

# Appendix G: Swimming Pools, Spas and Hot Tubs

## General Comments

Drowning is the second leading cause of accidental death in the home for children under five years of age. It has been the number one cause of accidental deaths in the home for that age group in a number of states, including Arizona, California, Florida, and Texas. The use of effective residential swimming pool barriers is the best way to reduce these tragic losses.

This appendix chapter sets forth the regulations for swimming pools, hot tubs, and spas. The primary focus of the provisions is the need for an effective barrier surrounding the water area to reduce the potential for young children to gain uncontrolled access.

Section AG101 establishes the scope of the chapter. Section AG102 defines those terms specific to this appendix chapter. Section AG103 identifies specification standards for the design and construction of swimming pools. Section AG104 identifies specification standards for the design and construction of spas and hot tubs. Section AG105 discusses barrier requirements for swimming pools, hot tubs, and spas. Section AG106 contains provisions for entrapment protection for suction outlets. Sec-

tion AG107 indicates the abbreviations for three standards-writing organizations, and Section AG108 specifies the various standards used in this appendix chapter.

## Purpose

According to the Consumer Product Safety Commission (CPSC), approximately 350 children under 5 years of age drown each year in residential swimming pools, spas, and hot tubs. A CPSC study, *Child Drowning Study: A Report on the Epidemiology of Drownings in Residential Pools of Children Under Age Five*, found that the majority of the victims lived in or were visiting the residence where the accident happened. Less than 2 percent of the drowning incidents occurred when a child trespassed on the property. For these reasons, this appendix chapter states that all swimming pools, spas, and hot tubs must be enclosed to prevent young children from gaining unsupervised access to pool areas. This chapter provides prescriptive details for the construction of enclosures around swimming pools, spas, and hot tubs to make it more difficult for children, particularly those 5 years old and younger, to enter such areas unsupervised.

## SECTION AG101 GENERAL

**AG101.1 General.** The provisions of this appendix shall control the design and construction of swimming pools, spas and hot tubs installed in or on the lot of a one- and two-family dwelling.

- ❖ This section provides the scope of the appendix chapter on swimming pools, spas, and hot tubs. It regulates the design and construction of such facilities where they are located inside a dwelling unit or on the lot of a one- or two-family dwelling.

## SECTION AG102 DEFINITIONS

**AG102.1 General.** For the purposes of these requirements, the terms used shall be defined as follows and as set forth in Chapter 2.

- ❖ This section clarifies the terminology used in this appendix chapter. The terms take on specific meanings, often different from the way they are typically used.

**ABOVE-GROUND/ON-GROUND POOL.** See "Swimming pool."

- ❖ These two terms have essentially the same meaning. If a side of a swimming pool projects above the adjacent ground level, the pool is referred to as an above-ground pool. If the bottom of the pool rests on the ground with no portion recessed except for leveling purposes, it is referred to as an on-ground pool. The important factor in both situations is that access to the pool surface is elevated and requires a vertical ascent (from at least one side) to gain access to the water.

A swimming pool situated on the ground or located above the ground is in the same category as other similar facilities such as spas, hot tubs, and in-ground pools. All such facilities are simply regulated as swimming pools.

**BARRIER.** A fence, wall, building wall or combination thereof which completely surrounds the swimming pool and obstructs access to the swimming pool.

- ❖ Any system of components that encloses a swimming pool to the degree that access is obstructed is a barrier. Enclosure components include the exterior wall of the dwelling unit, a fence, and any doors or gates included as a portion of the enclosure. Any construction or natural element that does not surround the pool will allow access at some point. The vast majority of provisions in this appendix chapter relate to the installation

of a complying barrier to restrict access to swimming pools, spas, and hot tubs. Left unprotected, these facilities present the potential for drownings and near-drownings.

**HOT TUB.** See “Swimming pool.”

- ❖ Typically regarded as a small soaking tub, a hot tub is defined as a swimming pool and is regulated in the same manner as spas and the various types of swimming pools. Hot tubs often are equipped to introduce bubbles or jets of water into the tub.

**IN-GROUND POOL.** See “Swimming pool.”

- ❖ An in-ground pool is a swimming pool in which the top of the pool structure is roughly at the same elevation as the adjoining surface surrounding the pool. Unlike an above-ground or on-ground pool, the pool construction itself does not limit access to the pool.

A swimming pool constructed in the ground is in the same category as similar facilities such as spas, hot tubs, above-ground pools, and on-ground pools. All such facilities are simply regulated as swimming pools.

**RESIDENTIAL.** That which is situated on the premises of a detached one- or two-family dwelling or a one-family townhouse not more than three stories in height.

- ❖ Where a pool is located on the property of a single-family dwelling, two-family dwelling, or one-family townhouse, it is “residential.” The scope of the provisions in this appendix chapter coincides with this definition.

**SPA, NONPORTABLE.** See “Swimming pool.”

- ❖ Typically regarded as a whirlpool tub, a spa is defined as a swimming pool and is regulated in the same manner as hot tubs and the various types of swimming pools.

**SPA, PORTABLE.** A nonpermanent structure intended for recreational bathing, in which all controls, water-heating and water-circulating equipment are an integral part of the product.

- ❖ A nonpermanent structure, a portable spa is self-contained, with all of the controls and equipment integrated.

**SWIMMING POOL.** Any structure intended for swimming or recreational bathing that contains water over 24 inches (610 mm) deep. This includes in-ground, aboveground and on-ground swimming pools, hot tubs and spas.

- ❖ In order to be considered a swimming pool for the provisions of this appendix chapter, the structure used for swimming or recreational bathing must be more than 24 inches (610 mm) deep. Hot tubs, spas, in-ground

pools, on-ground pools, and above-ground pools are included in this definition, provided they are the minimum depth prescribed.

**SWIMMING POOL, INDOOR.** A swimming pool which is totally contained within a structure and surrounded on all four sides by walls of said structure.

- ❖ Where a swimming pool is located in a enclosed structure, fully surrounded by walls, it is an indoor pool. Of critical concern is the easy access afforded to children by an indoor pool.

**SWIMMING POOL, OUTDOOR.** Any swimming pool which is not an indoor pool.

- ❖ Where a swimming pool is not fully enclosed, as is required in the definition of an indoor pool, it is an outdoor swimming pool. A pool that may be partially inside and partially outside is defined as an outdoor pool because it is not completely surrounded by a structure.

## SECTION AG103 SWIMMING POOLS

**AG103.1 In-ground pools.** In-ground pools shall be designed and constructed in conformance with ANSI/NSPI-5 as listed in Section AG108.

- ❖ The requirements of ANSI/NSPI-5 regulating residential in-ground swimming pools are applicable to all in-ground pools regulated by this appendix chapter.

**AG103.2 Above-ground and on-ground pools.** Above-ground and on-ground pools shall be designed and constructed in conformance with ANSI/NSPI-4 as listed in Section AG108.

- ❖ The requirements of ANSI/NSPI-4 regulating residential above-ground and on-ground swimming pools are applicable to all such pools regulated by this appendix chapter.

## SECTION AG104 SPAS AND HOT TUBS

**AG104.1 Permanently installed spas and hot tubs.** Permanently installed spas and hot tubs shall be designed and constructed in conformance with ANSI/NSPI-3 as listed in Section AG108.

- ❖ The requirements of ANSI/NSPI-3 regulating permanently installed residential spas are applicable to all nonportable spas and hot tubs.

**AG104.2 Portable spas and hot tubs.** Portable spas and hot tubs shall be designed and constructed in conformance with ANSI/NSPI-6 as listed in Section AG108.

- ❖ The requirements of ANSI/NSPI-6 regulating residential portable spas are applicable to all such spas.

## SECTION AG105 BARRIER REQUIREMENTS

**AG105.1 Application.** The provisions of this chapter shall control the design of barriers for residential swimming pools, spas and hot tubs. These design controls are intended to provide protection against potential drownings and near-drownings by restricting access to swimming pools, spas and hot tubs.

❖ This section describes the provisions for barriers around residential swimming pools, hot tubs, and spas. A swimming pool or similar facility creates an attractive temptation to children, including very young children and infants who do not know how to swim. The installation of an effective barrier can help reduce the number of children who die or are injured as the result of open access to a swimming pool, spa, or hot tub.

**AG105.2 Outdoor swimming pool.** An outdoor swimming pool, including an in-ground, aboveground or on-ground pool, hot tub or spa shall be provided with a barrier which shall comply with the following:

1. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier which faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier which faces away from the swimming pool. Where the top of the pool structure is above grade, such as an aboveground pool, the barrier may be at ground level, such as the pool structure, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm).
2. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.
3. Solid barriers which do not have openings, such as a masonry or stone wall, shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.
4. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1.75 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1.75 inches (44 mm) in width.
5. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1.75 inches (44 mm) in width.
6. Maximum mesh size for chain link fences shall be a 2.25-inch (57 mm) square unless the fence is provided with slats fastened at the top or the bottom which reduce the openings to not more than 1.75 inches (44 mm).
7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall not be more than 1.75 inches (44 mm).
8. Access gates shall comply with the requirements of Section AG105.2, Items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the gate, the release mechanism and openings shall comply with the following:
  - 8.1. The release mechanism shall be located on the pool side of the gate at least 3 inches (76 mm) below the top of the gate, and
  - 8.2. The gate and barrier shall have no opening greater than 0.5 inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.
9. Where a wall of a dwelling serves as part of the barrier one of the following conditions shall be met:
  - 9.1. The pool shall be equipped with a powered safety cover in compliance with ASTM F1346; or
  - 9.2. All doors with direct access to the pool through that wall shall be equipped with an alarm which produces an audible warning when the door and its screen, if present, are opened. The alarm shall sound continuously for a minimum of 30 seconds immediately after the door is opened and be capable of being heard throughout the house during normal household activities. The alarm shall automatically reset under all conditions. The alarm system shall be equipped with a manual means, such as touchpad or switch, to temporarily deactivate the alarm for a single opening. Such deactivation shall last for not more than 15 seconds. The deactivation switch(es) shall be located at least 54 inches (1372 mm) above the threshold of the door; or
  - 9.3. Other means of protection, such as self-closing doors with self-latching devices, which are approved by the governing body, shall be acceptable so long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described above.
10. Where an aboveground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps, then:
  - 10.1. The ladder or steps shall be capable of being secured, locked or removed to prevent access, or
  - 10.2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Section AG105.2, Items 1 through 9. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

- ❖ This section provides prescriptive requirements for the construction of the swimming pool barrier.
  1. The barrier height requirement of 48 inches (1219 mm) above the ground is based on reports that document the ability of children under the age of 5 to climb over barriers that are less than 48 inches (1219 mm) in height. The basis for the 4-inch (102 mm) criterion for an opening between the barrier and the top of the pool frame is the same as for guard construction as addressed in Section R312. Refer to Commentary Figure AG105.2(1).
  2. The general provision is applicable only when one of the conditions addressed in Items 4, 5, 6, and 7 is not present. For example, a chain-link fence would be regulated by the requirements of Item 6, which reduces the general opening criterion of 4 inches (102 mm) to 2.25 inches (57 mm). The basis for the 4-inch (102 mm) criterion is the same as for guard construction per Section R312. It is based on studies of the body measurements of children 13 to 18 months old.
  3. This provision reduces the potential for gaining a foothold and climbing the barrier.
  4. The more stringent 1.75-inch (44 mm) provision for spacing between vertical members applies when the spacing between horizontal members is less than 45 inches (1143 mm). It acknowledges the potential for a child to gain both a handhold and a foothold on closely spaced horizontal members and reduces the potential for a child to gain a foothold by limiting the space between the vertical members on the same barrier. If the horizontal members are spaced less than 45 inches (1143 mm) apart, they must also be located on the swimming pool side of the fence as shown in Commentary Figure AG105.2(2) so that they are not available to be used to climb the barriers.
  5. This requirement is the counterpart to Item 4 in that it permits the opening in the barrier to be 4 inches (102 mm) provided the vertical spacing of the horizontal members equals or exceeds 45 inches (1143 mm) as illustrated in Commentary Figure AG105.2(2). It is consistent with Item 2, which limits openings in the barrier to a 4-inch (102 mm) diameter. The spacing of horizontal members 45 inches (1143 mm) apart precludes them from being used by small children to climb the barrier.
  6. The 2 $\frac{1}{4}$ -inch (57 mm) dimension is intended to reduce the potential for a child to gain a foothold [see Figure AG105.2(3)]. The mesh size is permitted to be larger than 2 $\frac{1}{4}$ -inches (57 mm) square if slats are used to reduce the mesh opening to 1 $\frac{3}{4}$  inches (44 mm) in order to decrease

7. A slightly larger opening is permitted for barriers composed of diagonal members other than chain link fences, on the basis that such barriers would be more difficult to gain a foothold and handhold on than a chain link fence. The 1.75-inch (44 mm) dimension is consistent with Items 4, 5 and 6.
8. A gate represents the same potential hazard relative to climbing as do the other portions of the barrier; therefore, it must be constructed in accordance with applicable Items 1 through 7. Additionally, since the gate also represents a potential breach of the barrier because the gate can be opened, the code provides prescriptive details for the construction and operation of the gate. A self-closing pedestrian gate must open away from the pool because if the latch fails to operate, a child pushing on the gate will not gain immediate access to the pool. Pushing on the gate may also engage the latch. Large, nonpedestrian gates are not required to be self-closing because of prohibitive cost and maintenance concerns coupled with the fact that these gates are typically operated by persons other than small children. The 54-inch (1372 mm) latch height requirement limits the potential for small children to reach and activate the latch. If the latch is located lower than 54 inches (1372 mm), the code's prescriptive location requirements preclude the latch from being activated by small children who are not on the pool side of the gate.
9. Many residential settings with backyard pools use the dwelling as a portion of the barrier required around the pool, such as where the fence bounding the property terminates at the dwelling. This limits access to the pool by unsupervised children around the perimeter of the fence, but there is still a potential for children to access the pool from within the dwelling. Indeed, almost half the children involved in drowning or near-drowning accidents gained access to the pool from the dwelling.

The provisions of this section restrict such access by small children and are applicable to all doors in walls that form a portion of the barrier required around swimming pools.

Protection of such door openings to pool areas can be achieved in any one of the methods described in Items 9.1 through 9.3. The first alternative does not require protection of the exterior door itself but limits access to the pool by means of a power safety cover. The performance criteria specified when this option is selected assures that the power safety cover is an adequate and

reliable barrier to the pool. In Item 9.2, the alarm is configured to allow adults who are accessing the house to open the door, enter the house, and deactivate the system to prevent a false alarm. The touchpad permitted to deactivate the system is required to be mounted 54 inches (1372 mm) above the floor, which is presumed to be beyond the reach of small children.

Item 9.3 permits doors to pool areas to be protected by devices that render the door self-closing and self-latching. Any other requirements would be performance based, as the code only requires equivalency with Items 9.1 or 9.2. One possible criterion could require the release mechanism for the latching device to be located a minimum of 54 inches (1372 mm) above the floor, which is presumed to be beyond the reach of small children. In addition, doors protected by the method specified in Item 9.3 should probably open away from the pool area. This is so that if the door failed to latch, a child outside the pool area pushing against the door would cause it to close and not swing to an open position.

10. The code permits the wall of the pool itself to serve as the barrier to the pool, provided that the wall extends at least 48 inches (1219 mm) above the finished ground level around the perimeter of the pool. Unless capable of being secured, locked, or removed, the ladder must be surrounded by a complying barrier to limit access to the ladder.

**AG105.3 Indoor swimming pool.** All walls surrounding an indoor swimming pool shall comply with Section AG105.2, Item 9.

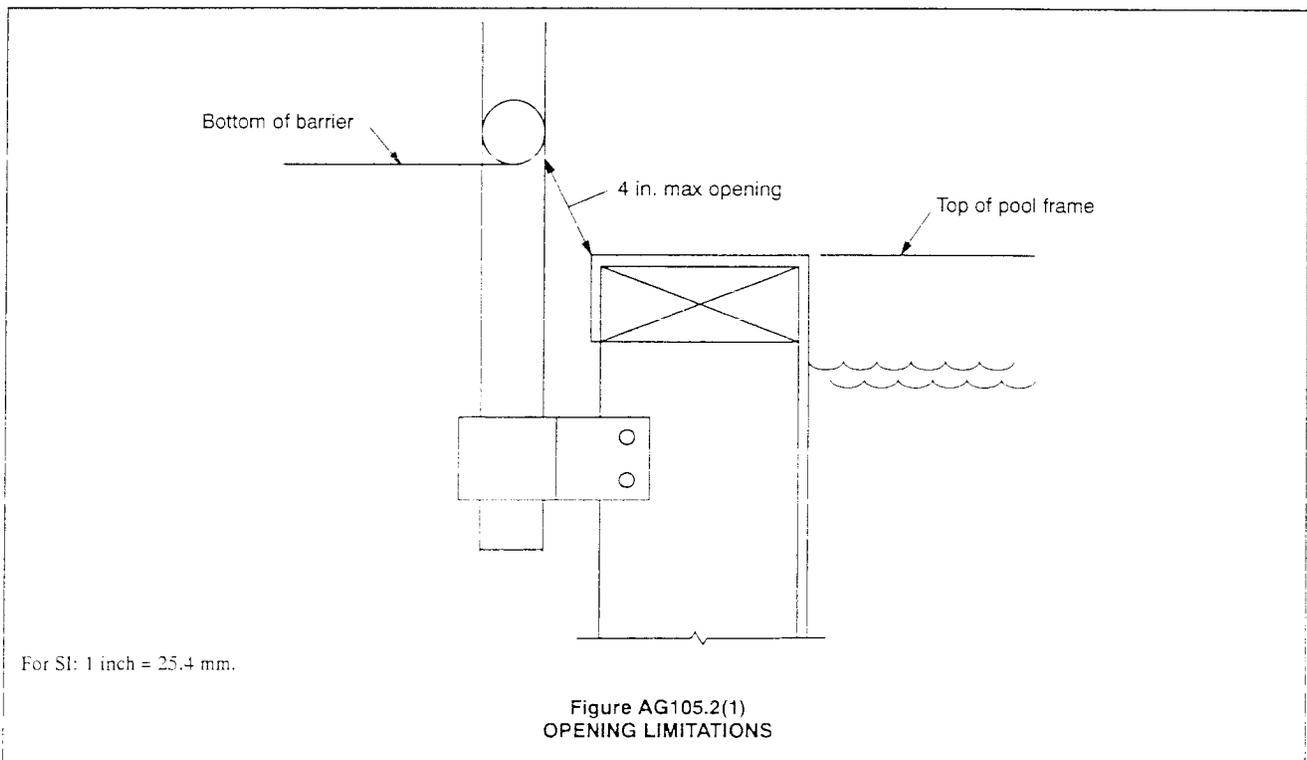
- ❖ Indoor pools represent the same hazards as outdoor pools. For this reason, the walls and doors surrounding an indoor swimming pool are regulated in the same manner as an exterior wall of a dwelling where the wall is used as a barrier for an outdoor pool. The provisions of Section AG105.2, Item 9 apply in their entirety.

**AG105.4 Prohibited locations.** Barriers shall be located so as to prohibit permanent structures, equipment or similar objects from being used to climb the barriers.

- ❖ The purpose of a swimming pool barrier would be defeated if children could climb on benches, planters, pumps, and similar permanent features adjacent to the barrier and gain access to the pool area. Therefore, the area adjacent to the barrier must be carefully designed and constructed to avoid such a condition. This provision is performance in character and must be reviewed on a case-by-case basis.

**AG105.5 Barrier exceptions.** Spas or hot tubs with a safety cover which complies with ASTM F 1346, as listed in Section AG108, shall be exempt from the provisions of this appendix.

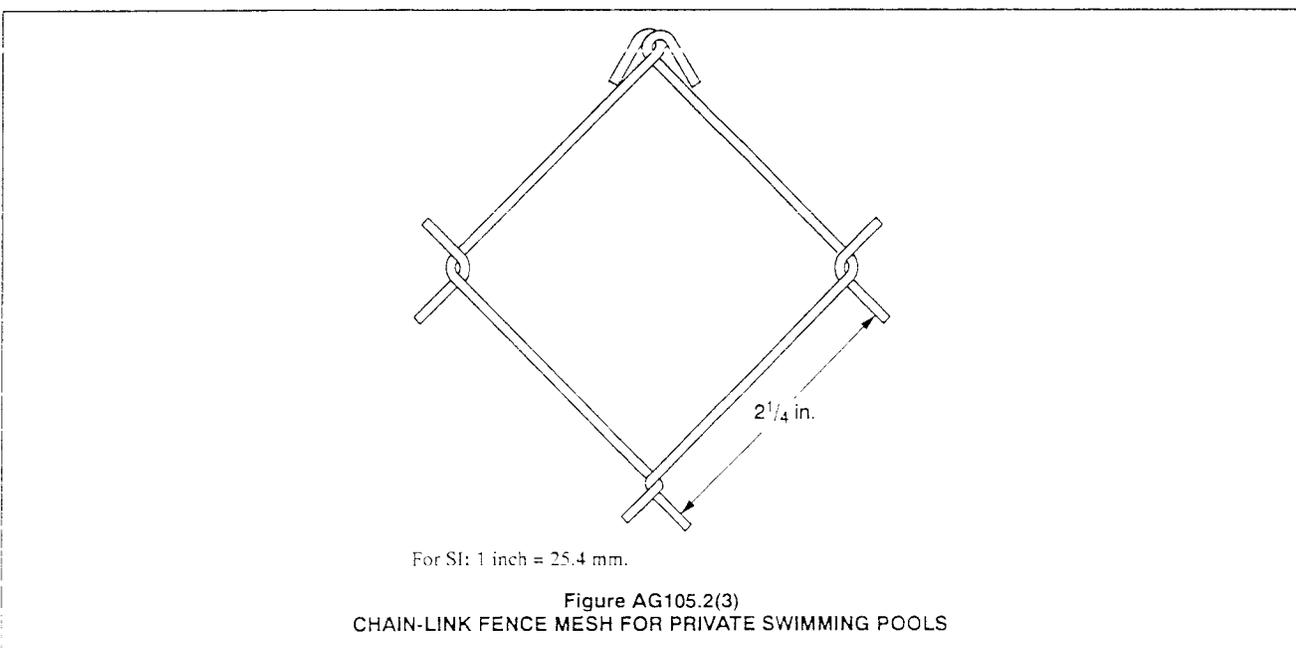
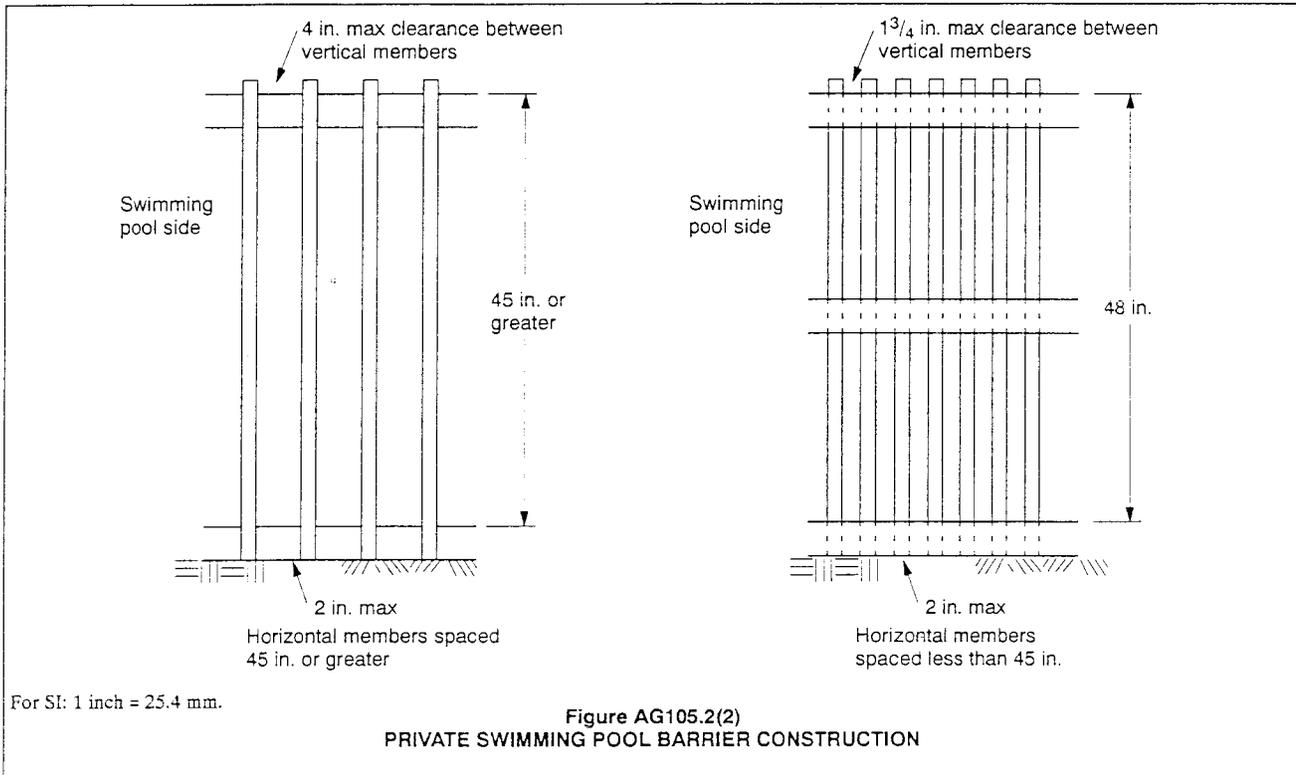
- ❖ The provisions of this appendix chapter are not applicable to spas and hot tubs where an approved safety cover serves as the protective barrier. The requirements of ASTM F 1346 contain a number of criteria so that the safety cover can provide an equivalent level of



protection as that provided by a swimming pool enclosure barrier. The following requirements are representative of several of the specifications found in the standard:

1. There should be a means of fastening the safety cover to the hot tub or spa, such as key locks, combination locks, special tools or similar devices that will prohibit children from removing or operating the cover. The fastening mechanism, design, and location are vital components that help prevent a child's entry to the water.

2. The safety cover should have a label that provides a warning and message regarding the risk of drowning. The label is also very important for



the transfer of information to second owners and temporary users.

3. The cover should have been tested to demonstrate that it is capable of supporting the weight of one child [50 pounds (23 kg)] and one adult [225 pounds (102 kg)] so an adult and a child can be supported during a rescue operation.
4. There should be no openings in the cover itself or at any point where the cover joins the surface of the hot tub or spa that would allow a child's head to pass through. The 4-inch (102 mm) spacing for guards in Section R312 and openings in pool enclosures of Section AG105.2 are also applicable.
5. Safety covers are to be installed in accordance with the manufacturer's instructions.

## SECTION AG106 ENTRAPMENT PROTECTION FOR SWIMMING POOL AND SPA SUCTION OUTLETS

**AG106.1 General.** Suction outlets shall be designed to produce circulation throughout the pool or spa. Single outlet systems, such as automatic vacuum cleaner systems, or other such multiple suction outlets whether isolated by valves or otherwise shall be protected against user entrapment.

- ❖ Vacuum devices for suction inlet systems in pool water circulation are a safety hazard. Body entrapment or hair entrapment can cause drowning and evisceration. Therefore it is important that protection be provided against possible entrapment at the pool entrances to suction inlets and that vacuum relief be provided for the vacuum system. Sections AG106.2 through AG106.5 contain requirements for the various types of safety devices.

**AG106.2 Suction fittings.** All Pool and Spa suction outlets shall be provided with a cover that conforms with ANSI/ASME A112.19.8M, or a 12" × 12" drain grate or larger, or an approved channel drain system.

**Exception:** Surface skimmers

- ❖ ANSI/ASME A112.19.8M requires cover material for pool and spa suction outlets to be tested for structural integrity and for entrapment/entanglement potential. It also requires the cover to be marked with the maximum flow rate for which the cover has been tested. Exceeding the maximum flow rate will increase the potential for a child or small adult being entrapped due to the increased suction. The code also allows 12-inch by 12-inch (305 mm by 305 mm) drain grates or approved channel drain systems as alternative protection methods. Both of these will provide larger surface areas to maintain the desired flow and will minimize the entrapment hazard because it will be difficult to seal off the entire one-foot-square area.

**AG106.3 Atmospheric vacuum relief system required.** All pool and spa single or multiple outlet circulation systems shall be equipped with atmospheric vacuum relief should grate covers located therein become missing or broken. Such vacuum relief systems shall include at least one approved or engineered method of the type specified herein, as follows:

1. Safety vacuum release system conforming to ASME A112.19.17, or
  2. An approved gravity drainage system
- ❖ Safety Vacuum Relief Systems (SRVS) are required for all pool and spa circulating systems to serve as a backup safety system in case the suction outlet cover or grate is removed or becomes broken. If the outlet becomes sealed off, the SRVS will activate and eliminate the high vacuum forces at the drain, avoiding body entrapment. An SRVS is not required if the pool or spa has a gravity drain system instead of a pumped circulation system.

**AG106.4 Dual drain separation.** Single or multiple pump circulation systems shall be provided with a minimum of two (2) suction outlets of the approved type. A minimum horizontal or vertical distance of three (3) feet shall separate such outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum relief-protected line to the pump or pumps.

- ❖ The principle for installing dual or multiple drain systems is to prevent a single drain opening from being the sole inlet to the suction side of the pump. The installation of additional drains effectively divides the suction between the drains, provided the interconnecting piping configuration produces hydraulic balance.

**AG106.5 Pool cleaner fittings.** Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least (6) inches and not greater than twelve (12) inches below the minimum operational water level or as an attachment to the skimmer(s).

- ❖ Pool cleaner fittings are not required for all pools and spas, but where they are provided, they need to be located below the normal water surface but not more than 12 inches (305 mm) below the surface. This location provides ease of access to the fittings for cleaning and prevents them from contributing to an entrapment situation at the bottom of the pool.

## SECTION AG107 ABBREVIATIONS

### AG107.1 General.

ANSI—American National Standards Institute  
11 West 42nd Street, New York, NY 10036

ASTM—ASTM International  
100 Bar Harbor Drive, West Conshohocken, PA 19428

NSPI—National Spa and Pool Institute  
2111 Eisenhower Avenue, Alexandria, VA 22314

❖ This section sets forth the full names and addresses of organizations that develop standards referenced in this appendix chapter. The abbreviations for the names of the organizations are used throughout the code text.

**SECTION AG108  
STANDARDS**

**AG108.1 General.**

**ANSI/NSPI**

ANSI/NSPI-3 Standard for Permanently Installed Residential Spas . . . . . AG104.1

ANSI/NSPI-4 Standard for Above-ground/On-ground Residential Swimming Pools . . . . . AG103.2

ANSI/NSPI-5 Standard for Residential In-ground Swimming Pools . . . . . AG103.1

ANSI/NSPI-6 Standard for Residential Portable Spas . . . . . AG104.2

ANSI/ASME A112.19.8M-1987 Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathing Appliances . . . . . AG106.2

**ASTM**

ASTM F 1346-91 Standard Performance Specifications for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs . . . . . AG105.2, AG105.5

**ASME**

ASME A112.19.17 Manufacturers Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool . . . . . AG106.3

❖ The seven referenced standards found in this appendix chapter are listed in this section.

**Bibliography**

The following resource materials are referenced in this chapter or are relevant to the subject matter addressed in this chapter.

ANSI/NSPI-3—1999, *Standard for Permanently Installed Residential Spas*. Alexandria, VA: National Spa and Pool Institute, 1999.

ANSI/NSPI-4—1999, *Standard for Aboveground/On-ground Residential Swimming Pools*. Alexandria, VA: National Spa and Pool Institute, 1999.

ANSI/NSPI-5—1999, *Standard for Residential Inground Swimming Pools*. Alexandria, VA: National Spa and Pool Institute, 1999.

ANSI/NSPI-6—1999, *Standard for Residential Portable Spas*. Alexandria, VA: National Spa and Pool Institute, 1999.

ASME A112.19.8M-1987 (1996), *Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances*. New York: American Society of Mechanical Engineers, 1996.

ASME A112.19.17-2002, *Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub and Wading Pool Suction System*. New York: American Society of Mechanical Engineers, 2002.

ASTM F 1346-91 (1996), *Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs*. West Conshohocken, PA: ASTM International, 1991.

**Table 680.3 Other Articles**

Topic	Section or Article
Wiring	Chapters 1–4
Junction box support	314.23
Rigid nonmetallic conduit	352.12
Audio Equipment	Article 640, Parts I and II
Adjacent to pools and fountains	640.10
Underwater speakers*	

\*Underwater loudspeakers shall be installed in accordance with 680.27(A).

**680.4 Approval of Equipment.** All electrical equipment installed in the water, walls, or decks of pools, fountains, and similar installations shall comply with the provisions of this article.

**680.5 Ground-Fault Circuit Interrupters.** Ground-fault circuit interrupters (GFCIs) shall be self-contained units, circuit-breaker or receptacle types, or other listed types.

**680.6 Grounding.** Electrical equipment shall be grounded in accordance with Parts V, VI, and VII of Article 250 and connected by wiring methods of Chapter 3, except as modified by this article. The following equipment shall be grounded:

- (1) Through-wall lighting assemblies and underwater luminaires (lighting fixtures), other than those low-voltage systems listed for the application without a grounding conductor
- (2) All electrical equipment located within 1.5 m (5 ft) of the inside wall of the specified body of water
- (3) All electrical equipment associated with the recirculating system of the specified body of water
- (4) Junction boxes
- (5) Transformer enclosures
- (6) Ground-fault circuit interrupters
- (7) Panelboards that are not part of the service equipment and that supply any electrical equipment associated with the specified body of water

**680.7 Cord-and-Plug-Connected Equipment.** Fixed or stationary equipment other than an underwater luminaire (lighting fixture) for a permanently installed pool shall be permitted to be connected with a flexible cord to facilitate the removal or disconnection for maintenance or repair.

**A) Length.** For other than storable pools, the flexible cord shall not exceed 900 mm (3 ft) in length.

**B) Equipment Grounding.** The flexible cord shall have a copper equipment grounding conductor sized in accordance

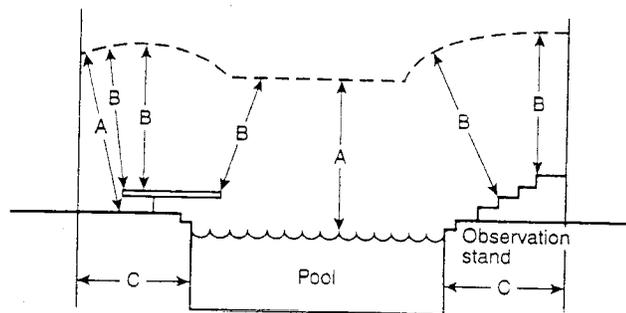
with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding-type attachment plug.

**(C) Construction.** The equipment grounding conductors shall be connected to a fixed metal part of the assembly. The removable part shall be mounted on or bonded to the fixed metal part.

**680.8 Overhead Conductor Clearances.** Overhead conductors shall meet the clearance requirements in this section. Where a minimum clearance from the water level is given, the measurement shall be taken from the maximum water level of the specified body of water.

**(A) Power.** With respect to service drop conductors and open overhead wiring, swimming pool and similar installations shall comply with the minimum clearances given in Table 680.8 and illustrated in Figure 680.8.

FPN: Open overhead wiring as used in this article typically refers to conductor(s) not in an enclosed raceway.



**Figure 680.8 Clearances from Pool Structures.**

**(B) Communications Systems.** Communication, radio, and television coaxial cables within the scope of Articles 800 through 820 shall be permitted at a height of not less than 3.0 m (10 ft) above swimming and wading pools, diving structures, and observation stands, towers, or platforms.

**(C) Network-Powered Broadband Communications Systems.** The minimum clearances for overhead network-powered broadband communications systems conductors from pools or fountains shall comply with the provisions in Table 680.8 for conductors operating at 0 to 750 volts to ground.

**680.9 Electric Pool Water Heaters.** All electric pool water heaters shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not over 60 amperes. The ampacity of the branch-circuit conductors and the rating or setting of overcurrent protective devices shall not be less than 125 percent of the total nameplate-rated load.

**Table 680.8 Overhead Conductor Clearances**

Clearance Parameters	Insulated Cables, 0–750 Volts to Ground, Supported on and Cabled Together with an Effectively Grounded Bare Messenger or Effectively Grounded Neutral Conductor		All Other Conductors Voltage to Ground			
	m	ft	0 through 15 kV		Over 15 through 50 kV	
			m	ft	m	ft
A. Clearance in any direction to the water level, edge of water surface, base of diving platform, or permanently anchored raft	6.9	22.5	7.5	25	8.0	27
B. Clearance in any direction to the observation stand, tower, or diving platform	4.4	14.5	5.2	17	5.5	18
C. Horizontal limit of clearance measured from inside wall of the pool	This limit shall extend to the outer edge of the structures listed in A and B of this table but not to less than 3 m (10 ft).					

**680.10 Underground Wiring Location.** Underground wiring shall not be permitted under the pool or within the area extending 1.5 m (5 ft) horizontally from the inside wall of the pool unless this wiring is necessary to supply pool equipment permitted by this article. Where space limitations prevent wiring from being routed a distance 1.5 m (5 ft) or more from the pool, such wiring shall be permitted where installed in rigid metal conduit, intermediate metal conduit, or a nonmetallic raceway system. All metal conduit shall be corrosion resistant and suitable for the location. The minimum burial depth shall be as given in Table 680.10.

**Table 680.10 Minimum Burial Depths**

Wiring Method	Minimum Burial	
	mm	in.
Rigid metal conduit	150	6
Intermediate metal conduit	150	6
Nonmetallic raceways listed for direct burial without concrete encasement	450	18
Other approved raceways*	450	18

\*Raceways approved for burial only where concrete encased shall require a concrete envelope not less than 50 mm (2 in.) thick.

**680.11 Equipment Rooms and Pits.** Electric equipment shall not be installed in rooms or pits that do not have drainage that adequately prevents water accumulation during normal operation or filter maintenance.

**680.12 Maintenance Disconnecting Means.** One or more means to disconnect all ungrounded conductors shall be provided for all utilization equipment other than lighting. Each means shall be readily accessible and within sight from its equipment.

**II. Permanently Installed Pools**

**680.20 General.** Electrical installations at permanently installed pools shall comply with the provisions of Part II, Part II of this article.

**680.21 Motors.**

**(A) Wiring Methods.**

**(1) General.** The branch circuits for permanently installed motors shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or Type E raceway at the location. Other wiring methods and materials shall be permitted in specific locations or applications as provided in this section. Any wiring method employed shall contain an insulated copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG.

(1) **Unit Heaters.** Unit heaters shall be rigidly mounted to the structure and shall be of the totally enclosed or guarded types. Unit heaters shall not be mounted over the pool or within the area extending 1.5 m (5 ft) horizontally from the inside walls of a pool.

(2) **Permanently Wired Radiant Heaters.** Radiant electric heaters shall be suitably guarded and securely fastened to their mounting device(s). Heaters shall not be installed over a pool or within the area extending 1.5 m (5 ft) horizontally from the inside walls of the pool and shall be mounted at least 3.7 m (12 ft) vertically above the pool deck unless otherwise approved.

(3) **Radiant Heating Cables Not Permitted.** Radiant heating cables embedded in or below the deck shall not be permitted.

### III. Storable Pools

**680.30 General.** Electrical installations at storable pools shall comply with the provisions of Part I and Part III of this article.

**680.31 Pumps.** A cord-connected pool filter pump shall incorporate an approved system of double insulation or its equivalent and shall be provided with means for grounding only the internal and nonaccessible non-current-carrying metal parts of the appliance.

The means for grounding shall be an equipment grounding conductor run with the power-supply conductors in the flexible cord that is properly terminated in a grounding-type attachment plug having a fixed grounding contact member.

**680.32 Ground-Fault Circuit Interrupters Required.** All electrical equipment, including power-supply cords, used with storable pools shall be protected by ground-fault circuit interrupters.

All 125-volt receptacles located within 6.0 m (20 ft) of the inside walls of a storable pool shall be protected by a ground-fault circuit interrupter. In determining these dimensions, the distance to be measured shall be the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier.

FPN: For flexible cord usage, see 400.4.

**680.33 Luminaires (Lighting Fixtures).** An underwater luminaire (lighting fixture), if installed, shall be installed in or on the wall of the storable pool. It shall comply with either 680.33(A) or 680.33(B).

(A) **15 Volts or Less.** A luminaire (lighting fixture) shall be part of a cord-and-plug-connected lighting assembly.

This assembly shall be listed as an assembly for the purpose and have the following construction features:

- (1) No exposed metal parts
- (2) A luminaire (fixture) lamp that operates at 15 volts or less
- (3) An impact-resistant polymeric lens, luminaire (fixture) body, and transformer enclosure
- (4) A transformer meeting the requirements of 680.23(A)(2) with a primary rating not over 150 volts

(B) **Over 15 Volts But Not Over 150 Volts.** A lighting assembly without a transformer and with the luminaire (fixture) lamp(s) operating at not over 150 volts shall be permitted to be cord-and-plug connected where the assembly is listed as an assembly for the purpose. The installation shall comply with 680.23(A)(5), and the assembly shall have the following construction features:

- (1) No exposed metal parts
- (2) An impact-resistant polymeric lens and luminaire (fixture) body
- (3) A ground-fault circuit interrupter with open neutral protection as an integral part of the assembly
- (4) The luminaire (fixture) lamp permanently connected to the ground-fault circuit interrupter with open-neutral protection
- (5) Compliance with the requirements of 680.23(A)

**680.34 Receptacle Locations.** Receptacles shall not be less than 3.0 m (10 ft) from the inside walls of a pool. In determining these dimensions, the distance to be measured shall be the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier.

### IV. Spas and Hot Tubs

**680.40 General.** Electrical installations at spas and hot tubs shall comply with the provisions of Part I and Part III of this article.

**680.41 Emergency Switch for Spas and Hot Tubs.** A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provide power to the recirculation system and jet system shall be installed at a point readily accessible to the users and not less than 1.5 m (5 ft) away, adjacent to, and within sight of the spa or hot tub. This requirement shall not apply to single-family dwellings.

**680.42 Outdoor Installations.** A spa or hot tub installed outdoors shall comply with the provisions of Parts I and III of this article, except as permitted in 680.42(A) and 680.42(B), that would otherwise apply to pools installed outdoors.

(A) **Flexible Connections.** Listed packaged spa or hot tub equipment assemblies or self-contained spas or hot tubs utilizing a factory-installed or assembled control panel or panelboard shall be permitted to use flexible connections as covered in 680.42(A)(1) and (A)(2).

(1) **Flexible Conduit.** Liquidtight flexible metal conduit or liquidtight flexible nonmetallic conduit shall be permitted in lengths of not more than 1.8 m (6 ft).

(2) **Cord-and-Plug Connections.** Cord-and-plug connections with a cord not longer than 4.6 m (15 ft) shall be permitted where protected by a ground-fault circuit interrupter.

(B) **Bonding.** Bonding by metal-to-metal mounting on a common frame or base shall be permitted. The metal bands or hoops used to secure wooden staves shall not be required to be bonded as required in 680.26.

(C) **Interior Wiring to Outdoor Installations.** In the interior of a one-family dwelling or in the interior of another building or structure associated with a one-family dwelling, any of the wiring methods recognized in Chapter 3 of this Code that contain a copper equipment grounding conductor that is insulated or enclosed within the outer sheath of the wiring method and not smaller than 12 AWG shall be permitted to be used for the connection to motor, heating, and control loads that are part of a self-contained spa or hot tub or a packaged spa or hot tub equipment assembly. Wiring to an underwater light shall comply with 680.23 or 680.33.

**680.43 Indoor Installations.** A spa or hot tub installed indoors shall comply with the provisions of Parts I and II of this article except as modified by this section and shall be connected by the wiring methods of Chapter 3.

*Exception: Listed spa and hot tub packaged units rated 20 amperes or less shall be permitted to be cord-and-plug connected to facilitate the removal or disconnection of the unit for maintenance and repair.*

(A) **Receptacles.** At least one 125-volt, 15- or 20-ampere receptacle on a general-purpose branch circuit shall be located not less than 1.5 m (5 ft) from, and not exceeding 3.0 m (10 ft) from, the inside wall of the spa or hot tub.

(1) **Location.** Receptacles shall be located at least 1.5 m (5 ft) measured horizontally from the inside walls of the spa or hot tub.

(2) **Protection, General.** Receptacles rated 125 volts and 30 amperes or less and located within 3.0 m (10 ft) of the inside walls of a spa or hot tub shall be protected by a ground-fault circuit interrupter.

(3) **Protection, Spa or Hot Tub Supply Receptacle.** Receptacles that provide power for a spa or hot tub shall be ground-fault circuit-interrupter protected.

(4) **Measurements.** In determining the dimensions in this section addressing receptacle spacings, the distance to be measured shall be the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier.

(B) **Installation of Luminaires (Lighting Fixtures), Lighting Outlets, and Ceiling-Suspended (Paddle) Fans.**

(1) **Elevation.** Luminaires (lighting fixtures), except as covered in 680.43(B)(2), lighting outlets, and ceiling-suspended (paddle) fans located over the spa or hot tub or within 1.5 m (5 ft) from the inside walls of the spa or hot tub shall comply with the clearances specified in (B)(1)(a), (B)(1)(b), and (B)(1)(c) above the maximum water level.

(a) Without GFCI. Where no GFCI protection is provided, the mounting height shall be not less than 3.7 m (12 ft).

(b) With GFCI. Where GFCI protection is provided, the mounting height shall be permitted to be not less than 2.3 m (7 ft 6 in.).

(c) Below 2.3 m (7 ft 6 in.). Luminaires (lighting fixtures) meeting the requirements of item (1) or (2) and protected by a ground-fault circuit interrupter shall be permitted to be installed less than 2.3 m (7 ft 6 in.) over a spa or hot tub:

(1) Recessed luminaires (fixtures) with a glass or plastic lens, nonmetallic or electrically isolated metal trim, and suitable for use in damp locations

(2) Surface-mounted luminaires (fixtures) with a glass or plastic globe, a nonmetallic body, or a metallic body isolated from contact, and suitable for use in damp locations

(2) **Underwater Applications.** Underwater luminaires (lighting fixtures) shall comply with the provisions of 680.23 or 680.33.

(C) **Wall Switches.** Switches shall be located at least 1.5 m (5 ft), measured horizontally, from the inside walls of the spa or hot tub.

(D) **Bonding.** The following parts shall be bonded together:

(1) All metal fittings within or attached to the spa or hot tub structure

(2) Metal parts of electrical equipment associated with the spa or hot tub water circulating system, including pump motors

(3) Metal conduit and metal piping that are within 1.5 m (5 ft) of the inside walls of the spa or hot tub and that are not separated from the spa or hot tub by a permanent barrier

(4) All metal surfaces that are within 1.5 m (5 ft) of the inside walls of the spa or hot tub and that are not separated from the spa or hot tub area by a permanent barrier

*Exception: Small conductive surfaces not likely to become energized, such as air and water jets and drain fittings, where not connected to metallic piping, towel bars, mirror frames, and similar nonelectrical equipment, shall not be required to be bonded.*

(5) Electrical devices and controls that are not associated with the spas or hot tubs and that are located not less than 1.5 m (5 ft) from such units; otherwise they shall be bonded to the spa or hot tub system

**(E) Methods of Bonding.** All metal parts associated with the spa or hot tub shall be bonded by any of the following methods:

- (1) The interconnection of threaded metal piping and fittings
- (2) Metal-to-metal mounting on a common frame or base
- (3) The provisions of a copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG solid.

**(F) Grounding.** The following equipment shall be grounded:

- (1) All electric equipment located within 1.5 m (5 ft) of the inside wall of the spa or hot tub
- (2) All electric equipment associated with the circulating system of the spa or hot tub

**(G) Underwater Audio Equipment.** Underwater audio equipment shall comply with the provisions of Part II of this article.

**680.44 Protection.** Except as otherwise provided in this section, the outlet(s) that supplies a self-contained spa or hot tub, a packaged spa or hot tub equipment assembly, or a field-assembled spa or hot tub shall be protected by a ground-fault circuit interrupter.

**(A) Listed Units.** If so marked, a listed self-contained unit or listed packaged equipment assembly that includes integral ground-fault circuit-interrupter protection for all electrical parts within the unit or assembly (pumps, air blowers, heaters, lights, controls, sanitizer generators, wiring, and so forth) shall be permitted without additional GFCI protection.

**(B) Other Units.** A field assembled spa or hot tub rated 3 phase or rated over 250 volts or with a heater load of more than 50 amperes shall not require the supply to be protected by a ground-fault circuit interrupter.

**(C) Combination Pool and Spa or Hot Tub.** A combination pool/hot tub or spa assembly commonly bonded need not be protected by a ground-fault circuit interrupter.

*FPN: See 680.2 for definitions of self-contained spa or hot tub and for packaged spa or hot tub equipment assembly.*

## V. Fountains

**680.50 General.** The provisions of Part I and Part V of this article shall apply to all permanently installed fountains as

defined in 680.2. Fountains that have water common to a pool shall additionally comply with the requirements in Part II of this article. Part V does not cover self-contained, portable fountains not larger than 1.5 m (5 ft) in any dimension. Portable fountains shall comply with Parts II and III of Article 422.

## 680.51 Luminaires (Lighting Fixtures), Submersible Pumps, and Other Submersible Equipment.

**(A) Ground-Fault Circuit Interrupter.** Luminaires (lighting fixtures), submersible pumps, and other submersible equipment, unless listed for operation at 15 volts or less and supplied by a transformer that complies with 680.23(A)(2), shall be protected by a ground-fault circuit interrupter.

**(B) Operating Voltage.** No luminaires (lighting fixtures) shall be installed for operation on supply circuits over 150 volts between conductors. Submersible pumps and other submersible equipment shall operate at 300 volts or less between conductors.

**(C) Luminaire (Lighting Fixture) Lenses.** Luminaires (lighting fixtures) shall be installed with the top of the luminaire (fixture) lens below the normal water level of the fountain unless listed for above-water locations. A luminaire (lighting fixture) facing upward shall have the lens adequately guarded to prevent contact by any person.

**(D) Overheating Protection.** Electrical equipment that depends on submersion for safe operation shall be protected against overheating by a low-water cutoff or other approved means when not submerged.

**(E) Wiring.** Equipment shall be equipped with provision for threaded conduit entries or be provided with a suitable flexible cord. The maximum length of exposed cord in the fountain shall be limited to 3.0 m (10 ft). Cords extending beyond fountain perimeter shall be enclosed in approved wiring enclosures. Metal parts of equipment in contact with water shall be of brass or other approved corrosion-resistant metal.

**(F) Servicing.** All equipment shall be removable from water for relamping or normal maintenance. Luminaires (fixtures) shall not be permanently embedded into the fountain structure such that the water level must be reduced or fountain drained for relamping, maintenance, or inspection.

**(G) Stability.** Equipment shall be inherently stable and securely fastened in place.

## 680.52 Junction Boxes and Other Enclosures.

**(A) General.** Junction boxes and other enclosures, other than underwater installation shall comply with

**Underwater Junction Boxes and Other Underwater Enclosures.** Junction boxes and other underwater enclosures shall meet the requirements of 680.52(B)(1) and (B)(2).

**Construction.**

- a) Underwater enclosures shall be equipped with provisions for threaded conduit entries or compression glands and seals for cord entry.
- b) Underwater enclosures shall be submersible and made of copper, brass, or other approved corrosion-resistant material.

**Installation.** Underwater enclosure installations shall comply with (a) and (b).

- (a) Underwater enclosures shall be filled with an approved potting compound to prevent the entry of moisture.
- (b) Underwater enclosures shall be firmly attached to the supports or directly to the fountain surface and bonded as required. Where the junction box is supported only by the conduit, the conduit shall be of copper, brass, stainless steel, or other approved corrosion-resistant metal. Where the box is fed by nonmetallic conduit, it shall have additional supports and fasteners of copper, brass, or other approved corrosion-resistant material.

FPN: See 314.23 for support of enclosures.

**680.53 Bonding.** All metal piping systems associated with the fountain shall be bonded to the equipment grounding conductor of the branch circuit supplying the fountain.

FPN: See 250.122 for sizing of these conductors.

**680.54 Grounding.** The following equipment shall be grounded:

- (1) All electrical equipment located within the fountain or within 1.5 m (5 ft) of the inside wall of the fountain
- (2) All electrical equipment associated with the recirculating system of the fountain
- (3) Panelboards that are not part of the service equipment and that supply any electrical equipment associated with the fountain

**680.55 Methods of Grounding.**

**(A) Applied Provisions.** The provisions of 680.21(A), 680.23(B)(3), 680.23(F)(1) and (F)(2), 680.24(F), and 680.25 shall apply.

**(B) Supplied by a Flexible Cord.** Electrical equipment that is supplied by a flexible cord shall have all exposed non-current-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of this cord. The grounding conductor shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure.

**680.56 Cord-and-Plug-Connected Equipment.**

**(A) Ground-Fault Circuit Interrupter.** All electrical equipment, including power-supply cords, shall be protected by ground-fault circuit interrupters.

**(B) Cord Type.** Flexible cord immersed in or exposed to water shall be of a type for extra-hard usage, as designated in Table 400.4 and shall be a listed type with a "W" suffix.

**(C) Sealing.** The end of the flexible cord jacket and the flexible cord conductor termination within equipment shall be covered with, or encapsulated in, a suitable potting compound to prevent the entry of water into the equipment through the cord or its conductors. In addition, the ground connection within equipment shall be similarly treated to protect such connections from the deteriorating effect of water that may enter into the equipment.

**(D) Terminations.** Connections with flexible cord shall be permanent, except that grounding-type attachment plugs and receptacles shall be permitted to facilitate removal or disconnection for maintenance, repair, or storage of fixed or stationary equipment not located in any water-containing part of a fountain.

**680.57 Signs.**

**(A) General.** This section covers electric signs installed within a fountain or within 3.0 m (10 ft) of the fountain edge.

**(B) Ground-Fault Circuit-Interrupter Protection for Personnel.** All circuits supplying the sign shall have ground-fault circuit-interrupter protection for personnel.

**(C) Location.**

**(1) Fixed or Stationary.** A fixed or stationary electric sign installed within a fountain shall be not less than 1.5 m (5 ft) inside the fountain measured from the outside edges of the fountain.

**(2) Portable.** A portable electric sign shall not be placed within a pool or fountain or within 1.5 m (5 ft) measured horizontally from the inside walls of the fountain.

**(D) Disconnect.** A sign shall have a local disconnecting means in accordance with 600.6 and 680.12.

**(E) Bonding and Grounding.** A sign shall be grounded and bonded in accordance with 600.7.

**680.58 GFCI Protection for Adjacent Receptacle Outlets.** All 15- or 20-ampere, single-phase 125-volt through 250-volt receptacles located within 6.0 m (20 ft) of a fountain edge shall be provided with GFCI protection.



# City of Highland

Department of Public Works  
Building and Zoning Division

## **CITY OF HIGHLAND** **ELECTRICAL REQUIREMENTS FOR POOLS**

- 1) All equipment must be UL approved.
- 2) One weatherproof outlet must be provided for the pump, a minimum of 5 ft. away from inside wall of the pool. Pump must be on a dedicated circuit.
- 3) One additional convenience weatherproof outlet must be provided not more than 20 ft. from inside wall of pool.
- 4) All outlets will be GFCI protected.
- 5) All lighting will be installed a minimum of 5 ft. away from inside wall of pool. If not 5 ft. it must be installed in rigid conduit and securely fastened. It must be GFCI protected.
- 6) Any wiring run within 5 ft. of inside of pool walls will be in approved conduit.
- 7) Wire may not be installed underneath the swimming pool.
- 8) Burial cable must be buried 24" deep.
- 9) Non-rigid conduit must be buried 18" deep.
- 10) Electrical disconnect shall be provided within sight of pool, properly labeled as pool/pump/outlet power disconnect.

THIS LIST IS NOT ALL INCLUSIVE. PLEASE REFER TO NATIONAL ELECTRIC CODE BOOK ART. # 680 AND ALL OTHERS APPLYING. PLEASE CALL CITY OF HIGHLAND AT 654-7115 FOR ANY QUESTIONS YOU MAY HAVE. THANK YOU FOR YOUR COOPERATION