Certifications, Listings and Regulatory Compliance

Underwriters Laboratories

Pool Cover Operator, Model Infinity 4000™ Classified in Accordance with ASTM F 1346-91 (2010)
File Number: E211895
UL Category Listings: Model Infinity 4000™

WBAH.E211895
Swimming Pool and Spa Cover Operators, Electric

WDDJ7.E211895
Swimming Pool and Spa Cover Operators, Electric Certified for Canada

Designation: Power Safety Cover (PSC) F1346-91
(Reapproved 2010)

The Infinity 4000™ exceeds the requirements set forth in ASTM Safety Covers for Swimming Pools, Spas and Hot Tubs standard F1346-91(2010).

Designation: F1346 – 91 (Reapproved 2010)

Standard Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs[1]

This standard is issued under the fixed designation F1346; 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 specification establishes requirements for safety covers for swimming pools, spas, hot tubs, and wading pools (hereinafter referred to as pools, unless otherwise specified). When correctly installed and used in accordance with the manufacturer's instructions, this specification is intended to reduce the risk of drowning by inhibiting the access of children under five years of age to the water.

1.2 This specification includes performance tests to demonstrate the compliance or noncompliance to requirements herein stated for safety covers. It also includes marking requirements for all covers.

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

1.4 The following safety hazards caveat pertains only to the test methods section, Section 9, of this specification: *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 *NFPA Document:*

National Electrical Code, Article 680-26[2]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *appurtenances*—subordinate parts or adjunct accessory components to the cover such as hardware including buckles, straps, ties, springs, anchors, tracks, rollers, lifting arms, and the like.

3.1.2 *automatic cover*—a cover which can be placed over the water area and removed with a motorized mechanism actuated by a suitable control mechanism. See also *power safety cover (PSC), other cover (OC).*

3.1.3 *barrier*—something that restrains or obstructs access to the body of water.

3.1.4 *blanket*—a material used for thermal insulation. See also *solar energy blanket.*

3.1.5 *cover*—something that covers, protects or shelters, or a combination thereof, a swimming pool, spa, or hot tub.

3.1.6 *debris cover*—a cover with attendant appurtenances positioned over the pool area which permits the cover to prevent debris, such as foliage, dirt, windblown trash, and the like from entering the pool. It is intended to be completely removed before the entry of bathers. See also *other covers (OC).*

3.1.7 *decks*—those areas abutting a pool, spa, or hot tub that are specifically constructed or installed (for example, of wood, concrete, brick, stone, and the like) for use by bathers for sitting, standing or walking and may also act as a base for supports for covers.

3.1.8 *dome*—a semipermanent enclosure supported by trusses, or positive air pressure erected over the pool area to provide temperature and atmospheric control over the pool environment.

3.1.9 *energy conservation*—the reduction of heat loss from pool water through air convection or evaporative cooling, or both.

3.1.10 *hot tub*—a spa constructed of wood with sides and bottoms formed separately; and the whole shape joined together by pressure from surrounding hoops, bands or rods; as distinct from spa units formed of plastic, concrete, metal, or other materials.

3.1.11 *inaccessible locations*—a location at least 5 ft (1.5 m) above the ground with no other access such as hand or footholds which would permit a child to reach the location.

3.1.12 *manual cover*—a cover which requires it to be placed over the water area by hand. See also *manual safety cover (MSC),* and *other covers (OC).*

This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.62 on Covers for Pools, Spas and Hot Tubs.

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[2] Available from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

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3.1.13 *markings*—the application of numbers, letters, labels, tags, symbols or colors to provide identification and safety information and to expedite handling during shipment and storage.

3.1.14 *manual safety cover (MSC)*—a barrier which requires it to be placed over the water manually. Provides a high level of safety for children under the age of five by inhibiting their access to the water.

3.1.15 *other covers (OC)*—includes any cover type not incorporated in the other two classifications; PSC, MSC. They are not intended to serve as a barrier for children under the age of five.

3.1.16 *power safety cover (PSC)*—a barrier which can be placed over the water area and removed with a motorized mechanism actuated by a suitable control mechanism. Provides a high level of safety for children under the age of five by inhibiting their access to the water.

3.1.17 *safety cover*—a barrier (intended to be completely removed before entry of bathers), for swimming pools, spas, hot tubs or wading pools, attendant appurtenances and/or anchoring mechanisms which reduces—when properly labeled, installed, used and maintained in accordance with the manufacturers' published instructions—the risk of drowning of children under five years of age, by inhibiting their access to the contained body of water, and by providing for the removal of any substantially hazardous level of collected surface water. See also *power safety cover (PSC)*, and *manual safety cover (MSC)*.

3.1.18 *solar energy blankets*—a cover which is a floating translucent (not transparent) heat insulating sheet incorporating, for example, encapsulated air bubbles or similar low heat transfer (floating) sheet material whose purpose is to inhibit heat dissipation from the pool water surface through air convection or evaporative cooling. The sheet material, customarily translucent (not transparent) to permit the transfer of solar radiation energy directly to the pool water at all depths and intended for day and night use, is cut to the shape of the pool and is not affixed to the pool structure. It is intended to be completely removed before the entry of bathers.

3.1.19 *energy conservation blanket*—a cover which is a floating heat insulating sheet material incorporating, for example, a cellular foam or similar low-heat transfer material whose purpose is to inhibit heat loss from the covered water, through air convection or evaporative cooling, or both. Such materials are customarily cut to the shape of the pool and are intended for a night covering. The blanket is not affixed to the pool structure. It is intended to be completely removed before the entry of bathers.

3.1.20 *wading pool*—a shallow pool intended for wading, not swimming.

3.1.21 *waterline*—the waterline shall be defined in one of the following ways:

3.1.22 *skimmer system*—the water line shall be at the mid-point of the operating range of the skimmers.

3.1.23 *overflow system*—the waterline shall be at the top of the overflow outlet.

4. Cover Classifications and Minimum Qualification Criteria

4.1 *Power Safety Cover (PSC)*—Provides a high level of safety for children under the age of five by inhibiting their access to the water.

4.1.1 Must satisfy 5.1-5.3, 6.1-6.5, 7.1-7.4, 8.1, 8.2, 8.4-8.12, 9.1-9.4, 10.1-10.4, and all subsections.

4.2 *Manual Safety Cover (MSC)*—Provides a high level of safety for children under the age of five by inhibiting their access to the water. May require a longer period of time to be fully secured.

4.2.1 Must satisfy 5.1-5.3, 6.1-6.5, 7.1-7.4, 8.1, 8.2, 8.4-8.12, 9.1-9.4, and all subsections.

4.3 *Other Covers (OC)*—Includes any cover type not incorporated in the other two categories MSC, PSC. They are not intended to serve as a barrier for children under the age of five. Design characteristics may be hazardous when used in the presence of children under the age of five.

4.3.1 Shall satisfy 5.1-5.3, 8.1-8.3, 8.5-8.12, and all subsections.

5. Materials and Manufacture

5.1 Only materials not known to be harmful to health, within the intended application, shall be used.

5.2 All materials and components shall be durable and satisfactory for the intended purpose under the conditions normally prevailing at the site.

5.3 The cover shall be manufactured or fabricated, or both, in accordance with generally accepted, good manufacturing practices.

6. *General Requirements for Safety Covers* General Requirements for Safety Covers

6.1 *Installation/Use of safety covers*—Unless installed by the manufacturer, or responsible parties, or both, detailed instructions for installation shall be given in a form included in the packaging or a label, or both, attached to the cover.

6.2 Labels attached to the cover shall meet the general requirements described in 8.5.1 and 8.8-8.8.2.

6.3 *Markings for safety covers shall include*:

6.3.1 the manufacturer's name,

6.3.2 date manufactured or installed, and

6.3.3 instructions to consumers to inspect the cover for premature wear or deterioration.

6.3.4 Labels attached to covers shall meet the general requirements described in 8.4.1, 8.7-8.8.1, and 8.9.

6.4 *Fastening mechanisms or devices*—Ties, attachment points, anchors, anchorage, and controls for automatic covers or other means of fastening a cover shall include provisions such as keys, combination locks, special tools, devices, or inaccessible locations, and the like, to inhibit children under five years of age from removing or operating the cover. When subjected to the load and perimeter deflection tests described in 9.1 and 9.2, all fastening devices shall remain in their intended, secured or closed, or both, position. After the test, the intended performance of the device should not be impaired.

6.5 *Openings*—The cover shall be designed in such a way that, when it is tested by the test method described in 9.4, any

opening in the major component or between the edge of the cover and the deck surface or coping wall, or both, and the top surface of the spa or pool does not allow the test object to pass through. The test object shall not gain access to the water, or be subject to entrapment.

6.6 Seams, ties or welds in the cover shall show no signs of damage, which will impair intended performance of the device when the cover is tested by the methods described in 9.1-9.4.

7. Performance Requirements for Safety Covers

7.1 *Static Load*—In the case of a pool with a width or diameter greater than 8 ft (2.4 m) from the periphery, the cover shall be able to hold a weight of 485 lb (220.0 kg) (2 adults and 1 child) to permit a rescue operation.

7.1.1 In the case of a pool with a width or diameter not greater than 8 ft (2.4 m) the cover shall withstand the weight of 275 lb (125 kg) (weight of a child and an adult). Compliance shall be determined by the test method described in 9.1.

7.2 *Perimeter Deflection*—The cover shall be designed in such a way that, when it is tested by the test method described in 9.2, deflection of the cover does not allow the test object to pass between the cover and the side of the pool, or to gain access to the water.

7.3 *Surface Drainage*—The cover shall be so constructed, or incorporate a system, or have an auxiliary system provided, that when used in accordance with the manufacturer's instructions, shall drain substantially all standing water from the cover within a period of 30 min after cessation of normal rainfall. Compliance shall be determined by the test in 9.3.

7.4 *Opening Tests*—The tests shall be conducted by the test method described in 9.4 to demonstrate that any opening in the major component or between the edge of the cover and the deck surface or coping wall, or both, and the top surface of the pool or the top surface of the spa is sufficiently small and strong to prevent the opening from being forced to a size that will allow the test object to pass through.

8. Minimum Label Requirements for All Covers for Swimming Pools, Spas, and Hot Tubs

8.1 *Product Label*—All covers shall be labeled/marked to identify manufacturers or other responsible parties (such as private label distributors), or both. Labels attached to covers shall meet the general requirements described in 8.5.1 and 8.8-8.8.2.

8.2 *Warning Labels*—All covers shall be required to have attached the following warning label:

8.2.1 *Signal Word*—**WARNING.**

8.2.2 *Safety Alert Symbol*—Preceding the signal word there shall be triangle with an exclamation point inside the triangle.

8.2.2.1 *Word Message*—The standard word message shall be AVOID DROWNING RISK which shall be the first message to appear directly under the signal word.

8.2.2.2 *Additional Word Message Statement*—Covers with any of the outlined hazards in Fig. 1 shall list all applicable warning statements on the label.

8.3 *Color*—Non-safety cover warning label.

8.3.1 *Signal Word*—Black letters with orange background.

8.3.2 *Safety Alert Symbol*—Black triangle with orange exclamation point.

8.3.3 *Word Message*—Black lettering on white background or white letters on black background.

8.4 *Color*—Safety cover warning label.

8.4.1 Colors assigned to the signal word panel may also be used for the message word panel provided the panel colors contrast with the lettering of the label. This is applicable to covers conforming with the PSC and MSC classifications only.

8.5 *Warning Label*—Letter size.

8.5.1 Lettering shall be of a size that enables a person with normal vision, including corrected vision, to read the safety sign or label at a safe viewing distance from the hazard. Considerations should be given to environmental variables that will affect readability.

8.5.2 *Signal Word*—Letter height shall be at least 50 % greater than the selected height of the message panel wording.

8.5.3 *Safety Alert Symbol*—Safety alert symbol, when used with the signal word shall precede the signal word. The base of the safety alert symbol shall be on the same horizontal line as the base of the letters of the signal word. The height of the safety alert symbol shall equal or exceed the signal word letter height.

8.5.4 Word message letter height shall be as defined in Table 1.

"HAZARD/WARNING STATEMENT CHART"

If This Hazard Exists	Add This Warning Statement
*Will not support weight (as defined in this specification) Nonsecured or improperly secured covers	*Stay off cover—will not support weight
*Concealment by slipping under cover	*Keep children away. Children or objects cannot be seen under cover
*Drowning on top of cover in accumulated surface water (as defined in this specification)	*Remove Standing Water—child can drown on top of cover
*Concealment, Entrapment—Drowning under cover	*Remove cover(s) completely before entry of bather s—entrapment possible
*General requirement for all covers	*Non-secured or improperly secured covers are a hazard
*Option to above for Safety Covers	*Failure to follow all instructions may result in injury or drowning
*Cover does not meet all requirements of this specification for PSC, MSC.	*This is not a Safety Cover.

FIG. 1 Hazard/Warning Statement Chart

TABLE 1 Word Message Letter Height Sizes

Safe Viewing Distance	Minimum Letter Height for FAVORABLE Reading Conditions	Minimum Letter Height for UNFAVORABLE Reading Conditions
less than 24 in	Height (in.) = View Distance / 150	Height (in.) = View Dist. / 75
24 to 96 in	Height (in.) = View Distance / 300	Height (in.) = View Dist. / 150
greater than 96 in.	Height (in.) = View Distance / 400	Height (in.) = View Dist. / 300

8.6 *Letter style:*

8.6.1 Signal Word shall be in sans serif letters in upper case only.

8.6.2 Message Panel shall be in sans serif letters. Letters may be in upper case only.

8.6.3 Examples of acceptable lettering styles are: medium or bold helvetica, or news gothic bold.

8.7 *Placement*—Location shall be such that the message will:

8.7.1 Be readily visible to the intended viewer, taking into consideration all possible viewing angles, and

8.7.2 Alert the viewer to the potential hazard in time to take appropriate action.

8.7.3 Label must be located so as not to be removed in the fitting process.

8.8 *Life Expectancy*—The label shall have a reasonable expected life with good color stability and word message legibility when viewed as stated in 8.5.1. Reasonable expectancy shall be taken into consideration in accordance with the expected life of the product.

8.8.1 *Protection*—When possible, placement of label should provide protection from foreseeable damage, fading, or visual obstruction caused by abrasion, ultraviolet light or substances such as chemicals or dirt.

8.8.2 *Attachment*—The label shall be attached permanently to the product or so that it cannot be easily removed.

8.9 *Replacement*—Product/Warning labels should be replaced by the product user when they no longer meet legibility requirements for safe viewing distance described in 8.5.1 and 8.7.1. In cases where products have an extensive expected life or where exposed to extreme conditions, the product user should be able to obtain replacement labels from the manufacturer or responsible party.

8.10 *Instruction/Use Label*—Any product instructions or use label not attached to the product, intended to be viewed by the consumer/user shall contain in its contents the same applicable warning label as set forth in 8.2-8.6.3.

8.10.1 When special circumstances limit use of label colors to two colors, the colors assigned to the message word panel may also be used for the signal word panel provided that the panel colors contrast with background color of instruction/use label

8.11 *Packaging Label*—If packaging is intended for product display to the consumer/user, applicable warning label as described in 8.2-8.6.3 shall be placed on the printed side of the package intended for display and/or consumer information. The label shall be printed on or affixed to the package and not easily removable.

8.11.1 When special circumstances limit use of label colors to two colors, the colors assigned to the signal word panel may also be used for the message word panel provided that the panel colors contrast with background color of packaging.

8.12 *Compliance Labeling*—All labels shall note the specific cover classification.

9. Test Methods For Safety Covers

9.1 *Static Load Test:*

9.1.1 This test shall be conducted to demonstrate that the cover is capable of supporting a weight of (a) 485 lbs (composed of one 210-lb, one 225-lb or one 50-lb weight) for pools or spas within a width or diameter greater than 8 ft or (b) 275 lbs (composed of one 225-lb and one 50-lb weight) for a pool or a spa with a width or diameter equal to or less than 8 ft distributed over 1 ft^2 each, all of which are within a 3-ft radius without the test objects causing damage which would allow any of the test objects to pass through the cover. During this test there shall be no requirement for the absence of water appearing on the surface of the cover.

9.1.2 *Procedure*—The pool shall be filled to its waterline and the cover fitted in accordance with the cover manufacturer's instructions. The test objects shall be placed on the surface of the cover at the following critical points:

9.1.2.1 The center point of the cover.

9.1.2.2 Between attachment points and a distance of at least 4 ft (1.2 m) but not to exceed 6 ft from the side of the pool.

9.1.2.3 The test objects shall remain in each test position for a period of 5 min.

9.2 *Perimeter Deflection Test:*

9.2.1 This test shall be conducted to demonstrate the following: if a child under the age of five were to fall onto the cover neither that child nor another child could slip through any openings that may occur between the cover and the side of the pool.

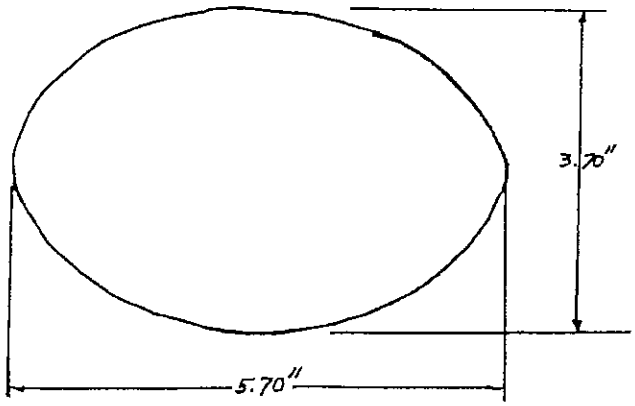
9.2.2 *Perimeter Deflection Test Object*—Test object shall be 3.7 in. (0.09 m) by 5.7 in. (0.14 m) by a minimum 12 in. length and a weight of 36.6 lbs in an ellipsoidal shape. See Fig. 2.

9.2.3 *Procedure*—With 50 lbs (22.7 kg) on the cover at a distance of at least 4 ft, but not exceeding 6 ft from the side of the pool, the same cover shall not deflect to allow a perimeter test object to pass through, gain access to the water or be subject to entrapment between the cover and the side of the pool.

9.3 *Surface Drainage Test:*

9.3.1 *Surface Drainage Test Object*—Timmy[3] or equivalent (32 in. length by 9 in. width by 5 in. deep by 36.6 lbs torso-shaped object) shall be placed on the pool cover in a supine position, faceup, within two to three feet of and parallel with the pool's edge. Three minutes later there shall not be an unsafe amount of water. An unsafe amount of water is defined as any quantity of water which completely covers the torso of the surface drainage test object.

[3] "Timmy" is a CPR mannequin, three year old boy, available from Simulaids Inc., P.O. Box 807, Dixon Avenue, Woodstock, NY 12498.



NOTE 1—Area = 16.6 $in.^2$
NOTE 2—Perimeter = 15.0 in

FIG. 2 Template for Swimming Pool Cover Standard

9.3.2 *Procedure*—Test the cover by spraying water evenly over the area at an application rate of 10 gal/min per 1000 ft^2 (9.29 m^2) of pool area for a period of 30 min. During this test, all equipment shall operate in accordance with cover manufacturer's instructions. Thirty minutes after completion of this procedure, the cover shall pass the test method in 9.3. At all times during the procedure, maintain the pool level at the waterline.

9.4 *Openings Test*:

9.4.1 These tests shall be conducted to demonstrate that any openings remain small enough to prevent a small child's head from gaining access to the water.

9.4.2 *Openings test object*—A solid faced sphere test object with a maximum breadth of 4.5 in.

9.4.3 *Procedure*—The cover shall be fitted in accordance with the cover manufacturer's instructions. The test object shall be placed at or into any existing opening and apply a force of 40 lbs (plus or minus 1 pound) steadily to ensure the test object cannot pass through at the following critical openings:

9.4.3.1 Any opening between the edge of the cover and the deck surface and coping wall, or both, or the top surface of the spa or pool.

9.4.3.2 Any opening in the major component of the cover.

10. Operating Controls, Safety Covers

10.1 The open-close switch shall be spring-loaded or of the momentary contact type, so that when released, the cover stops operation immediately at any point in the open or closed cycle period.

10.2 The cover shall be reversible in direction from a full stop at any point in its travel without having to complete the full open or closed cycle.

10.3 Electrically operated control switches and motors shall be installed in accordance with the National Electrical Code Article 680-26.

10.4 The type of pool covering operating controls shall be such that:

10.4.1 Its fixed location is in the line of sight of the complete pool cover, or by its operating process. This ensures that the operator shall be in complete view of the cover at all times during the closing or pool covering process.

10.4.2 Switching devices shall be key-operated or locked away or able to be de-activated or otherwise located in an inaccessible location. An inaccessible location shall be at a height of at least five feet above the deck.

ANNEX

(Mandatory Information)

A1. RATIONALE

A1.1 Scope

A1.1.1 Although the majority of child-drowning and near-drowning which were reported did not involve safety covers, those who purport to provide a level of safety should be held to a higher level of reliability. Injury reports made available from CPSC indicate that male children, one and two years of age, living in a home with an in-ground pool are at the highest risk of being involved in a submersion incident that requires medical care.

A1.2 Referenced Documents

A1.2.1 Allows document reviewers the necessary information to validate the text of the standard.

A1.3 Terminology

A1.3.1 Consumers and new manufacturers may not be familiar with the technological language used within the text. This section also provides definitions for new terms created for this standard.

A1.4 Cover Classifications and Minimum Qualification Criteria

A1.4.1 By defining both the level of safety afforded and standard requirements to be satisfied, manufacturer and consumer will be able to define their needs and properly interpret the standard. This section also allows manufacturers to research and develop new technology which when applied could change their designation.

A1.5 Materials and Manufacture

A1.5.1 Varying lead times for material availability restrict or delay immediate compliance with this standard.

A1.6 Performance Requirements For Safety Covers

A1.6.1 Specified load factors represent the 95th percentile for a child under the age of five as well as one male adult and one female adult.

A1.6.2 If one child should gain access to the surface of the cover, another child in the area of the pool should not face increased risk.

A1.6.3 Recognizing that some residual water will remain after the surface water is removed, the test has been devised to ensure that the level can be maintained below that deemed substantially hazardous to a child of three based on data received from the Consumer Product Safety Commission.

A1.6.4 Openings in the major component or horizontal openings between the cover and solid structure of the pool area should remain small enough to prevent the head of a small child from gaining entrance. The head breadth for a 5th percentile of a 7 month old is about 4.5 in. The smallest mobile child would be about 7 months old since at this age 50 % of children can creep on hands and knees.

A1.7 Minimum Label Requirements For All Covers For Swimming Pools, Spas, and Hot Tubs

A1.7.1 Labeling on the product allows for transfer of the information to second owners and temporary users.

A1.7.2 The combination of Signal Word, Safety Alert Symbol and Word Message provides a higher level of warning than any single effort.

A1.7.3 An effort is being made nationally to make consistent the colors used to alert consumers to potential hazards.

A1.7.4 Contrast of colors between letter colors and labels are necessary in order to attract users' attention to label and enable readability.

A1.7.5 Letter size is an important factor in warning legibility so the consumer can recognize and avoid the hazard

A1.7.6 Style of lettering affects the readability of the warning message.

A1.7.7 Warning labels can be more effective if they allow for reaction time on the part of the consumer.

A1.7.8 Damaged labels would not provide as strong a message as necessary.

A1.7.9 Due to extended life expectancy of cover products, labels cannot be expected to maintain their original appearance.

A1.7.10 Labeling messages and format should be consistent from point of purchase to use and/or application of cover.

A1.7.11 Packaging is, at times, the consumers first exposure to product information. Information contained on the warning label is necessary for making informed choices.

A1.7.12 All labels shall note that the product meets the requirements described in Specification F1346.

A1.8 General Requirements For Safety Covers

A1.8.1 Installation can be a key factor in the effectiveness of a safety cover whether it is manually or power installed.

A1.8.2 Manufacturer's markings are necessary to allow a continuity for second owners and consumer/manufacturer contact.

A1.8.3 The mechanisms which secure the cover are an integral component that help to defeat a child's entry to the water.

A1.8.4 Openings shall not be so large that the purpose of the cover is defeated.

A1.8.5 Structural integrity is necessary to provide safety.

A1.9 Test Methods For Safety Covers

A1.9.1 The rescue operation may require two adults and the cover shall support the total combined weight to avoid possible injury to those in the rescue attempt. The 95th percentile is represented by the 225-lb male, 210-lb female and 50-lb child.

A1.9.2 This test was devised to avoid an opening large enough for one child or another child to fall between the edge of the cover and the edge of the pool when one child of 50 lb is already on the cover.

A1.9.3 Recognizing that some residual water remains after the surface water is removed, this test is devised to ensure that the level is maintained below a level deemed substantially hazardous to a child under three years of age.

A1.9.4 No opening shall exist in the cover or at any point that the cover joins the surface of the pool structure or deck area (which would allow a small child's head to gain access to the water or become entrapped). The head breadth for a 5th percentile 7 month old is about 4.5 in.

A1.10 Operating Control, Safety Covers

A1.10.1 Operator controlled momentary contact type switches afford greater control in the event of an emergency.

A1.10.2 Should a child enter the water during the closure process, the cover shall be able to reverse without total closure.

A1.10.3 It is important in the case of an electrical installation to protect children and all swimmers from the possibility of electrocution, which is the purpose of Article 680-26 of the National Electrical Code.

A1.10.4 Operator observation of the pool during the closing process is necessary to ensure that another person does not enter the water during the process. Additionally, the location of the activating device or the ability to render it inactive is necessary to avoid unauthorized opening of the cover.