ANSI/APSP/ICC-11 2019

American National Standard for

Water Quality in Public Pools and Spas

Approved November 7, 2018

APSP
The Association of Pool & Spa Professionals®

ICC INTERNATIONAL CODE COUNCIL®

ANSI/APSP/ICC-11 2019

American National Standard for Water Quality in Public Pools and Spas

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American National Standards Institute (ANSI)

This standard is published in partnership with the International Code Council (ICC). ICC develops and publishes the *International Building Code (IBC)* and *International Residential Code (IRC),* which are adopted as the basis for the building codes used in most states and jurisdictions within the United States. Additionally, APSP and ICC have collaborated to develop the first comprehensive model swimming pool and spa code, known as the *International Swimming Pool and Spa Code (ISPSC)*. This landmark document incorporates and references material from ANSI/APSP standards and ICC's model codes, to create a stand-alone code that is consistent with codes and standards from both organizations.

These codes and standards are the result of a joint effort between ICC and APSP as a service to both the swimming pool and spa community, and building code professionals. It is the hope of both organizations that they will lead to enhanced safety for pool and spa users around the world.

American National Standard

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Foreword

This Foreword is not a part of the American National Standard ANSI/APSP/ICC-11 2019 It is included for information only.

The ANSI/APSP/ICC-11 2019, *Standard for Water Quality in Public Pools and Spas* was approved by ANSI on November 7, 2018, as a revision of ANSI/APSP-11 2009, *Standard for Water Quality in Public Pools and Spas*. It was originally approved by the American National Standards Institute (ANSI) as a new standard on June 15, 2009.

The objective of this voluntary standard is to provide recommended minimum guidelines for the specifications for water quality parameters in public pools and spas. It is intended to meet the need for incorporation into national or regional health 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 the code or ordinance style of the jurisdiction adopting this document.

This standard was drafted by the Recreational Water Quality Committee (RWQC) of The Association of Pool and Spa Professionals (APSP) in accordance with ANSI's *Essential Requirements: Due Process Requirements for American National Standards (ANS)*. Consensus approval was achieved by a ballot of the ANSI Standards Consensus Committee (SCC).

The SCC that approved this standard was balanced to ensure that individuals from competent and concerned interests have had an opportunity to participate. The proposed standard was made available for public review and comment, which provides an opportunity for additional input from industry, academia, regulatory agencies, and the public at large.

Consensus approval was achieved by a ballot of the American National Standards Institute (ANSI) Consensus Voting Body, the APSP Standards Consensus Committee (SCC), 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.

Organizations Represented

Consensus approval in accordance with ANSI procedures was achieved by ballot of the following APSP Standards Consensus Committee (SCC). Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

Producers

All American Custom Pools & Spas, Inc.. . . . . John C. Romano, CSP, CBP
Carefree Pools, Inc.. . . . . John Bently, CSP, CBP
Idaho Aquatice Services, LLC / Idaho Pool Remodeling . . . Scott Heusser, CPO, CPOI, CPI, CAEA
Hayward Industries, Inc. . . . . John O'Hare
Team Horner Group. . . . . Bill Kent, Ph.D.
Latham Pool Products, Inc. . . . . Michael Tinkler
Master Spas, Inc. . . . . Nathan Coelho
Paragon Pools . . . . . Joseph M. Vassallo
S.R. Smith, LLC. . . . . Bill Svendsen
Van Kirk & Sons, Inc. . . . . Don Cesarone, Jr.

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American Red Cross . . . . . Connie Harvey
Chesapeake Aquatic Consultants, LLC . . . . . Frank H. Goldstein, CSP, CBP
United Independent School District, TX . . . . . Louis Sam Fruia, M.Ed, AFO, CPO, CPI
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MasterCorp, Inc.
(American Hotel & Lodging Association) . . . . . Tony Mendez
Walt Disney's Water Parks and Miniature Golf . . . . . Michael Beatty
World Waterpark Association . . . . . Rick Root
Water Technology Inc. . . . . Chuck Neuman

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Cecil County Government (MD) . . . . . William V. Funk, Jr.
City of Martinsville, VA. . . . . Kris Bridges, Chair
CSG Consultants . . . . . Mike Teemant
Illinois Department of Health. . . . . Justin DeWitt, P.E., LEEDAP
International Code Council (ICC) . . . . . Lee Clifton
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Orange County Florida. . . . . Joseph R. Crum, CBO
Texas Department of State and Health Services . . . . . Katie O. Moore, R.S., CPO
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Washington State Dept. of Health . . . . . Jun Naotsuka
U.S. Consumer Product Safety Commission . . . . . Perry Sharpless*
*non-voting

In accordance with American National Standards Institute (ANSI) procedures, this document will be reviewed periodically. The Association of Pool & Spa Professionals welcomes your comments and suggestions, and continues to review all APSP standards, which include:

ANSI/APSP/ICC-1 2014 Standard for Public Swimming Pools

APSP-2 1999 Standard for Public Spas

ANSI/APSP/ICC-3 2014 Standard for Permanently Installed Residential Spas and Swim Spas

ANSI/APSP/ICC-4 2012 Standard for Aboveground/Onground Residential Swimming Pools Includes Addenda A Approved April 4, 2013

ANSI/APSP/ICC-5 2011 Standard for Residential Inground Swimming Pools Includes Addenda A Approved June 28, 2012

ANSI/APSP/ICC-6 2013 Standard for Residential Portable Spas and Swim Spas

ANSI/APSP/ICC-7 2013 Standard for Suction Entrapment Avoidance In Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins

ANSI/APSP/ICC-8 2005 (R2013) Standard Model Barrier Code for Residential Swimming Pools, Spas, and Hot Tubs

APSP-9 2005 Standard for Aquatic Recreation Facilities

ANSI/APSP/ICC-11 2019 Standard for Water Quality in Pub-lic Pools and Spas

ANSI/SPSP/ICC/NPC-12 2016 Standard for the Plastering of Swimming Pools and Spas

ANSI/APSP/ICC-13 2017 Standard for Water Conservation Efficiency in Residential and Public Pools, Spas, Portable Spas and Swim Spas

ANSI/APSP/ICC-14 2014 Standard for Portable Electric Spa Energy Efficiency

ANSI/APSP/ICC-15 2011 Standard for Residential Swimming Pool and Spa Energy Efficiency Includes Addenda A Approved January 9, 2013

ANSI/APSP/ICC-16 2017 Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas, and Hot Tubs

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Introduction

This standard is a revision of the published ANSI/APSP-11 2009 standard available for pool and spa water quality and chemistry. It was developed in response to the need expressed by public health officials for a national standard for water quality in public pools and spas. A 2004 survey of more than 5000 public health officials nationwide provided an overwhelming endorsement for the development of a national water quality standard.

The Recreational Water Quality Committee (RWQC) of The Association of Pool and Spa Professionals (APSP) actively partnered with public health officials during the development of this draft standard by visiting with public health officials asking for feedback on the standard. Public health and code officials also played an important role in the development of consensus necessary for this standard to be published as an American National Standard (ANS).

Since APSP has been accredited by the American National Standards Institute (ANSI), its standards are developed according to ANSI's published requirements. Since 1983, APSP has published nine ANSI standards for the pool and spa industry. When this standard is published as an American National Standard, it will enable state and local health and code officials to adopt a uniform, national code governing the maintenance of swimming pools, spas, and other treated recreational water venues.

The ANSI process requires consensus approval through a uniform national public review and balanced-interest voting process. It affords a rigorous third-party process for standards development, providing due process, openness, and consensus agreement among a diversified group of stakeholders. These include public health and code officials, architects, regulatory agencies, academicians, representatives of safety organizations, consultants, subject matter experts, as well as pool and spa professionals. The balance of interests represented by voters is another key component of ANSI's requirements. During the ANSI process all objections are considered with an effort toward resolution. On account of the universal scope and depth of this unique standard, APSP encourages state and local public health and code officials to adopt it into their state laws and local codes.

The standards developed by APSP are the benchmark for the pool and spa industry because they are based on science, verifiable data, and best practices. The ANSI/APSP standards are voluntary minimum standards. Their goal is to provide for all viable technologies. APSP standards promote aquatic safety, provide consistency in design, provide construction and installation requirements for the nation, and provide the basis for adoption into law by state and local jurisdictions.

During development of the standard, the RWQC decided that in addition to writing a uniform national consensus standard, it wanted to provide readers with explanatory information about the values for the requirements listed in the body of the standard. In developing the Appendix A material, the committee questioned many standard practices in the industry and sought to provide scientific justification for the values in the body of the standard.

Many water quality parameters that do not have a direct impact on public health, but that can severely influence the operation of the pool, such as the effect of low calcium levels on corrosion, were included in the standard. This standard is primarily health and safety related operating within the allowed ranges of all the water quality parameters. Further information on the protection of pool surfaces may be found in Appendix A. For purposes of public health, the requirements of the standard generally reference a minimum or a maximum value, or both. It is important to remember that there is a range of values that are acceptable for pool and spa operation. Appendix A should be consulted for recommendations on the ideal ranges of operation in those instances when the standard lists minimums/maximums. In order to distinguish the operational factors from the factors that could represent an immediate danger to public health, the section on pool closure was added. In this special section each of the highlighted factors– clarity, sanitizer level, pH, and temperature –were included because of their direct impact on public health.

Contents

Standard for Water Quality in Public Pools and Spas

1 Scope

1.1 Public swimming pools and spas. This standard covers public swimming pools and spas to be used for bathing and operated by an owner, licensee, or concessionaire, regardless of whether a fee is charged for use.

1.1.1 Public swimming pools covered by this standard. Public swimming pools covered by this standard include all the classes in section 2 below.

1.1.2 Pools designed for interaction with marine life have special requirements and are not covered by this standard.

1.2 Variation in methods. This standard provides specifications for water quality parameters, but does not specify the technologies needed to achieve these values.

2 Definitions

Acid: A liquid or dry chemical used to lower the pH and/or alkalinity of pool or spa water.

Acid Demand: A measure of the amount of acid required to lower the pH to a desired level.

Acid Demand Test: Acid of known strength is added in increments to a measured water sample to determine the amount of acid necessary to make an adjustment in a pool to achieve the desired pH.

Acidic: Having a pH below 7.0. Opposite of basic.

Acid Wash: A procedure using an acid solution to clean an interior surface of a pool with subsequent neutralization of the acid.

AF: See *Alkalinity Factor*.

Aggressive Water: Water that is corrosive because it is low in pH, and/or calcium hardness, and/or alkalinity. See *LSI*.

Algae: Microscopic plant-like organisms that contain chlorophyll.

Algicide: Any chemical or material that kills algae. Also referred to as algaecide.

Algistatic: Able to inhibit the growth of algae.

Alkali: A term applied to bases, usually carbonates, bicarbonates, and hydroxides, that raise the pH and alkalinity when added to water.

Alkaline: Having a pH above 7.0.

Alkalinity: See *Total Alkalinity*.

Alkalinity Factor (AF): A number used to calculate the saturation index of water based on carbonate/bicarbonate alkalinity.

Alum (Aluminum Sulfate) ($Al_2(SO_4)_3$): A compound used to cause suspended solids in the water to form filterable masses (flocculate).

Ammonia (NH_3): A chemical compound of hydrogen and nitrogen that combines with free chlorine in pools to form chloramines or combined chlorine. It also combines with free bromine to form bromamines.

Amphoteric: Having the ability to serve as either an acid or a base. Also referred to as amphiprotic.

Aquatic Venue: A constructed structure or modified natural structure containing water and intended for recreational or therapeutic use. Exposure to water in these structures may occur by contact, ingestion, or aerosolization. Examples include swimming pools, wave pools, lazy rivers, surf pools, spas, hot tubs, therapy pools, spray pads, waterpark pools, and other interactive water venues.

Available Chlorine: A rating of a chemical's total chlorine content based on a comparison to elemental (gaseous) chlorine having 100% available chlorine.

Back Pressure: Resistance to flow, normally expressed in pounds per square inch (kilograms per square centimeter).

Backwash: The process of cleansing the filter medium and/or elements by the reverse flow of water through the filter.

Backwash Cycle: The time required to backwash the filter medium and/or elements and to remove debris in the filter vessel.

Bacteria: Single-celled microorganisms of various forms, some of which cause infections or disease. See *Recreational Water Illness*.

Bactericide: Any chemical or material that kills bacteria.

Balance: In pools and spas, a term used to refer to a condition of the water that is neither scaling nor corrosive. See *Saturation Index*.

Base: A chemical used to raise pH and/or total alkalinity of pool or spa water.