

Madani, Mo

From: Vincent, Bob G <Bob.Vincent@flhealth.gov>
Sent: Tuesday, May 26, 2026 11:25 AM
To: Madani, Mo
Cc: Vallone, Gina
Subject: FW: FBC 9th edition conflict with Florida Statutes 514.0315
Attachments: APSP-16_2017 HILITES + CPSC exempt sections-orange.pdf

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I have provided below the **exceptions** that would relax the ANSI/APSP/ICC standard 16 for hair and body entrapment.

The Department of Health has concerns over a statutory conflict regarding the Florida Building Code 9th edition revision for cold plunge spas in section 454.1.

The 9th edition swimming pool TAC revision SW12252 AM/A2 underlined below conflicts with the 2025 Florida Statutes section 514.0315 for anti-entrapment safety features.

This section of state statutes requires compliance with the “successor standard” for anti-entrapment, which is “ANSI/APSP/ICC-16 2017, Suction Outlet Fitting Assemblies (SOFA) for use in Pools, Spas and Hot Tubs”.

The UL 1563, Electric Spas, allows **exceptions** for suction outlet anti-entrapment safety features in ANSI/APSP/ICC-16 at **UL 1563 section 40.10**, these are snipped below with conflict **exceptions** bolded.

2026 9th edition supplement 454.1 Public swimming pools and bathing places.

Public swimming pools and bathing places shall comply with the design and construction standards of this section.

Exceptions:

3. Portable self-contained factory manufactured cold-spa pools that are listed and labeled in accordance with UL 1563, and operated in accordance with manufacturer’s instructions, are exempt from the provisions of Section 454.1.
... (Step 2 – SW12252 AM/A2 – 2nd comment period)

CORRECTIVE ADDITION SUGGESTED for the 9th edition revision to 454.1 clause #3. After the current language “...listed and labeled in accordance with UL 1563,” please add the following: “and recirculation system suction outlets shall be certified compliant with Florida’s suction outlet anti-entrapment standard ANSI/APSP/ICC—16 2017,” ...

2025 UL 1563 Standard for Safety

Electric Spas, Equipment Assemblies, and Associated Equipment

Section 40.10 Suction openings

40.10.1 Each spa shall be provided with a minimum of two suction openings, **or one suction opening and a skimmer equipped with a vacuum break.** ...

Exception: *A fitting with no marked flow rating need not comply with 40.10.1(a) if it complies with all the provisions of APSP-16 when installed in the spa. Controls shall be adjusted for the maximum water flow through the fitting.*

This **exception** would relax the APSP standard #16 for hair and body entrapment.

40.10.5 Suction openings shall be installed in such a manner that it is unlikely both suction openings or a

suction opening and skimmer on the same pump can be simultaneously blocked. The installed fitting(s) and skimmer shall comply with the body entrapment requirements specified in APSP-16.

Exception No. 1: *Constructions where the spa is provided with features, electrical, mechanical, or both that release the pump vacuum in the event both fittings on a single pump are blocked. The functionality of these features shall be evaluated by the Body Entrapment Test in APSP-16. Mechanical or electrical construction features necessary for the function of the system shall be evaluated for reliability.*

Exception No. 2: *Suction outlets protected by either (1) a suction-limiting vent system with a tamper resistant atmospheric opening or (2) or gravity drainage system.*

These exceptions would relax the APSP standard #16 for hair and body entrapment.

40.10.8 Skimmers represented by the general descriptions in (a) – (c) and conforming to the overall general shapes and designs (or the equivalent) illustrated in Figure 40.1 – Figure 40.3 are not required to comply with the requirements in 40.10.3 – 40.10.8.

a) Weir door style skimmer

b) Floating Weir Style Skimmer

c) **Strip Style Skimmer** – A vertically-mounted, rectangular-shaped skimmer installed in the side wall of the spa shell. Two-piece construction (faceplate and threaded back plate). ...

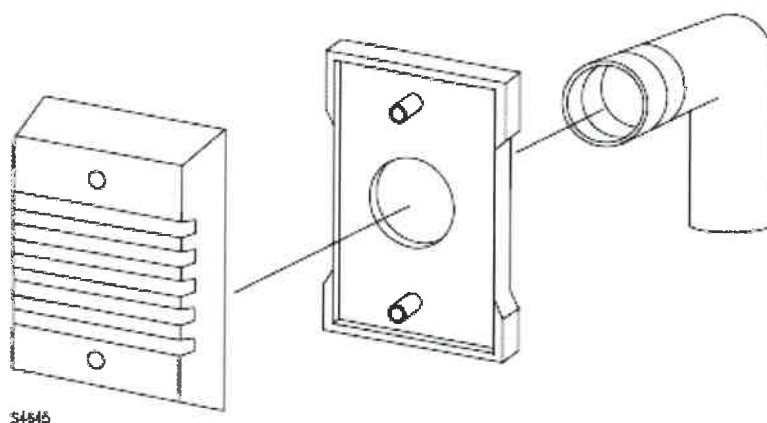
Provided with a half inch plumbing connection attached to the threaded back plate. Faceplate is screwed to the threaded back plate and is provided with multiple openings ...

Additional openings are provided either on the tapered sides of the faceplate, or on the threaded back plate having a total

area of approximately 3 inches (7.6 cm²). See Figure 40.3 for the general shape and design of strip style skimmer.

This exception would relax the APSP standard #16 for hair and body entrapment.

Figure 40.3
Strip Style Skimmer



40.11 Suction openings for cold tubs

40.11.1 A Cold Tub shall comply with 40.10, as applicable.

40.11.2 As an alternative to 40.11.1, a Cold Tub with low flow water recirculation or filtration only and not provided with high flow jet pump(s) and massage jets, for example with a single skimmer with vacuum break that complies with 40.10.8 and 40.10.9, may be considered acceptable.

This exception would relax the APSP standard #16 for hair and body entrapment.

Kind Regards, Bob

Bob Vincent, RS, CEHP, MPA, Environmental Administrator, Florida Dept of Health, Division of Disease Control and Health Protection, Bureau of Environmental Public Health, Water Programs, Tallahassee, FL O 850.245.4578, C 850.251.7510, F 850.487.0864 Webpage: [Healthy Environments | Florida Department of Health \(floridahealth.gov\)](#) Note: Florida has a very broad public records law. Most written communications to or from state officials regarding state business are public records available to the public and media upon request. Your e-mail communications may therefore be subject to public disclosure.

ANSI/APSP/ICC-16 2017

American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas and Hot Tubs

Approved August 18, 2017




APSP
*The Association of
Pool & Spa Professionals®*

 **INTERNATIONAL
CODE COUNCIL®**

American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas, and Hot Tubs

1 GENERAL

1.1 Scope

This standard establishes materials, testing, use, installation, and marking requirements for new or replacement *bather-accessible* Suction Outlet Fitting Assemblies (SOFAs), other than maintenance drains, that are designed to be *fully submerged* for use in any *pool*, which include, but are not limited to a swimming pool, hot tub, spa, portable spa, or non-portable wading pool, or other aquatic venue intended for swimming or recreational bathing. The term *pool* is used throughout this standard as an identifier for these bodies of water.

1.1.1 Effective date. This standard becomes effective 18 months after adoption by the U.S. Consumer Product Safety Commission (CPSC).

1.1.2 Existing product compliance. SOFA components that were manufactured or installed before the effective date of this standard, and that meet APSP-16 2011, shall be considered in compliance with this standard.

1.1.3 Service life. Cover/grates and all other SOFA components shall be replaced at or before the end of their service life as stated by the manufacturer. Service life begins the month and year in which a SOFA component is installed with or without water.

1.1.4 Skimmers are excluded from the scope of this standard.

1.1.5 Vacuum cleaner ports. *Vacuum connection covers* are excluded from the scope of this standard. See the International Association of Plumbing and Mechanical Officials (IAPMO) SPS-4, Special Use suction fittings for Swimming Pools, Spas and Hot tubs for Suction-Side Automatic Swimming Pool Cleaners.

1.2 Suction Outlet Fitting Assembly Types

1.2.1 General purpose SOFAs: A manufactured SOFA for transferring water from the pool directly or indirectly to a pump.

1.2.2 Maintenance drain and fire suppression water source outlet: A manufactured, restricted use fitting used only by pool maintenance personnel or fire suppression personnel ONLY at times when the pool is closed to *bathers*. Maintenance drains and fire suppression water source outlets are exempt from sections 5 and 6 of this standard. Any SOFA certified to this standard shall be permitted to serve this purpose.

1.2.3 Self-contained spa SOFAs: A manufactured, restricted use, SOFA that is distributed exclusively as a component of a self-contained factory-manufactured spa, where the *self-contains spa SOFA* has been further evaluated while installed in the spa at the time it is tested and certified in conformance with ANSI/UL 1563.

1.2.4 Swim jet combination SOFAs: A manufactured SOFA that merges a suction port(s) and discharge port(s) into as single assembly for use in a *single SOFA system* and/or a *multiple SOFA system*.

1.2.5 Registered Design Professional SOFAs: A field-built SOFA that is typically used for high flow rate systems found in large public pools and water park type recreation facilities. They shall be designed using only *sumps* that qualify as *unblockable*. The term *RDP SOFA* is used throughout this standard as an identifier for this type of SOFA.

1.2.6 Venturi SOFAs: A manufactured, restricted use, *blockable* SOFA distributed exclusively as a component of a water-driven suction system that returns all water from the Venturi SOFA to the pool without it passing through a pump.

1.3 Certifications

1.3.1 Prohibited certifications.

1.3.1.1 Manufactured SOFAs and *RDP SOFAs* that are not evaluated to all applicable sections or fail any applicable requirement of this standard shall not be certified as meeting this standard.

1.3.2 Required testing and certification.

1.3.2.1 *Manufactured SOFAs* shall be tested by a laboratory in conformance with paragraph 1.3.4 and certified by an agency in conformance with paragraph 1.3.5.

1.3.2.2 *RDP SOFAs* shall be designed, installed, and certified in conformance with all applicable requirements of this standard by a *registered design professional* whose credentials are in conformance with the paragraph 1.3.6.

1.3.2.3 *Manufacturers* and *registered design professionals* of SOFAs intended to enter commerce within the United States shall make available a General Certificate of Conformity (GCC) for each SOFA model as required by 16 CFR Part 1450.

1.3.3 Prohibited installations.

1.3.3.1 Pools equipped with a SOFA(s) that does not result in an *individual suction system flow rating* equal to or greater than the pool's actual *individual suction system flow rate*, or pools with a SOFA(s) that was not installed in accordance with the SOFA specific instructions, including fasteners used with preexisting components, shall not be considered in conformance with this standard.

1.3.3.2 Cover/grate shall only be installed on existing SOFA components if the replacement cover/grate manufacturer has designated the products as suitable for attachment to previously installed SOFA components. When used, the designation shall include how to identify compliant fastener attachment points and/or how to install the replacement cover/grate without using existing attachment points.

1.3.4 Testing laboratory accreditation. Laboratories shall be accredited to ISO 17025 and shall ensure all testing of *manufactured* SOFAs conform to this APSP-16 standard.

1.3.5 Certification agency accreditation. Certification bodies shall be accredited to ISO 17065, and shall provide certification of all *manufactured* SOFAs to this APSP-16 standard.

1.3.6 Registered design professional accreditation. Any individual who designs and certifies *RDP* SOFAs shall be registered or licensed to practice their design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the *pool* receiving the *RDP* SOFA is located.

1.3.7 Flow rating determination – *manufactured* SOFAs. The flow rating for each *manufactured* SOFA configuration shall be determined by the lowest passing flow rate obtained during any of the Type 1 hair tests, the Type 2 hair tests, and the *body-blocking element (BBE)* test, unless the SOFA manufacturer specifies a lower flow rate, which shall then be the maximum allowable flow rate for that SOFA.

1.3.7.1 For all SOFA configurations with a suction piping opening less than 16 inches from the *finished surface of the pool*, the cover/grate shall be tested on each *SOFA configuration* in accordance with section 5. The distance shall be measured from the SOFA's designated *finished surface of the pool* using a string line to represent the greatest distance Type 1 and Type 2 hair can travel into the cover/grate and sump. Each of these SOFA configurations shall receive a flow rating.

1.3.7.2 For all SOFA configurations with a suction piping opening greater than 16 inches from the *finished surface of the pool*, measured in accordance with section 1.3.7.1, the cover/grate shall be tested on one *SOFA configuration* in accordance with section 5. The SOFA configuration tested shall be one using the largest pipe opening(s) size specified for the *cover/grate* resulting in the highest flow potential.

1.3.8 Flow rating determination – *RDP* SOFAs. The *registered design professional* shall determine the SOFA's flow rating in accordance with section 3.9.

1.3.9 Water velocity limits. For purposes of suction safety, this standard provides SOFA configuration specific water velocity limits through a *cover/grate* based on the SOFA tests of sections 5 and 6. These limits are expressed in gallons per minute (gpm), which can be converted directly into feet per second (fps) velocity units when desired. State and Local Codes may limit flow through a cover/grate based on water velocity (fps) rather than the marked flow rate (gpm) of the cover/grate. When this methodology is used, the resultant flow rating shall not exceed the cover/grate's SOFA specific flow rating in gallons per minute.

1.3.10 Removal force calculation. Table 1, Applicable Body Block Element – Calculation of Removal Force, referenced in ANSI/APSP – 16 2011 has been replaced with Equation 2 in section 6.4.

1.3.11 Units. When values are stated in U.S. Customary units and in the International System of Units (SI), the values stated in U.S. Customary units shall be considered as the standard.

1.4 Related Standards

Because the scope of this standard is directly related to suction fittings, it is important to mention that the fittings themselves represent only one portion of the suction entrapment scenario. Additional standards to be consulted to provide coverage for the various other potential hazards in swimming pools, wading pools, spas, and hot tubs and aquatic recreation facilities. These other standards include, but are not limited to, the following:

16 CFR Part 1450 Virginia Graeme Baker Pool and Spa Safety Act

ANSI/APSP/ICC-1 Standard for Public Swimming Pools

ANSI/NSPI-2 Standard for Public Spas

ANSI/APSP/ICC-3 Standard for Permanently Installed Residential Spas and Swim Spas

and onground structures, and includes hot tubs, spas, portable spas, infinity edge catch basins, slide and other amusement termination basins, and non-portable wading pools.

Pool owner: The person(s) recognized by the law as having the ultimate control over, and responsibility for the property on which a *pool* is located.

Product specifications: Information specific to a product, including, but not limited to model numbers, flow ratings, service life, SOFA type, etc., that is made available by the manufacturer or Registered Design Professional in advance of the product being sold and installed.

Q: Volumetric flow rate in cubic feet per second (ft³/s).

Registered design professional: An individual who is registered or licensed to practice their design profession, as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

Registered Design Professional (RDP) SOFAs: A SOFA designed and certified as conforming to all applicable requirements of this standard by a *registered design professional* that is custom-made for a specific *pool* at the construction site, or custom-made for a specific *pool* at a facility not normally engaged in *SOFA manufacturing*.

Restricted use. A SOFA type that is only certified for used in a specific pool type, e.g., *self-contained factory-manufactured spa*, or that is distributed exclusively as a component of a *manufactured, individual suction system*, e.g., venturi SOFA.

Self-contained factory-manufactured spa: A spa that is certified in conformance with ANSI/UL 1563.

Self-contained spa SOFA: See paragraph 1.2.3.

Service life: The period of time between the installation of a component in a *pool*, with or without water at the time of installation, and the end of its useful life as specified in conformance with paragraph 3.1.1.

Shadow: That portion of a SOFA sump that is hidden by the *body-blocking element (BBE)* to a person viewing perpendicularly to the *mounting surface* of the SOFA sump.

Sharp edge: An edge that can cause a cut-type injury when contacted during normal use by a bather. Refer to UL 1439 Standard for Tests of Sharpness on Edges of Equipment.

Skimmer: A partially submerged *suction outlet* that is designed to remove water from the surface of a *pool*.

Skimmers that are not *fully submerged* are not SOFAs; therefore, they are excluded from testing and certification to this standard.

SOFA configuration: A *manufacturer* or *registered design professional* specified assembly where any difference in mounting orientation (wall or floor), *suction pipe* opening size, or *suction pipe* opening orientation (horizontal or vertical exit from the *sump*) results in a different *SOFA model number*.

Suction outlet: Any appurtenance that provide a *localized low-pressure area* for the transfer of water from a *pool* to an *individual suction system*, e.g. SOFA, skimmer, gutter overflow, etc.

Suction outlet fitting assembly (SOFA): All components, including the *cover/grate*, used to attach a *cover/grate(s)* to the *finished surface of a pool* and to an *individual suction system*.

Suction pipe: A pipe used to convey water to an *individual suction system*.

Suction pipe opening: The inside diameter of suction pipe, suction port fitting, or other geometry through which water will flow exiting a sump.

Suction port: The portion of a SOFA *sump* used to connect the SOFA directly to the *suction pipe*.

Suction system flow rating: The maximum flow for which an *individual suction system* is permitted to operate while remaining in compliance with this standard.

Sump: The vessel between the suction outlet cover/grate and suction outlet piping. This may be manufactured or field-built.

Swim jet combination SOFA: A *manufactured* inlet/outlet SOFA that combines a *suction port(s)* and return port(s) into one suction outlet fitting assembly.

Total dynamic head (TDH): The total equivalent height that pool water is to be pumped, considering friction losses in the pipe. This term, along with flow rate, is used to specify the expected performance of a pool pump over its operating range, expressed as a curve plotted against head pressure versus flow rate.

Unblockable SOFA: A suction outlet fitting assembly that, when installed according to the manufacturer's instructions, cannot be shadowed by an 18" x 23" Body Blocking Element, and has a rated flow through the remaining open area beyond the shadowed portion that cannot create a suction force in excess of the force calculated in equation 2.

bather-accessible when the SOFA is fully assembled and installed in the *pool*. The bonding connection provided shall not be located within a SOFA *flow path zone* or where it may pose a hair entanglement/entrapment hazard, nor prevent service access to *suction piping*.

3.1.14.1 The bonding connection and associated bonding wire shall be considered non-*bather* accessible when it cannot be touched by any portion of the "UL Articulate Probe" when evaluating the SOFA in accordance with section 7, Finger and Limb Entrapment testing.

3.2 SOFA Configurations

3.2.1 Product identifier. Each SOFA *component* part shall be assigned a *part number* and each SOFA *configuration* shall be assigned a *model number*.

3.2.2 Head loss curve. Cover/grate manufacturers shall provide a legible head loss curve covering the full range of flow for each SOFA *model*. The curve shall plot the SOFA specific suction head loss in inches of mercury versus flow rate using data collected or confirmed in accordance with paragraph 5.4.5. The actual SOFA suction head loss curve shall be within a range of -3% to + 5% of the suction head or $\pm 5\%$ of the flow rate, whichever is greater, indicated by the curve. The accuracy of the curve shall be verified at three points along the curve include the suction head loss at approximately 20, 50 and 100 percent of the SOFA's certified flow range. The head loss curve shall be accompanied by a description and/or illustration showing the approximate location the suction head was measured to aid pool designers calculating the total dynamic head (TDH) of a recirculation system.

3.2.3 Cover/grates used for multiple SOFA configurations. It shall be permissible to use a single cover/grate part(s) as a component of multiple SOFAs.

3.2.4 "Blockable" and "Unblockable" designations. SOFAs shall be categorized as *blockable* or *unblockable*, as appropriate, by physical examination using the dimensions of the *body-blocking element (BBE)* of paragraph 6.2.2. If the sump opening can be completely shadowed by the *body-blocking element (BBE)* when viewed perpendicular to the *pool mounting surface* in which the SOFA is installed, it shall be categorized as *blockable*; those that cannot be completely shadowed shall be categorized as *unblockable*.

3.3 Cover/Grate Security, Fasteners, and Servicing Instructions

3.3.1 Fastener instructions. Cover/grate manufacturers shall provide installation instructions that detail the type of fasteners to be used and the recommended installation

torque. Instructions shall also include a statement to start installation of screws by hand to ensure proper thread engagement and to prevent cross threading, and state the following: "DO NOT USE POWER TOOLS TO INSTALL FASTENERS".

3.3.2 Replacement cover/grates for existing pools. Manufacturer's of replacement cover/grates and other SOFA *components* intended for installation on *existing pools* with unknown sumps and *mud frames* shall provide replacement specific instructions for identifying when it is acceptable to attach the new cover/grate and how to confirm the attachment was successful.

3.3.3 Flow paths including pool surface. For cover/grates where a portion of the flow path is formed by the *interior surface of the pool*, the cover/grate manufacturer's installation instructions shall provide a method for the installer to verify the actual installation conforms to section 7.3.

3.4 User Maintenance Instructions

All SOFA *types* shall be accompanied by user maintenance instructions containing all the information of this section that is applicable to the SOFA:

3.4.1 Field modifications. A statement that any field modification made to a SOFA not authorized by the manufacturer's installation instructions shall void the SOFA certification.

3.4.2 Configuration modifications. A statement that no modification shall be made to a SOFA structure or flow path unless the new configuration has been certified as new SOFA.

3.4.3 Service life. A statement that cover/grates and all other SOFA components shall be replaced at or before the end of their service life and that service life begins the month and year in which a SOFA component is installed with or without water.

3.4.4 Winterizing instructions. Cover/grate manufacturers shall provide instructions stating how to winterize *manufactured* SOFAs. *Registered design professionals* shall provide winterizing instructions stating how to winterize the *RDP SOFA* when the *pool* is in a location known to require winterizing.

3.4.5 Service instructions. Cover/grate manufacturers shall provide service instructions, including a list of the required tools and the following:

3.4.5.1 A statement that the cover/grate, including fasteners, shall be observed for damage or tampering each *operational day*.

3.4.5.2 A statement that missing, broken, or cracked *cover/grates* shall be replaced before *bathers* are allowed to use the *pool*.

3.4.5.3 A statement that loose *cover/grates* and associated *components* shall be reattached before *bathers* are allowed to use the *pool*.

3.4.5.4 A statement indicating that SOFA *components* and fastener receptacles shall be clean and free of debris or obstructions during installation of *cover/grate* and fasteners.

3.4.5.5 Instructions shall indicate the proper alignment and assembly order of all SOFA *components*.

3.4.5.6 The statement "DO NOT USE POWER TOOLS TO INSTALL FASTENERS" and to start installation of screws by hand to ensure proper thread engagement and to prevent cross threading.

3.4.5.7 A statement indicating the requirement to hand-check *cover/grate* for snugness to the *sump/frame* after installation.

3.4.5.8 A statement indicating how to evaluate the integrity of SOFA *components*, including how to address color change, brittle components with chunks or pieces broken off, stripped screw holes, cracks, and if a *mud ring* is used, cracked or broken *interior finish of the pool* holding the *mud ring* in place.

3.4.5.9 A statement indicating that when any SOFA *component* is held in place by the *interior finish of the pool*, that surface shall be free of deterioration and voids.

3.4.5.10 Instructions for reinstallation or repair of damaged fasteners and corresponding receptacles either inserted, tapped, or self-threaded. Instructions shall include a description of the condition(s) indicating when it is necessary to remove the SOFA from service. Reinstallation and repair examples may include:

- Remove and replace SOFA *component*.
- Provide additional holes to receive fasteners in a different orientation.
- Instructions for drilling new holes, including conditions when and where it is appropriate, and how to confirm proper installation in conformance with the requirements of this standard.

3.5 Flow Hazard Related Requirements and Limitations

Sumps play an important role in addressing suction safety. Flowing water turbulence can twist and tangle

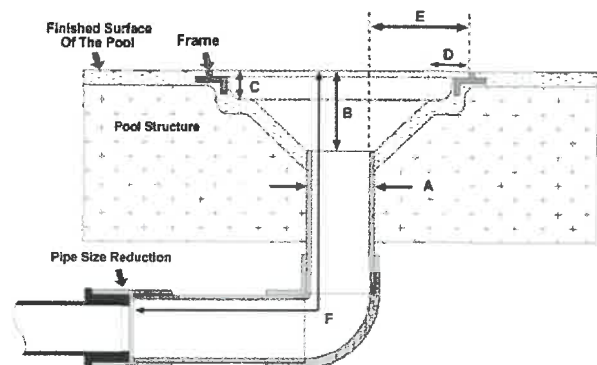
hair in, under, and around the *cover/grate* and other SOFA *components*, including the *suction piping* itself. For this reason, the "Figure 2: Field-Built Sump" in the previous version of this standard has been revised and supplemented by Figures 3, 5 and 6.

Additionally, the standard now requires each SOFA *configuration* to be tested whenever a *suction pipe(s)* opening is positioned within reach of the hair used for certification testing. For SOFA configurations with all suction pipe openings positioned outside the reach of the test hair, the *cover/grate* only needs to be tested over a single, representative SOFA *sump* configuration with the highest flow potential.

3.5.1 Sump specifications. *Cover/grates* shall only be installed on *sump* configurations authorized by the *manufacturer's* installation instructions resulting in a unique SOFA configuration, with a specific certified flow rating. *Manufactured or field-built sumps* shall be permitted. Refer to Figures 2, 3, 5 and 6.

3.5.1.1 The *manufacturer's product specifications* and installation instructions, as appropriate, shall define each SOFA configuration and include the *flow path zone*, minimum suction pipe(s) opening depth below/behind the *finish surface of the pool*, pipe size, pipe orientation, and minimum suction pipe opening length before any reduction in pipe size. Refer to Figure 5 and 6.

Figure 5: Sump specifications

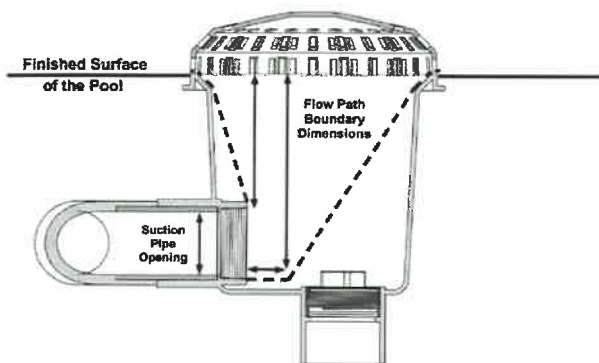


- A. Specified PVC Pipe Size
- B. Minimum Sump Depth
- C. Minimum Ledge Depth
- D. Maximum Ledge Width
- E. Minimum Pipe Offset
- F. Minimum Length Before Reduction

3.5.1.2 The *manufacturer* shall specify the minimum flow path zone dimensions equal to or exceed the dimensions of the *sump* used during the SOFA specific test as described in section 5, Hair Entrapment Testing. The boundaries shall encompass the volume between *cover/grate* apertures and suction pipe(s) opening

defined by the SOFA-specific flow path of 1.3.7.1. Refer to Figures 3, 4, 5 and 6.

Figure 6: Flow path zone dimensions



3.6 Installation Requirements and Limitations

All applicable information and safety considerations provided in this section shall be included in the *manufacturer's product specifications* and/or installation instructions, as appropriate, to assist *pool designers*, installers, and owners in the proper selection, installation, operation, and maintenance of products certified to this standard.

3.6.1 Installation. All SOFAs shall be installed in accordance with the *manufacturer's installation instructions*, or for RDP SOFAs, in accordance with the *registered design professional's engineering plans*.

3.6.2 Field modifications. No modification shall be made to a SOFA structure or flow path unless the new configuration has been certified to the original SOFA.

3.6.3 Individual product flow ratings. This standard provides performance-based flow ratings for all SOFA(s). These flow limits are designed to prevent suction entrapment.

3.6.3.1 Compliance with this standard requires that these SOFA-configuration specific flow ratings NOT be exceeded at any time the pool is open to bathers.

3.6.3.2 Compliance with this standard requires selecting and installing a SOFA, or combination of SOFAs, such that the resulting *individual suction system flow rating* is greater than the pumping system's *maximum system flow rate*.

It is also important to state that skimmers, gutters, and other overflow systems may not always be operational and could divert all the pump(s) flow through the SOFA suction system, therefore the flow

capacity of these systems shall not be included when evaluating an *individual suction system flow rating*.

3.6.4 Installed suction system flow ratings:

3.6.4.1 The flow rating for pools with multiple, blockable SOFAs piped together in one body of water without isolation valves shall be determined by combining the flow rating of all SOFAs, minus the flow rating of one. If the flow ratings of all SOFAs are not equal, subtract the flow rating of the SOFA with the highest flow rating.

3.6.4.2 The flow rating for existing pools with a single, blockable SOFA is the flow rating of the SOFA, when also installed in conjunction with an *additional device or system designed to prevent suction entrapment*, where the additional device or systems is of a type listed in section 9.4. A single, blockable SOFA in a system that does not also include one of the additional devices or systems shall result in a flow rating of zero.

3.6.4.3 The flow rating for pools with single, or multiple unblockable SOFAs shall be determined by combining the flow rating of all SOFAs piped together in one body of water.

3.6.5 Protrusion. Cover/grates, when installed, shall not protrude more than 2 in. (51 mm) from the *finished surface of the pool* in which the SOFA is installed.

3.6.6 Pool surface types. *Manufacturer's product specifications* and installation instructions shall state the type of pool surfaces for which the SOFA is intended, e.g. concrete, vinyl lined, or composite pools.

3.6.7 Location limits. SOFAs shall not be located on seats or the backrests for seats.

3.7 SOFA Specific Specifications and Instructions

3.7.1 Cover/grates marked "Blockable" - for use in new pools. Blockable SOFAs shall be installed in a *multiple SOFA system only*.

3.7.1.1 When used in multiple-outlet systems, cover/grates marked *blockable* shall be arranged such that the two outermost sumps/frames shall have a minimum separation of three feet, measured center-to-center. If they are to be installed closer than three feet center-to-center, they shall be located on two different planes, i.e., one SOFA shall be located on the pool floor, and one shall be located on a vertical wall, or one SOFA shall be located on each of two separate walls.

3.7.2 Cover/grates marked *blockable* – for use in existing pools. Cover/grates marked *blockable* installed in existing pools with single SOFA systems shall also be installed in conjunction with an additional device or system designed to prevent suction entrapment, where the additional device or systems is of a type listed in section 9.4.

3.7.3 Unblockable SOFAs. Cover/grates marked *unblockable* are permitted for use in multiple SOFA systems, and single SOFA systems when authorized by the cover/grate manufacturer.

3.8 Self-Contained Spa SOFAs

3.8.1 Specifications and instructions. The cover/grate manufacturer shall provide product specifications and installation instructions stating:

3.8.1.1 Self-contained spa SOFAs shall be used only in self-contained factory-manufactured spas tested and certified in accordance with ANSI/UL 1563.

3.8.1.2 Self-contained spa SOFAs shall be installed into the body or shell of the spa at the time that the spa is manufactured.

3.8.1.3 At least two self-contained spa SOFAs shall be piped so that water is drawn through them simultaneously through a common line to the related pump(s). The use of valves or fittings capable of isolating one self-contained spa SOFA from any other on the common line to the related pump is prohibited.

3.8.1.4 Self-contained spa SOFAs shall be connected to a tee leading to the pump utilizing only the SOFA manufacturer's specified size(s) of PVC hose or pipe.

3.8.1.5 The maximum hose length difference between any self-contained spa SOFA and the tee leading to the pump shall not exceed 13 feet (3.96 m).

3.8.1.6 The suction pipe size between self-contained spa SOFAs shall be specified for each SOFA model.

3.9 Requirements for RDP SOFAs

3.9.1 Body entrapment flow rating methods. RDP SOFAs shall be rated by the body entrapment test of section 6, or the following formulas, which shall yield the maximum allowable flow, Q , through the cover/grate. All calculations involve the open area of the cover/grate only.

3.9.1.1 Entrapping Force Criterion for Q

Equation 1

$$Q = a_R \sqrt{\frac{F}{C \frac{\rho}{2} a_B}}$$

where:

a_B = largest area of the cover/grate flow path openings in ft^2 , that can be shadowed by the body blocking element (BBE).

a_R = area of the cover/grate flow path openings, in ft^2 , that remains unblocked

C = flow coefficient based on the design of the flow path openings in the cover/grate. It shall be based upon the actual loss coefficient of the cover/grate or representative sample from laboratory test data, unless otherwise demonstrated by calculation or test.

F = 120 lbf (534 N)

Q = limiting flow rate in ft^3/s based on the allowable entrapping force

ρ = density of water.

3.9.1.2 The maximum flow rating of the SOFA in cubic feet per second (ft^3/s) is Q .

3.9.1.3 The maximum flow rating of the cover/grate in gallons per minute (gal/min) is Q multiplied by 7.48 gal/ft^3 multiplied by 60 s/min .

3.9.2 Water velocity limit through cover/grate. RDP SOFAs are limited to a flow velocity of 1.5 ft/sec (0.46 m/s) through any remaining cover/grate aperture not shadowed by the body blocking element of Figure 17, unless rated at a lower flow rate by a registered design professional.

3.9.3 Control of flow through cover/grate. RDP SOFAs shall have a sump below or behind the cover/grate of a design provided by a registered design professional documented to control flow through the open area of the cover/grate such that the design does not exceed the water velocity limits of paragraph 3.9.2. Refer to Figures 2, 3, 5 and 6.

3.9.4 Certification report. The design of RDP SOFAs shall be specified by a registered design professional in plans acceptable to the authority having jurisdiction (AHJ) for the specific pool and a written report addressed to the pool owner. The plans and report shall fully address the considerations used during SOFA certification and shall address all applicable requirements of sections/paragraphs 1.2.5, 1.3, 3.1, 3.3 through 3.6, 3.6.4.3, 4.2 through 4.8, 4.10, 7, 8.5, 9.2, 9.3 through 9.7 as well as features particular to the specific site.

9.3.1 Identification of the product covered by this certificate: Describe the SOFA covered by this certification in enough detail to match the certificate to each product it covers and no others.

9.3.2 Citation to VGBA to which this product is being certified: The certificate must identify the Virginia Graeme Baker Pool and Spa Safety Act, the consumer product safety rule that is applicable to SOFAs.

9.3.3 Identification of the U.S. importer or domestic manufacturer certifying compliance of the product: Provide the name, full mailing address, and telephone number of the importer or U.S. domestic manufacturer certifying the product.

9.3.4 Contact information for the individual maintaining records of test results: Provide the name, full mailing address, e-mail address, and telephone number of the person maintaining test records in support of the certification.

9.3.5 Date and place where this product was manufactured: For the date(s) when the product was manufactured, provide at least the month and year. For the place of manufacture provide at least the city (or administrative region) and country where the product was manufactured or finally assembled. If the same manufacturer operates more than one location in the same city, provide the street address of the factory.

9.3.6 Provide the date(s) and place when the product was tested for compliance with this standard: Provide the location(s) of the testing and the date(s) of the test(s) or test report(s) on which certification is being based.

9.3.7 Identification of any third-party laboratory on whose testing the certificate depends.

9.4 VGBA Devices and Systems Designed to Prevent Suction Entrapment

9.4.1 Blockable SOFAs. For cover/grates marked *blockable* the cover/grate manufacturer's installation instructions shall include a statement that the SOFAs be installed **ONLY** in *multiple SOFA systems*, or the manufacturer's instructions shall state that the installer shall include one or more of the following devices or systems designed to prevent suction entrapment:

9.4.1.1 SAFETY VACUUM RELEASE SYSTEM- A system that ceases operation of the pump, reverses the circulation flow, or otherwise releases the vacuum in a circulation system when a blockage is detected, that has been tested by an independent third party and found to conform to ASME/ANSI standard A112.19.17 or ASTM standard F2387.

9.4.1.2 SUCTION-LIMITING VENT SYSTEM- A circulation system that incorporates a tamper-resistant atmospheric vent that is hydraulically located between the suction outlet and the circulation pump, which allows air to enter the circulation system and release the vacuum within the system when the suction outlet is blocked and the circulation pump is operating.

9.4.1.3 GRAVITY DRAINAGE SYSTEM- A powered circulation system, which utilizes a collector tank hydraulically located between the pump and the suction outlet that is filled by the gravitationally induced flow of water from the suction outlet, and is vented to the atmosphere by a tamper-resistant opening.

9.4.1.4 AUTOMATIC PUMP SHUT-OFF SYSTEM- A system that is designed to sense blockage of the suction fitting and then turn-off the power to the pump, and subsequently release the vacuum in the circulation system when a blockage is detected.

9.4.1.5 DRAIN DISABLEMENT- A device or system that permanently stops the flow of water from a SOFA.

9.4.1.6 OTHER SYSTEMS- Any other system determined by the Consumer Product Safety Commission to be equally effective as, or better than, the systems described in paragraphs 9.4.1.1 through 9.4.1.5 above, at preventing or eliminating the risk of injury or death associated with pool drainage systems.

9.5 User Maintenance Instructions

The *manufacturers* and *registered design professionals* responsible for any product certified to this standard shall provide user maintenance instructions that shall include all applicable information in section 3.4.

9.6 Important Safety Instructions

The important safety instructions shall be separated in format from the other instructions and shall appear before the user-maintenance instructions specified in section 3.4. The important safety instructions shall be in the exact words specified or in equally definitive terms. No substitution shall be made for the words "WARNING" or "DANGER." The first and last items specified in the important safety instructions shall be first and last, respectively. Other precautionary items considered appropriate by the manufacturer may be included. The letter size in the important safety instructions shall be as follows:

- Uppercase letters shall be no less than 1/12 inch (2.1 mm) high;