RECREATIONAL WATER PRODUCTS

JULY 2017 BULLETIN

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GLOBAL WATER DIVISION

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ABOUT NSF INTERNATIONAL

NSF International (nsf.org) is a global independent organization that writes standards, and tests and certifies products for the water, food, health sciences and consumer goods industries to minimize adverse health effects and protect the environment. NSF tests and certifies pool and spa components (such as pumps, drain covers, filters, chemicals, etc.) and has developed an American National Standard that specifies pool equipment requirements.

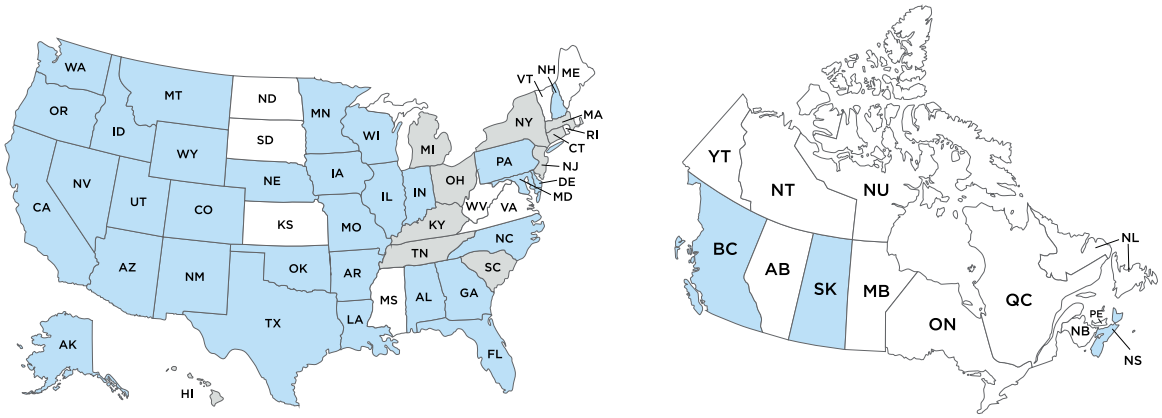
NSF/ANSI 50: EQUIPMENT FOR POOLS, SPAS, HOT TUBS AND OTHER RECREATIONAL WATER FACILITIES

This standard specifies the testing requirements for virtually every product used at a recreational water facility. NSF International developed NSF/ANSI 50 through a consensus process with balanced input from the regulatory, industry, academic and consumer communities. The NSF/ANSI 50 standard continues to evolve to incorporate the latest product and material test methods and regulations.

SPECIFICATION OF NSF/ANSI 50: WHERE IT IS REFERENCED

NSF/ANSI 50 is referenced by the majority of U.S. states and some Canadian provinces/territories. The standard is also referenced in three of the major pool codes: the Model Aquatic Health Code (MAHC), the International Swimming Pool & Spa Code (ISPSC) and the Uniform Swimming Pool, Spa and Hot Tube Code (USPSHTC).

While NSF/ANSI 50 is referenced in most state pool codes, local requirements in city or county pool codes may also apply. Always check with your local authority.



COMMON NSF CERTIFICATION MARKS
SEEN IN THE RECREATIONAL WATER INDUSTRY

There are different types of NSF certification marks on products based on the standard they were tested to, as well as the type of product. An NSF certification mark can only be used on products that successfully meet all standard and policy requirements after a full technical review.

While there are different types of NSF certification marks for products certified to NSF/ANSI 50, there are only a few permissible color options: a white, blue or black circle (as illustrated below). Examples of acceptable NSF certification marks do not appear in the standard because these marks have registered trademarks that belong to NSF.

As an end user, it is important that you can identify acceptable certification marks and be able to easily identify what that mark represents (i.e. what exactly the product has been tested for).

Did you know?

Only companies that obtain their certification through NSF International are permitted to use the blue NSF mark.

NSF/ANSI 50 CIRCLE CERTIFICATION MARK

NSF® Certified to NSF/ANSI Standard 50

NSF® Certified to NSF/ANSI Standard 50

NSF® Certified to NSF/ANSI Standard 50

Products bearing this mark have been tested and certified to applicable product sections in NSF/ANSI 50 by NSF International.

Different colors are used based on the preference of the manufacturer. Sometimes printing color schemes do not accommodate the NSF blue mark, so white and black are offered as alternatives. All colors of this certification mark have equal meaning.

NSF/ANSI 50 TEXT CERTIFICATION MARK

For products that have size or configuration constraints, the text version of the NSF/ANSI 50 certification mark is sometimes used, with or without a box around it. This version of the certification mark has the same meaning as the circular mark – the product has been certified by NSF International to NSF/ANSI 50.

NSF® - 50 NSF® - 50

Blue or black text can be used based on the manufacturer's preference.

DUAL CERTIFICATION MARKS

NSF - 50
<Relevant Standard>

NSF - 50
<Relevant Standard>

NSF - 50
<Relevant Standard>

Some products may hold a certification to NSF/ANSI 50 as well as to other recreational water industry standards. Products bearing multiple certifications will bear the "NSF-50" certification mark, plus the list of additional standards in the box below the mark.

NSF - 50
ASTM F2208

Example: A product that has obtained certification by NSF International to NSF/ANSI 50 and ASTM F2208 will bear this dual mark.

NSF/ANSI 50 COMPONENT CERTIFICATION MARK

NSF also offers a component certification to manufacturers that produce components of full systems that are used in the treatment or operation of a recreational water facility (e.g. a pool filtration device). The use of the NSF component mark is authorized after review by NSF staff. Upon approval, the components of functional devices are required to bear either of the marks below (Pantone 294 blue or black is acceptable) in order to prevent misinterpretation if the entire system being certified.

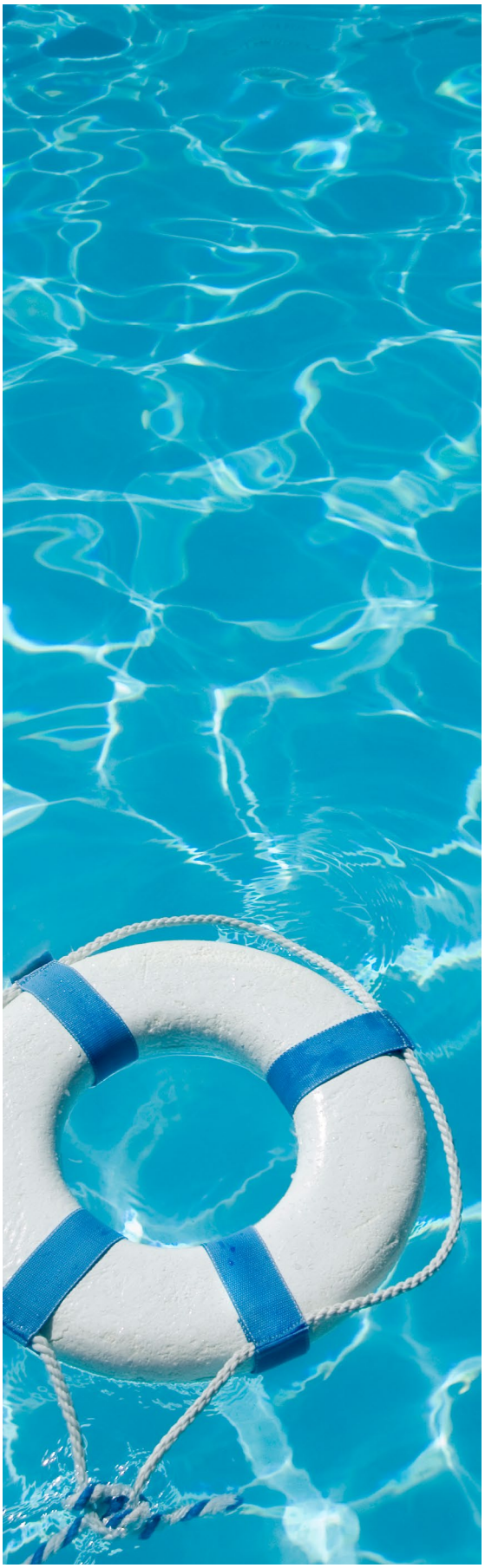
Component Certified to
NSF/ANSI Standard 50

Component Certified to
NSF/ANSI Standard 50

Component Certified to
NSF/ANSI Standard 50

For questions about NSF certification marks, the testing and certification process, or how to find NSF certified products, contact us at +1.800.673.8010 or **info@nsf.org**.

Article by Theresa Bellish – NSF General Manager – Recreational and Municipal Water Products (bellish@nsf.org).



CRACKING THE CODE:
THE MODEL AQUATIC HEALTH CODE AND NSF/ANSI 50

The Model Aquatic Health Code (MAHC), first published in 2014 by the Centers for Disease Control and Prevention (CDC), is a set of guidelines developed with the intention of reducing injuries and illnesses caused by use of recreational water facilities. But what exactly is the MAHC, and how does it differ from NSF/ANSI 50, the ANSI accredited standard for swimming pools, spas, hot tubs and other recreational equipment?

What is a code? What is a standard? What's the difference?
A code is a set of rules that may be enacted into law by a local, regional or national government. A standard, by contrast, provides technical definitions, specifies minimum requirements and defines acceptable criteria for product manufacturers. Codes may require conformance to standards, thereby making some standards legally enforceable. In a nutshell, a code tells you what you need to do and a standard tells you how to do it.

A model code is developed by an organization independent of any particular jurisdiction in order to provide a consistent set of rules across an industry. Model codes can be adopted in part or in whole, and can be customized for use by individual jurisdictions. Model codes are developed through a consensus process, typically by a team of subcommittees comprised of subject matter experts. Model codes have become a popular archetype for the development of building codes because the development and maintenance of building codes is often outside of the technical and financial capabilities of local jurisdictions, and because use of model codes promotes consistency across an industry.

The MAHC is a voluntary code published by the CDC, based on the state of the science in the pool industry and on a set of well-established best practices at the national level. The MAHC addresses public aquatic facilities such as public swimming pools; pools, hot tubs and spas in hotels, apartment complexes, and neighborhoods; interactive fountains and spraypads; and waterparks. The code includes guidelines aimed at preventing health- and safety-related problems in aquatic facilities, including injury, drowning and illness. Individual government agencies at national, state and municipal levels may adopt this model code in part or in whole in order to reduce the risk for disease, drowning and injury in their localities.

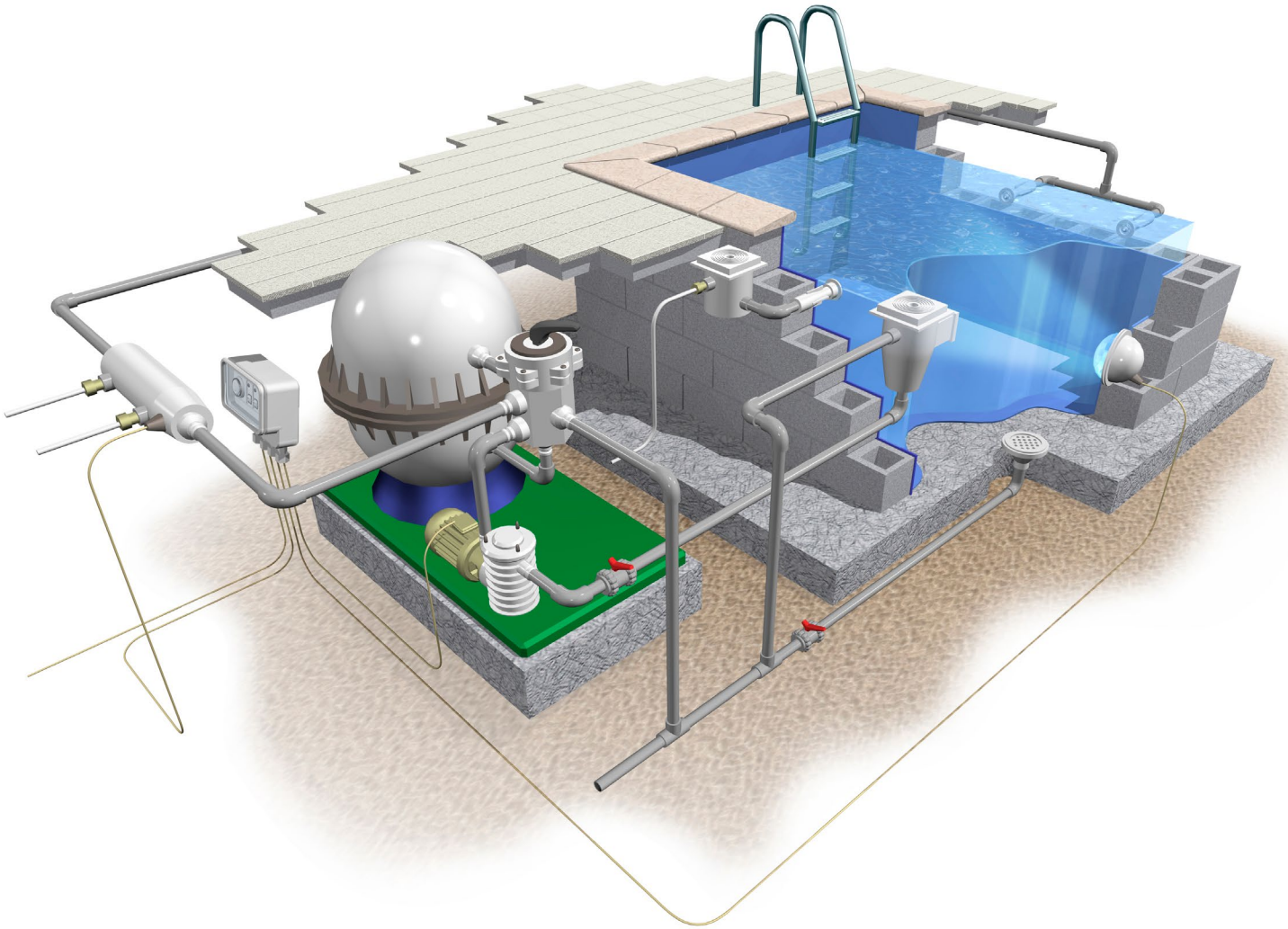
NSF/ANSI 50	versus	MODEL AQUATIC HEALTH CODE (MAHC)
CONSENSUS STANDARD		MODEL CODE
Provides technical definitions, specifies minimum requirements and defines acceptable criteria for product manufacturers.		A set of rules that may be enacted into law by a local, regional or national government.
Defines design, performance and testing requirements and evaluation criteria.		Addresses the design, construction, operation, maintenance, policies, and management of public aquatic facilities.
Covers materials, chemicals, components, products, equipment and systems related to public and residential recreational water facility operation.		Covers public aquatic facilities such as public swimming pools; pools, hot tubs and spas in hotels, apartment complexes and neighborhoods; interactive fountains and spraypads; and waterparks.
Created and updated by a joint committee of equal representation by manufacturers, public health officials and end users.		Developed by an organization independent of any particular jurisdiction in order to provide a consistent set of rules across an industry.

Important Takeaway

A **code** tells you what you **need** to do, a **standard** tells you **how** to do it.

The development and maintenance of the MAHC is controlled by the Council for the Model Aquatic Health Code (CMAHC), a group of scientists, public health officials, product manufacturers and members of the general public who work together to ensure that the MAHC remains up to date and relevant to the latest in industry, technology and science. The CMAHC considers recommendations for changes to the MAHC on a two-year cycle, and the second edition of the MAHC was published in the summer of 2016.

As a model code, the MAHC is not a law, and only becomes law if adopted by a state or municipality. The code may be adopted in whole or in part by states or local governments to easily update the pool codes in local jurisdictions. This allows local governments to more easily keep their pool codes up to date with the state of the science and pool technology, especially in localities where resources are limited and maintaining individual codes is difficult.



The current version of the MAHC contains numerous references to NSF/ANSI 50 for equipment requirements. NSF/ANSI 50 is the most widely recognized equipment and chemical standard for safety, quality and performance in the recreational water industry. NSF/ANSI 50 defines design, performance and testing requirements and evaluation criteria for materials, chemicals, components, products, equipment and systems related to public and residential recreational water facility operation. The standard is continually revised, and new products and technologies are added on an annual basis. Changes to the standard are controlled by a voting group comprised in equal parts of manufacturers, users and public health officials.

Products tested and certified under NSF/ANSI 50 must meet product-specific requirements for design, performance, safety and material health effects. For example, to be certified to NSF/ANSI 50, a pool pump must meet specific design requirements for operation, accessibility, replacement parts, strainers, drain plugs, shaft seals and motors. The pump's data plate must meet specific labeling requirements. The pump must successfully pass a series of pressure tests and have its manufacturer-claimed performance curve verified through independent testing. Self-priming pumps must undergo additional testing to confirm the self-priming height claimed by the manufacturer. Finally, like all materials used in an NSF/ANSI 50 certified product, the materials in the pump that come into contact with pool or spa water must not impart undesirable levels of contaminants or color to the water. Each product type included in NSF/ANSI 50 must comply with a similar set of requirements specific to the product type, and this compliance must be validated by independent third-party testing by an accredited certification organization.

The MAHC requires third-party certification to NSF/ANSI 50 (or another NSF standard) for the following types of equipment used in aquatic facilities:

- Piping
- Flow meters
- Granular media filters
- Pre-coat filters
- Cartridge filters
- Filter media
- Automated chemical controllers
- Ozone Equipment
- Secondary disinfection systems
- Chemical feeders
- Chemical feed pumps
- Electrolytic chemical generators
- Water quality test devices

By requiring compliance to NSF/ANSI 50 via the MAHC, local governments that chose to adopt the code ensure that the aquatic facilities within their jurisdictions are installing equipment that has been validated for safety and real-world performance that matches the manufacturer's claims. The Model Aquatic Health Code and NSF/ANSI 50 work together to provide assurance to aquatic facility operators that the equipment used in the facility has been verified to operate as intended, helping to keep the water a fun and safe place to exercise, relax and play.

Article by Kathryn Foster – NSF International Technical Operations Manager, Municipal and Recreational Water Products (kfoster@nsf.org).

ANNEX R
ADDS POOL CHEMICALS TO THE NSF/ANSI 50 STANDARD

In 2015, NSF International expanded the scope of NSF/ANSI 50: *Equipment for Pools, Spas, Hot Tubs, and Other Recreational Water Facilities* to include Annex R, Toxicology Review and Evaluation Procedures for Swimming Pool Treatment Chemicals. This annex is specifically designed for the evaluation of swimming pool treatment chemicals, making it the first NSF International requirement of its kind.

In the coming years, it is anticipated that many public health officials will adopt NSF/ANSI 50 Annex R certification as a regulatory requirement for chemicals used in the treatment of pools, spas and other recreational water facilities. Currently, disinfection, biocide and algicide chemicals are the only categories of pool treatment chemicals that are subject to comprehensive federal regulation in the U.S. The adoption of NSF/ANSI 50 will begin to fill the void in the regulation of many pool treatment chemicals (e.g. clarifiers, chelating agents, and evaporation reducers). As it's adopted into local and state regulations, it is important to review the background of this change and how NSF/ANSI 50 differs from NSF/ANSI 60: *Drinking Water Treatment Chemicals – Health Effects*, which is currently being used as a requirement for regulatory acceptance of chemicals used in pool/spa treatment in many regions.

While both NSF/ANSI 50 and 60 focus on the health effects of water treatment chemicals, the end-use of the water in each application, and its effects on the user, vary greatly. NSF/ANSI 60 solely considers the oral route of exposure, but assumes a potential lifetime exposure through the consumption of two liters of water per day over 70 years. Due to the nature of the exposure to pool chemicals, the consequences of inhalation and dermal exposure, in addition to oral exposure, need to be considered in the evaluation of pool treatment chemicals to NSF/ANSI 50.

In order to properly assess the consequences of exposure to pool treatment chemicals, a risk-based screening approach was developed that consists of evaluating the treatment chemicals and trace contaminants contained in the finished product when dosed into the swimming pool at a specified maximum dose rate. However, these exposure routes are assessed at a lesser threshold and quantity than NSF/ANSI 60. All exposures within NSF/ANSI 50 are established based on the EPA Swim Model, are set with the following assumptions:

1. Oral exposure assumption: 12-50 mL per day, 1-5 days/week.
2. Inhalation exposure assumption: 1/2-3 hours per day, 1-5 days/week.
3. Dermal exposure assumption: 1/2-3 hours per day, 1-5 days/week.

At this time, the scope of NSF/ANSI 50 Annex R is focused exclusively in the area of health effects parameters. This is especially important for chemicals not covered by the scope of the U.S. EPA Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements, such as biocides algicides, and disinfectants, which undergo a separate evaluation/registration through the EPA Office of Pesticides. Chemicals which are registered by EPA are not subject to the additional risk assessment criteria of NSF/ANSI 50-Annex R. However, routine analysis for trace contaminants is required for all pool chemicals under the requirements of the new NSF/ANSI 50 Annex.

Article by Blake Stark – NSF General Manager, Treatment Chemicals and Media (stark@nsf.org).

Interested in learning more about NSF standards?

NSF International offers free courses for public health officials to gain valuable insight into the public health protection provided by NSF/ANSI 50. Products covered under this standard include treatment chemicals, chemical feeders and generators, controllers, UV, filtration, pumps and skimmers.

To view our recorded webinar on NSF/ANSI 50, go to **http://www.nsf.org/newsroom/webinar-nsf-ansi-50-overview**.

If you would like training tailored to your staff, please contact us at **info@nsf.org** for more information.

Attending NSF training sessions does not provide an advantage, nor is it linked in any way to the granting of certification.

THE EMERGING FLOAT TANK INDUSTRY

Standards and regulations for new or emerging products and services are always behind the curve of popularity. As these products and services gain acceptance in the public sector, it becomes important to evaluate potential public health concerns. Enter stage right the float tank industry. This is certainly not a new industry but its recent resurgence in popularity, in the public sector, has caught the attention of public health officials. Most states do not have specific codes or regulations to properly address float tanks. However, a float tank has many similarities to a hot tub -- it incorporates a small body of water that is heated, circulated and treated with much of the same equipment. As a consequence, some states regulate float tanks using the same framework set by the recreational water industry. There are a few factors that make incorporating existing recreational water codes more complicated than expected.

WHAT IS A FLOAT TANK?

Float tanks are also referenced as sensory deprivation or isolation tanks. A float tank is basically a vessel designed to isolate a person from environmental stimuli while floating in a small body of water. The goal of the tank is to achieve a setting that is absent of all visual, auditory and physical stimulation. Float tanks are manufactured in a variety of shapes and sizes. The majority of tanks are shaped like small single body pods with just enough room to float without hitting the sides. Others are much larger and similar to a walk-in refrigerator. Some float tanks are not even tanks at all. They are open vessels of water, similar to a hot tub installed in a private room that provides a semi-isolated environment.

To handle the float water properly, float tanks are equipped with water circulation and treatment equipment. Those that are involved in the recreational water industry are very familiar with these products. Float water is circulated by a pump through valves and piping. Along the circulation path the float water is filtered, disinfected and heated. Ultraviolet light and ozone generation systems are the most common types of disinfection equipment. The float water is also heated to 93.5 degrees Fahrenheit. The water itself contains high quantities of magnesium sulfate (Epsom salt) to obtain a specific gravity of 1.24. This density allows for effortless floating.

A NEW BENCHMARK: NSF COMPONENT CERTIFICATION SPECIFICATION 12804

NSF International has been the leader in standards development for the recreational water industry since the 1960s. NSF/ANSI 50 is the most referenced standard for equipment and products utilized in this industry, but float tanks are not currently included in the standard. A Component Certification Specification (CCS) can be created for products that are not specifically addressed by NSF/ANSI 50 and is often the stepping stone into the NSF/ANSI 50. (For more information, see the next article.) CCS 12804 is the first comprehensive standard to address float tanks. The CCS incorporates many of the equipment requirements already established by NSF/ANSI 50 but also addresses the differences in application between recreational water and float tank water.

The requirements in CCS 12804 start with the materials of use. Materials in the chamber and in contact with the float water must comply with NSF/ANSI 50, Section 3 for material health and chemical resistance. Interior shells and liners must also pass the applicable performance standards for tear, puncture, durability, structural load and slip resistance. Individual components such as pipes, valves and pumps must comply with the applicable performance and material requirements of NSF/ANSI 50. In addition to general design and construction requirements of accessibility and cleanability, manufacturers must also provide surface skimming. This is an essential requirement for proper float water treatment. There will be a substantial accumulation of contaminants at the surface due to its specific gravity.

One substantial difference between CCS 12804 and NSF/ANSI 50 deals with the life test. In the standard, life testing is required for all process equipment (water treatment equipment). Three units are required to achieve 9,000 hours of run time and one unit must achieve 3,000 hours of consecutive run time. Process equipment designated for use on a float tank must simulate 3,000 hours of operational time. This includes turning the system on and off, which creates additional strain on the system. After life testing, disinfection efficacy testing is performed.

In the CCS, filtration and disinfection equipment must comply with NSF/ANSI 50 but is also tested for turbidity removal (particulate reduction) and disinfection efficacy.

While NSF/ANSI 50 already requires turbidity removal and disinfection efficacy, CCS 12804 requires testing this equipment installed with the float tank as a system. One of the major differences between traditional recreational water venues and the float tank venue is that, for the vast majority, float tank water is only circulated in between float sessions. With this critical detail, water samples for these tests are acquired from the tank versus effluent of the equipment. This promotes clean and sanitary float water as the tank's treatment system is cycled on and off between sessions.

REGULATION

In 2015, an issue paper was submitted to the NSF/ANSI 50 Joint Committee to take CCS 12804 and create the first ANSI standard for float tanks. The Joint Committee agreed to form a task group to develop a consensus ANSI standard. The group was provided with CCS 12804 as a starting point and was tasked to provide comments on that existing document. The group has been working toward addressing each of the comments.

When CCS 12804 was created, there were very few codes, standards or regulations for a float tank or the industry. A few states have drafted or introduced regulation in recent years. While most states are keeping an eye on the incorporation of CCS 12804 into NSF/ANSI 50, the Council of Model Aquatic Health Code (MAHC) has decided to develop code to address regulation of float centers and the tanks. The first draft of the new section of the MAHC for the float tank industry is complete. The language includes references NSF CCS 12804.

For a copy of NSF CCS 12804, contact **info@nsf.org**.

Article by Sung Choe – NSF Senior Technical Reviewer, Recreational Water Products (choe@nsf.org).

COMPONENT CERTIFICATION SPECIFICATIONS
HELP GAIN ACCEPTANCE FOR PRODUCT TYPES NOT YET INCLUDED IN NSF/ANSI 50

NSF/ANSI 50 is the definitive standard for health, safety and performance of equipment used in pools, spas, float tanks and splash pads. Most states require or reference NSF/ANSI 50 certification for pool and spa products. The standard has product-specific sections detailing the requirements for health effects, design and construction, and performance, but not every product type currently has a distinct section in NSF/ANSI 50. To address that gap, NSF has developed a program to certify products against a Component Certification Specification (CCS) to keep up with changes and advances in product requirements and technology. The CCS identifies the necessary health, design and performance criteria for a specific product type. The intent of the CCS is that its requirements will be balloted for inclusion into NSF/ANSI 50 within two years.

Pool and spa systems are becoming more involved and complicated with increasing numbers of products and technologies addressing issues ranging from chloramine management to chemical use reduction. With any novel technologies or approach, facility operators want to know the products work, and regulators need to make sure products are effective and won't harm swimmers and bathers. One of the most effective ways to gain end user and regulator acceptance is through independent certification to a standard such as NSF/ANSI 50 or to a CCS. Certification shows end users that product claims have been independently verified, and regulators know the product has met minimum design and safety requirements as well as ongoing monitoring for compliance.

Several product types (including gas injection systems, for non-ozone gases, and pool cleaners) have been certified to a CCS and are already gaining market access and regulatory acceptance. Flow meters are an example of how the CCS program can aid regulatory approval. California and the Model Aquatic Health Code have required NSF/ANSI 50 certified meters for several years, but prior to the flow meters section being added to NSF/ANSI 50 in 2016, flow meters could be certified to Component Certification Specification 12485.

Floatation centers are required to meet many building and safety codes, but the design and performance of floatation chambers or cabins aren't covered by existing code language in many municipalities. Some cities and states classify the tanks or chambers as swimming pools and require them meet the pool code. A lack of code language, or classification as a pool, can make it difficult for local governments to verify the tanks and chambers are safe and not a danger to bathers. A float tank certified to Component Certification Specification 12804, however, addresses many common safety concerns (such as slip and fall, sanitation, and suction entrapment), easing the approval process.

The CCS certification mark includes the CCS number and is different from the NSF/ANSI 50 mark. NSF may also approve a text-only version of the mark with or without a black box around it. Once the CCS is incorporated into the standard, products can then switch from bearing the CCS mark to bearing the NSF/ANSI 50 mark.

The types of products which can be covered by a CCS are limited only by the ingenuity of designers and manufacturers. These new technologies need certification to garner broader adoption by allowing operators to confident in the product's function and regulators to be assured of the product's safety to swimmers and bathers.

A product certified to Component Certification Specification will bear this NSF mark with the applicable number.

NSF Recreational Water
CCS-12804

Article by David Nance – NSF Business Unit Manager, Recreational and Municipal Water Products (dnance@nsf.org).

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