surface*—Pool alarm floating on water surface.

4.1.2 *Type B, Subsurface*—Pool alarm located below the water surface.

4.1.3 *Type C, Pool Perimeter*—Pool alarm located such as to detect movement at the perimeter of or above the water surface.

4.1.4 *Type D, Personal Immersion Alarm*—Pool alarm device located on the person(s).

5. Performance Requirements

5.1 *General:*

5.1.1 Alarms shall sound both at poolside and inside any adjacent residence or building of occupancy via a remote receiver within 20 s or less when tested in accordance with Section 6.

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

5.1.2 The operational condition of a swimming pool alarm, either on or off, shall be indicated with an energized lamp or other distinctive indicator, visible from a distance of 10 ± 1 ft (3 ± 0.3 m) at angles of 45 ± 5° perpendicular to the unit to indicate the operability of the product.

5.1.3 Pool alarms shall have a minimum sound pressure rating of 85 dBA at 10 ft (3.5 m) for 3 min.

5.1.4 If the device is battery operated, there shall be a low-battery indicator. A low-battery condition is defined as an inability to meet the requirements of 5.1.3.

5.1.5 Pool alarms shall automatically reset.

5.1.6 Pool alarm manufacturers who employ wireless communication (RF) shall comply with all relevant provisions of FCC Part-15 rules for unlicensed radio frequency devices including the required compliance labeling and statement.

5.1.7 If the alarm deactivates or has reduced sensitivity due to environmental factors, the alarm shall indicate this in both a visual and audible manner.

5.2 *Type A, Surface Alarm:*

5.2.1 Type A alarms shall provide for the automatic sound of the alarm when tested in accordance with 6.1. For alarms with variable sensitivity, the setting shall be set at the least sensitive, according to manufacturer's instructions.

5.2.2 Type A alarms shall not alarm when tested in accordance with 6.3. For alarms with variable sensitivity, the setting shall be set at the most sensitive, according to manufacturer's instructions.

5.3 *Type B, Subsurface Alarm:*

5.3.1 Type B alarms shall provide for the automatic sound of the alarm when tested in accordance with 6.1. For alarms with variable sensitivity, the setting shall be set at the least sensitive, according to manufacturer's instructions.

5.3.2 Type B alarms shall not alarm when tested in accordance with 6.3. For alarms with variable sensitivity, the setting shall be set at the most sensitive, according to manufacturer's instructions.

5.4 *Type C, Pool Perimeter Alarm:*

5.4.1 Type C alarms shall provide for the automatic sound of the alarm when tested in accordance with 6.4, according to manufacturer's instructions.

5.4.2 Type C alarms shall not alarm when tested in accordance with 6.5, according to manufacturer's instructions.

5.5 *Type D, Personal Immersion Alarm:*

5.5.1 Type D alarms shall provide for the automatic sound of the alarm when tested in accordance with 6.6, according to manufacturer's instructions.

5.5.2 Type D alarms shall have a key-locking device to prevent the removal of the device from the child.

6. Test Procedures

6.1 The test for a child intrusion shall be comprised of five (5) separate drop tests, two (2) vertical drop tests, and three (3) horizontal drop tests. The weight of the child intrusion simulator (CIS) is 20 ± 0.5 lb (9.07 ± 0.23 kg) and shall be filled with water. The CIS to meet these criteria shall be a mannequin called Rescue Timmy.[3] Rescue Timmy meets the requirements of the National Center(s) for Disease Control[4] for a one-year-old child. All testing shall be done in a 16-by-32 ft (4.87-by-9.75 m) swimming pool with a minimum depth of 36 in. (91 cm). Any pool shape is sufficient as long as the pool measures at some point 16 by 32 ft (4.87 by 9.75 m). During all drop tests, both fans shall be operating as described in 6.3. During all drop tests, the pump and filter shall be on and operating.

6.2 To begin each drop test the pool shall be in a non-operational state, that is, pump, filter, and fans off for a minimum of 10 min. All drop tests are conducted two times with the second drop test following the completion of the first drop test using the testing sequence A, B, C, as described below.

A. Turn pump, filter, and both fans on for 2 min.

B. Initiate any one of the five (5) the drop tests.

C. Two minutes after initiating the drop test turn pump, filter, and fans off for 10 min, repeat test.

D. Each of the two drop tests shall follow the same sequence (A, B, C).

6.2.1 *Vertical Drop Test:*

6.2.1.1 Position of the pool alarm shall be in accordance with manufacturer's specifications.

6.2.1.2 All vertical drop tests shall be conducted using a ramp (see Fig. 1). Material for the ramp shall be 10- to 20-mm thick polytetrafluoroethylene (PTFE) or fluorinated ethylene propylene (FEP), approximately 2 ft (0.6 m) wide and 4 ft (1.2 m) in length. A sheet of polypropylene precision woven mesh that is 12 in. in width and 30 in. in length with 20.3 by 20.3 openings per square inch and a thread diameter of .0173 in. shall be placed between Rescue Timmy and the ramp to enable Rescue Timmy to slide off the ramp in a consistent manner.[5] The ramp shall be located on the 16-ft (4.87-m) side of the pool between the two fans approximately in the middle.

6.2.1.3 Place and secure Rescue Timmy (CIS) on his stomach at the lower end of the ramp with the head even with the end of the ramp for a head-first intrusion. Use a string and sinker to maintain the ramp 6 ± 0.5 in. (15 ± 1.3 cm) above the water and have the ramp at a 35 ± 1° angle. Release Rescue Timmy into the water head first. This test shall be repeated two times (see 6.1).

6.2.1.4 Place and secure Rescue Timmy (CIS) on his back at the end of the ramp with the feet even with the lower end of the ramp for a feet-first intrusion. Use a string and sinker to maintain the ramp 6 ± 0.5 in. (15 ± 1.3 cm) above the water

[3] The sole source of supply of the apparatus known to the committee at this time is Simulaids, 16 Dixon Ave., P.O. Box 807, Woodstock, NY 12498. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[4] Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion.

[5] One source of supply for the sheet of polypropylene (part number 9275T3) is McMaster-Carr, 200 Aurora Industrial Parkway, Aurora, OH 44202. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

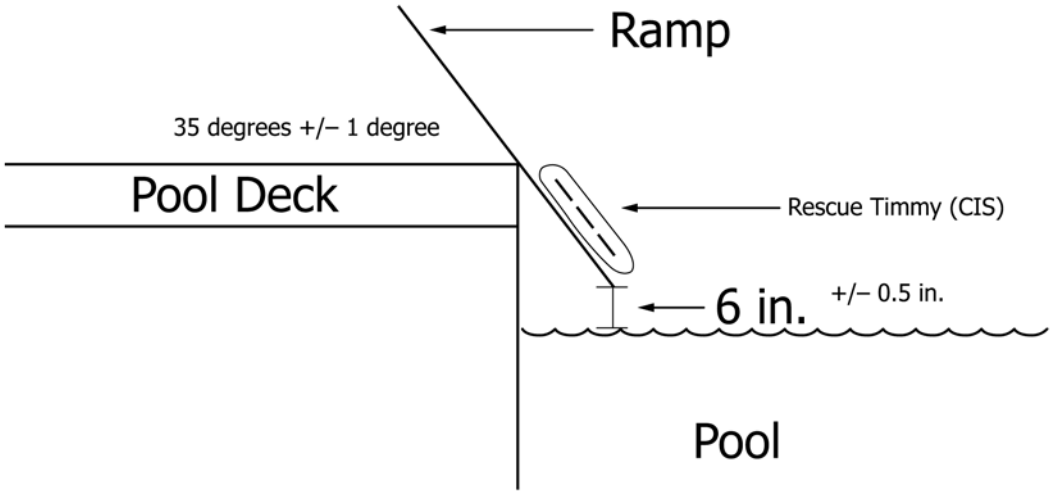

FIG. 1 Vertical Drop Test

and have the ramp at a 35 ± 1° angle. Release Rescue Timmy into the water feet first. This test shall be repeated two times (see 6.1).

6.2.2 *Horizontal Drop Test:*

6.2.2.1 All tests shall be conducted with the water level of the pool 6 ± 0.5 in. (15 ± 1.3 cm) from the top of the pool deck. All drops shall be conducted at the farthest distance from the pool alarm to simulate worst-case conditions. The position of the pool alarm shall be in accordance with manufacturer's specifications.

6.2.2.2 Place Rescue Timmy (CIS) on his stomach with the side of his head and the side of his body on the edge of the pool deck parallel to the water. Timmy shall be placed close enough to the edge of the pool so that he enters the water on his back (180 ± 10° rotation about the spine) when rolled off the edge of the deck. This test shall be repeated two times (see 6.1).

6.2.2.3 Place Rescue Timmy (CIS) on his back with the side of his head and the side of his body on the edge of the pool deck parallel to the water. Timmy shall be placed close enough to the edge of the pool so that he enters the water on his stomach (180 ± 10° rotation about the spine) when rolled off the edge of the deck. This test shall be repeated two times (see 6.1).

6.2.2.4 Place Rescue Timmy (CIS) on the pool deck on his side parallel to and facing the pool water. Timmy shall be placed close enough to the edge of the deck that when released, he falls into the pool on his stomach under his own weight (90 ± 10° rotation about the spine). This test shall be repeated two times (see 6.1).

6.3 A simulated wind test shall be conducted by using two fans located on the short side of a 16- by 32-ft (4.87- by 9.75-m) pool and placed 2 ft ± 6 in. (0.6 m ± 15 cm) back from the pool edge. The distance between the fan axes shall be 8 ft ± 6 in. (2.4 m ± 15 cm) (that is, approximately 4 ft (1.2 m) from each corner of the short side). The fan shall be a minimum of 15 in. (38 cm) in diameter. Each fan will have an output of not less than 3000 ft^3/min (1.4 m^3 /s) and shall generate a wind speed of 12 ± 1 mph (19.3 ± 1.6 km/h). Wind speed shall be measured with a professional anemometer 36 ± 2 in. (91.4 ± 5 cm) from the wind source (each fan) at a height of 12 ± 1 in. (30.5 ± 2.5 cm) above the pool deck.

6.3.1 Pool pump and filter shall remain on during the entire wind test. The pool alarm shall be positioned at the furthest point from the wind sources in accordance with the manufacturer's specifications. The device shall not false alarm. This test shall be run in the sequence as follows: fans 15 min on, fans 15 min off, fans 15 min on. This test shall be conducted one time.

6.4 Rescue Timmy (CIS) shall be introduced vertically at a 45 ± 10° angle and then horizontally (crossing the field of detection at 2 to 4 mph (3.2 to 6.4 km/h) and removed) at the point farthest from the sensor. This test shall be repeated three times.

6.5 A sheet of metal, 2 by 2 in. (5 by 5 cm) at ½ in. (1.3 cm) thick, is introduced at 36 ± 1 in. (91.4 ± 2.5 cm) from the sensor into the field of detection at 6 mph (9.7 km/h) and removed. This test shall be repeated three times at 10-min intervals.

6.6 The personal alarm device shall be installed on Rescue Timmy (CIS) and dropped into the water from a height of 6 ± 0.5 in. (15 ± 1.3 cm) above the water surface. The test shall be repeated three times at 10-min intervals.

7. Quality Assurance

7.1 A test sample of the product, drawn from a standard production lot, shall meet requirements of Section 5 when tested by the defined test methods of Section 6.

7.2 Each manufacturer or distributor of the product shall test the product in such a manner and at such intervals to insure compliance in accordance with the defined methodology described by the test procedures in Section 6. Records of all testing shall be retained for a period of up to three years.

8. Instructions

8.1 Instructions shall be shipped with each unit and, using ANSI Z535.6 as a guide, shall address, at minimum:

8.1.1 Proper installation;

8.1.2 Any adjustments needed;

8.1.3 Size and shape limitations, if any, on pools;
8.1.4 Troubleshooting instructions;
8.1.5 Name, address, telephone number of manufacturer;
8.1.6 Power requirements or batteries; and
8.1.7 Recommended distance from transmitter to receiver.
8.1.8 *Statement*—"This device is not intended to replace any other safety consideration; that is, adult supervision, lifeguards, fences, gates, pool covers, locks, and so forth, and some devices may not detect gradual entry."

8.2 Manufacturers' instructions shall clarify or provide, or both, contact information for the recommended number of alarms and locations for alarms for pools with sides greater than 16 by 32 ft (5 by 10 m), or irregular shapes.

8.3 Manufacturers' instructions shall clarify or provide, or both, contact information regarding whether pool features (waterfalls, automatic cleaners, and so forth) may affect alarm reliability. Instructions shall specify the number and location of alarms needed to address the existence of pool features.

8.3.1 Manufacturers' instructions shall clarify or provide, or both, contact information for circumstances such as pool cleaner operation, water feature operation, pump cycling, and other normal operating modes that can lead to false alarm tendencies or operational performance issues.

8.3.2 Manufacturers' instructions shall clarify or provide, or both, contact information for environmental conditions such as high or continuous winds that can lead to false alarm tendencies.

9. Labeling

9.1 Products complying with all requirements of this specification shall be labeled or marked "Meets requirements of ASTM Safety Specification F2208."

9.2 Name, model number, date of manufacture, and contact information shall be placed permanently on the product as appropriate.

9.3 Labels and marks shall be designed using ANSI Z535.4 as a guide.

10. Keywords

10.1 alarm; children's safety; pool alarm; spas; swimming pool