



*The Association of  
Pool & Spa Professionals™*



**American National Standard  
for Suction Entrapment Avoidance  
in Swimming Pools, Wading Pools, Spas,  
Hot Tubs, and Catch Basins**



**ANSI  
APSP-7 2006**

**American National Standard**

**For Suction Entrapment Avoidance in  
Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins**

**Sponsor**

**The Association of Pool and Spa Professionals**

Approved September 11, 2006

**American National Standards Institute, Inc.**

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**The Association of Pool and Spa Professionals, 2111 Eisenhower Avenue, Alexandria, VA 22314**

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## Foreword

(This Foreword is not part of American National Standard ANSI/ APSP-7 2006)

The ANSI/APSP-7 2006, *Standard for suction entrapment avoidance in swimming pools, wading pools, spas, hot tubs, and catch basins*, was approved by ANSI September 11, 2006, as a new standard.

The objective of this voluntary standard is to provide recommended minimum guidelines for suction entrapment avoidance in the design, equipment, operation, and installation of new and existing swimming pools, wading pools, spas, hot tubs, and catch basins for builders, installers, pool operators, and service professionals. It is intended to meet the needs for incorporation into national or regional building codes, and also for adoption by state and/or local municipalities as a local code or ordinance. It is understood that for the sake of applicability and enforceability, the style and format of the standard may need adjustment to meet code or ordinance style of the jurisdiction adopting this document.

The design recommendations and construction practices in this standard are based upon sound engineering principles, research, and field experience that, when applied properly, contribute to the delivery and installation of a safe product.

The words “safe” and “safety” are not absolutes. While the goals of this standard are to design and construct a safe, enjoyable product, it is recognized that risk factors cannot, as a practical matter, be reduced to zero in any human activity. This standard does not replace the need for good judgment and personal responsibility. In permitting use of the pool or spa by others, owners must consider the skill, attitude, training, and experience of the expected user.

As with any product, the specific recommendations for installation and use provided by the manufacturer should be carefully observed.

This standard was prepared by the APSP-7 Suction Entrapment Avoidance Standard Writing Committee of the Association of Pool and Spa Professionals (APSP) in accordance with American National Standards Institute (ANSI) *Essential Requirements: Due process requirements for American National Standards*.

Consensus approval was achieved by a ballot of the balanced ANSI Consensus Voting Body below and through an ANSI Public Review process. The ANSI Public Review provided an opportunity for additional input from industry, academia, regulatory agencies, safety experts, state code and health officials, and the public at large.

Suggestions for improvement of this standard should be sent to the Association of Pool and Spa Professionals, 2111 Eisenhower Avenue, Alexandria, VA 22314.

Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

### **ANSI Consensus Voting Body**

Consensus approval in accordance with ANSI procedures was achieved by ballot of the following ANSI consensus voting body. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

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## Introduction

Suction entrapment has seen increased attention in the media and in legislative actions. Annual reported entrapment events to The Consumer Product Safety Commission (CPSC) are shown to be declining despite the increase of millions of residential and commercial pools.

Because the consumer and regulatory agencies may be unaware of the hazards associated with suction outlets in swimming pools and spas, APSP has pursued, since the early 1980s, the development of ANSI voluntary consensus standards for the United States that include new warnings and better-defined performance criteria for suction outlet entrapment as well as construction methods that decrease the chance of suction entrapment. In addition, the CPSC released its 1996 and 2005 "Guideline for Entrapment Hazards: Making Pools and Spas Safer." APSP references other standards and government guidelines on suction entrapment avoidance.

Based upon a review of the reported cases of injury or death, solicitation of the industry, and through open forums on entrapment issues, 5 potential categories of hazards have been identified that are associated with suction outlets in a circulation system.

- Hair entrapment – Hair becomes knotted or snagged in an outlet cover.
- Limb entrapment – A limb sucked or inserted into an opening of a circulation outlet with a broken or missing cover in the pool resulting in a mechanical bind or swelling.
- Body suction entrapment – Suction applied to a large portion of the body or limbs resulting in an entrapment.

- Evisceration/disembowelment – Suction applied directly to the intestines through an unprotected sump or suction outlet with a missing or broken cover.
- Mechanical entrapment – Potential for jewelry, swimsuit, hair decorations, finger, toe or knuckle to be caught in an opening of an outlet or cover.

Complication arises from conflicting solutions for these different forms of entrapment. For example, the suction outlet cover that prevents limb entrapment can cause hair entrapment. This has become confusing for local building officials and even state regulatory agencies, because specific safety devices and/or piping configurations are often perceived as complete entrapment solutions when in fact, they may address one or more, but not all, of the hazards. These devices and/or piping systems are a critical part of a total solution, but future legislation, codes and standards must not be centered on a particular device or system. It must be noted that there is one overriding conclusion that is inescapable; there is no "back up" for a missing suction outlet cover. If any suction outlet cover is found to be damaged or missing, the pool/spa must be closed to bathers immediately.

Legislation, codes, and standards should be written to allow all valid engineering solutions based on performance criteria.

This standard was written to move toward performance-criteria for each identified hazard and allow state authorities to define clear codes for use by designers, builders, and inspectors.

## ANSI/APSP-7 2006

# Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins

## 1 Scope

**1.1 General.** This standard covers design and performance criteria for circulation systems including components, devices, and related technology installed to protect against entrapment hazards in residential and public swimming pools, wading pools, spas, hot tubs, and catch basins, hereinafter referred to as "pools and spas."

This standard applies to new and, when retrofitting, existing installations. (See Appendix B.)

**1.2 Alternative methods.** The provisions of this standard are not intended to prevent the use of any alternative material, system, or method of construction, provided any such alternative meets the intent and requirements of this standard and is approved by the authority having jurisdiction.

**1.3 Exception.** Commercial water parks and their associated suction systems are outside the scope of the standard.

## 2 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this standard.

ANSI/ASME A112.19.8 1987 (reaffirmed 1996), *Suction fittings for swimming and wading pools, spas, hot tubs and whirlpool bathtub appliances.*<sup>1</sup>

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<sup>1</sup> American Society of Mechanical Engineers (ASME), 3 Park Avenue, 20<sup>th</sup> Floor, New York, NY 10016, (212) 591-8562, [www.asme.org](http://www.asme.org)

ANSI/ASME A112.19.17-2002, *Manufactured safety vacuum release systems (SVRS) for residential and commercial swimming pool, spa, hot tub and wading pool suction systems.*<sup>2</sup>

ASTM F 2387-04, *Standard specification for manufactured safety vacuum release systems, swimming pools, spas and hot tubs.*<sup>3</sup>

IAPMO SPS-4 2000, *Special use suction fittings for swimming pools, spas and hot tubs (for suction side automatic swimming pool cleaners).*<sup>4</sup>

NFPA 70 – 2005, *National electrical code*, Article 680, Swimming pools, fountains, and similar installations.<sup>5</sup>

## 3 Definitions

**3.1 alternative method:** A substitute way of achieving the same goal or purpose.

**3.2 anti-entrapment cover:** See LISTED SUCTION OUTLET COVER/GRATE.

**3.3 anti-vortex cover:** An outlet cover designed to prevent air entrainment from the surface of the water. This term is no longer used to describe LISTED SUCTION OUTLET COVER/GRATE.

**3.4 approved safety outlet cover:** See LISTED SUCTION OUTLET COVER/GRATE.

**3.5 branch piping:** 1. multiple suction outlet covers/grates: all pipe and fittings, including the tee, located between covers/grates and the single suction pipe feeding the pump or pumps. (See figure 1 and figures 4 – 10.) 2. sumps in series: all pipe and fittings between the first sump and a

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<sup>2</sup> ASME, previously listed

<sup>3</sup> ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, (610)832-9500, [www.astm.org](http://www.astm.org)

<sup>4</sup> International Association of Plumbing and Mechanical Officials (IAPMO), 5001 E. Philadelphia St., Ontario, CA 91761, (909) 472-4100, [www.iapmo.org](http://www.iapmo.org)

<sup>5</sup> National Fire Protection Association (NFPA) 1 Batterymarch Park, Quincy, MA 02169-7471, (617) 770-3000, [www.nfpa.org](http://www.nfpa.org)