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Standard Safety Specification for Residential Pool Alarms¹

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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.*

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. 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.

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 $45 \pm 5^\circ$ 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 Control⁴ 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 $35 \pm 1^\circ$ 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 Simulaid, 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.