NSF/ANSI 50

Equipment for Swimming Pools, Spas, Hot Tubs and other Recreational Water Facilities

Evaluation criteria for materials, components, products, equipment and systems for use at recreational water facilities

1.5 Normative references

The following documents contain provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication, the indicated editions were valid. All standards are subject to revision, and parties are encouraged to investigate the possibility of applying the recent editions of the standards indicated below.

- ANSI/APSP - 6, Portable Spas
- ANSI Z124.7, Prefabricated Plastic Spa Shells
- IAPMO SPS 4, Material and property standard for special use suction fittings for swimming pools, spas, and hot tubs (for suction side automatic swimming pool cleaners)
- UL 1081, Swimming Pools Pumps Filters and Chlorinators
- ANSI/UL 1261, Electric Water Heaters for Pools and Tubs
- UL 1563, Electric Spas, Equipment Assemblies, and Associated Equipment

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1 The Association of Pool and Spa Professionals (APSP), 2111 Eisenhower Avenue, Suite 500, Alexandria, VA 22314-4695 www.apsp.org
2 American National Standard Institute (ANSI), 1819 L Street, NW. 6th floor, Washington, DC 20036 www.ansi.org
3 ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2859 www.astm.org
4 International Association of Plumbing and Mechanical Officials (IAPMO), 5001 E. Philadelphia St. Ontario, CA 91761 www.iapmo.org
5 Underwriters Laboratory (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542 www.ul.org
4.1.9 Spas and Hot Tubs

Spas and hot tubs shall conform to the requirements of ANSI/AS-6, Section 19 and/or the material requirements of Section 3 of this Standard.

19 Spas and hot tubs

19.1 Scope

This establishes health and performance requirements for spas and hot tubs including requirements for the materials, design and construction, performance of spa components, including those involved in the circulation, filtration, heating and sanitation of spa water.

19.2 Limitations

The section does not establish requirements for the installation of spas or spa components.

19.3 Variations in design and operation

A spa varying in design and/or operation may qualify under this section. Appropriate tests and investigations shall indicate the spa or spa component performs as well as systems complying with this section. Such spas or spa components shall meet the requirements for materials and construction in this standard.

19.4 Materials

All spa materials contacting spa water shall meet the health effects and corrosion resistance requirements in Section 3 of this standard. Plastic piping system components for spa use shall meet the requirements of one of the following:

- NSF/ANSI 14 - Plastics Piping System Components and Related Materials for potable water usage;
- ASME A112.19.8 – Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs;
- IAPMO PS 33 – Flexible PVC Hose for Pools, Hot Tubs, Spas, and Jetted Bathtub; or
- IAPMO SPS 4 – Special Use Suction Fittings For Swimming Pools, Spas and Hot Tubs (For Suction Side Automatic Swimming Pool Cleaners).

19.4.1 Alternate materials

If specific materials are mentioned, other materials equally satisfactory from the standpoint of public health and performance may be permitted so long as they meet the requirements of this standard.

19.5 Electrical components
All relevant electrical components shall meet the requirements per UL 1563, *Standard for Electric Hot Tub, Spas and Associated Equipment* or other electrical standard as specified in this section.

19.6 Design and construction

19.6.1 General

Spas shall be designed and constructed to prevent the accumulation of dirt and debris, and to facilitate the inspection, maintenance, servicing and cleaning. There shall be no protrusions, extensions, or other obstructions that may create an entanglement hazard in the bathing area.

Exterior surfaces of spa shall be sealed to prevent leakage of spa water or precipitation into mechanical equipment areas. Spas shall meet the requirements of ANSI/UL 1563, *Standard for Electric Hot Tubs, Spas and Associated Equipment*.

19.6.2 Accessibility

Water and air circulation system components including pumps, motors, blowers, and filters, shall be accessible for inspection, maintenance, repair and/or replacement.

19.6.2 Spa shell or tub

19.6.2.1 Spa shell or tub: surface material, strength, and slip resistance

- Plastic spa shells shall meet the applicable requirements of ANSI Z124.7, *Prefabricated Plastic Spa Shells*.

- Spa shell materials not covered under the scope of ANSI Z124.7 shall meet the applicable performance requirements specified in ANSI Z124.7.

- Surfaces within the spa intended primarily for footing (steps) shall be slip-resistant, as defined by the requirements of ASTM F462, *Standard Consumer Safety Specification for Slip-Resistant Bathing Facilities*.

19.6.2.2 Spa water depth

- The water depth, as measured from the waterline, shall not exceed 48 inches (122 cm) at any location.

- The water depth of any seat or sitting bench, as measured from the waterline, shall not exceed 28 inches (71 cm).

- The water depth at any seat or bench intended for use as a step when entering or exiting the spa shall not exceed 24 inches (62 cm).

- The water depth, as measured from the waterline, shall not exceed 72 inches at any location in a swimspa, unless designed for a special purpose and authorized by the regulatory authority having jurisdiction.

19.6.2.3 Spa floor slope
The floor of the spa shall not have a slope exceeding one inch per foot (maximum pitch 1:12).

19.6.3 Steps and handrails (if applicable)

19.6.3.1 Residential applications:

- If the spa is designed with steps for entering, step treads shall have a minimum unobstructed horizontal depth of 10 inches (25.4 cm) and a minimum unobstructed surface area of 240 in² (1550 cm²).

- Riser heights shall be consistent and no less than 7 inches (17.78 cm) and no greater than 12 inches (30.48 cm). If the bottom tread serves as a bench, the bottom riser may be a maximum of 14 inches (35.56 cm) above the spa floor.

- If the spa rim is designed by the manufacturer for use as a step, a handrail shall be provided. The handrail shall not be readily removable without the use of tools.

19.6.3.2 Public applications:

The above mentioned criteria should be used in the absence of other criteria. Always defer to the local authority having jurisdiction.

19.6.4 Safety covers

Spas shall include a safety cover meeting the requirements of ASTM F1346, Standard Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs.

19.6.5 Lighting

If a spa has submerged lighting, such lighting shall meet the relevant requirements of ANSI/UL 1563, Standard for Electric Hot Tubs, Spas and Associated Equipment.

19.7 Circulation system

19.7.1 General

Spas shall have a circulation and filtration system consisting of equipment such as pumps, piping, fittings, valves, return inlets, suction outlets, filters, skimmers, and other necessary components that provide circulation of water throughout the spa. The circulation system shall be capable of:

- Residential or public applications, producing a re-circulation turn over rate of the total water volume of the spa through the filtration system within 30 minutes when operated at the maximum flow rate of the filter in a clean media condition.

- Residential applications, producing a re-circulation turn over rate of the total water volume of the spa through the filtration system at least once every 24 hour period when the spa is not in use.
− Public applications, producing a re-circulation turn over rate of the total water volume of the spa through the filtration system at the frequency (number of hours or minutes) determined by the local regulatory authority having jurisdiction, when the spa is not in use.

NOTE - To conform to both energy efficiency and public health regulations, during periods of non-use the spa should be run at a slower rate to minimize energy consumption while maintaining proper chemical balance and disinfection residuals as required by the local regulatory authority having jurisdiction.

19.7.2 Pumps

Pumps shall meet the requirements of section 6 of this Standard. Pumps shall also meet the requirements of ANSI/UL 1081, Standard for Swimming Pool Pumps, Filters and Chlorinators. Pump horsepower rating and labeling shall not exceed the brake horsepower of the motor. Pumps shall be mounted per pump manufacturer’s specifications. Pumps shall be accessible for inspection, service, and maintenance. Pumps shall be supported to prevent damage to the pump and piping due to settling or other movements.

19.7.3 Suction and vacuum fittings

19.7.3.1 Suction fittings

Each spa shall be provided with a minimum of two (dual) suction fittings, or one suction fitting and a skimmer. Each suction fitting shall be provided with the means to reduce the risk of entrapment and hair entanglement. Suction fittings not associated with filtration shall:

− Be tested and certified to the current requirements of ANSI/ASME A112.19.8, Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs; and

− Have a flow rate which equals or exceeds the flow rating of the specific opening when tested as described in ANSI/UL 1563, Section 59.1.

19.7.3.2 Specialty vacuum fittings

Each spa that is provided with a specialty vacuum fitting shall have the fitting tested and certified to the requirements of:

− IAPMO SPS 4, Special use suction fittings; and
− Section 3 Material formulation requirements of this Standard.

19.7.4 Filters

All filters and filtration systems components shall meet the requirements of:

− Section 5 Filters of this Standard; and
− ANSI/UL 1081, Standard for Swimming Pool Pumps, Filters and Chlorinators.

For filters integral to the spa, the requirements shall apply during normal spa operation. A separate data plate and operational instructions should not be required.

19.7.5 Surface skimmers/weirs
All surface skimmers shall meet the requirements of Section 8 Recessed automatic surface skimmers of this Standard NSF/ANSI 50 – Equipment for Swimming Pools, Spas, Hot Tubes and Other Recreational Water Facilities. For surface skimmers integral to the spa, the requirements shall apply to the spa under normal operating conditions. A separate data plate and operational instructions may not be required.

19.8 Air Blower and air induction systems

The requirements of this section apply to systems that induce or allow air to enter the spa either by means of a power pump or passive design:

- Air blower systems shall prevent water backflow;
- Air intake sources shall not introduce water, dirt or contaminants from outside the spa unit, into the spa;
- Integral air passages shall be able to withstand 150% the manufacturer’s maximum rated working pressure for a minimum of 5 minutes; and
- Air blower tubing shall meet or exceed the tubing performance requirements of IAPMO PS 33.

19.9 Temperature control systems

19.9.1 Temperature control

Each spa shall have a temperature-regulating control that is in conformance with ANSI/UL 1563 Standard for Electric Hot Tubs, Spas, and Associated Equipment, including requirements for:

- Maximum set point corresponding to a water temperature of 40 °C (104 °F) in the tub; and
- Tolerance at the maximum temperature setting of not more than ± 3 °C (± 5 °F).

19.9.2 Temperature limits

Each spa shall have a temperature-limiting control that is in conformance with ANSI/UL 1563 Standard for Electric Hot Tubs, Spas, and Associated Equipment, including requirements for:

- Limiting the water at the inlet to the tub to a maximum temperature of 50 °C (122 °F); and
- Tolerance at the maximum temperature setting of not more than ± 3 °C (± 5 °F).

19.9.3 Temperature display

Each spa shall have a display in one degree increments (Fahrenheit or Celsius) reflecting the spa water temperature. This display shall be located on the top surface or side of the spa and shall be readily visible to persons prior to entry.

19.9.4 Heater

The heater shall be stable and stationary after plumbing and electrical connections are completed. The minimum clearances to combustible materials, as specified by the heater manufacturer, shall be maintained. Electric heaters shall meet the requirements of ANSI/UL 1261 Electric Water Heaters for Pools and Tubs.
19.10 Sanitation systems

19.10.1 Water sanitation via chlorine and bromine

Water sanitation in the spa shall be accomplished using chemicals registered by the United States Environmental Protection Agency (EPA) under the Federal Insecticide, Fungicide, and Rodenticide Act, as recommended in the manufacturer’s manual. The applicable requirements of this Standard shall apply to equipment supplied by the spa manufacturer for use in chlorine/bromine sanitation. Systems shall be of the following types and shall meet the applicable requirements of this Standard:

- Mechanical chemical feeding systems;
- Flow through chemical feeding systems; and
- Electrolytic chlorine/bromine generators.

For process equipment integral to the spa, the requirements shall be met during normal spa operation and a separate data plate and operational instructions for the sanitation component may not be required. Systems for use in public applications shall not require direct or hand feeding of chemicals except in extreme cases such as super-chlorination or water balancing.

19.10.2 Water sanitation and treatment equipment other than chlorine and bromine

The applicable requirements of this Standard shall apply to equipment supplied by the spa manufacturer for use in treatment of spa water, including:

- Ozone systems;
- UV light systems; and
- Copper and silver ion generators.

For process equipment integral to the spa, the requirements shall be met during normal spa operation and separate data plate and operational instructions may not be required. Water treatment equipment shall meet the requirements of the relevant electrical safety standards for the intended market.

19.11 Data plate

Each spa shall have a data plate that is permanent and easy to read. The data plate shall have, at a minimum, the following information:

- Manufacturer’s name and address;
- Model and serial number;
- Maximum number of users (bathers);
- Maximum recommended temperature;
- Recommended spa water quality parameters, including pH, temperature, sanitizer level (i.e. 3-5 mg/L (ppm) Free Available Chlorine, 4-6 mg/L (ppm) Total Bromine);
- Reference to using EPA registered chemical disinfectants;
- Date of manufacture; and
19.12 Owner’s manual

A comprehensive manual or manual package shall be provided with each spa covering important areas such as spa operation, maintenance, water quality monitoring, and safety. For spas utilizing components certified under this Standard, separate component manuals shall be included in the manual package. If the spa component is integral to the spa, equivalent information shall be provided in the spa manual.

19.12.1 General spa safety

This section shall include, at a minimum, the following information:

− Electrical hazards;
− Drowning hazards; and
− Appropriate injury and health hazards.

19.12.2 Spa specifications

This section shall include, at a minimum, the following information:

− Maximum number of users (bathers);
− Footprint dimensions;
− Spa height;
− Effective filtration area;
− Heater output;
− Water capacity;
− Dry weight;
− Filled weight, assuming average occupant weight of 175 lbs;
− Dead weight, assuming average occupant weight of 175 lbs;
− Electrical requirements; and
− A general description of how the spa operates.

19.12.3 Installation instructions

Installation instructions shall include, at a minimum:

− Site preparation;
− Ventilation instructions, if installed indoors;
− Spa leveling procedure; and
− Electrical requirements and precautions.

19.12.4 Operating instructions

Operating instructions shall include, at a minimum:

− Start-up and refill procedures and frequency;
− Jet control operations;
− Temperature adjustment operations; and
− Lighting control, if appropriate.
19.12.5 Spa care and maintenance instructions

Maintenance instructions shall include, at a minimum:

− Draining instructions;
− Filter system maintenance, including filter cartridge removal, cleaning, and installation;
− Care instructions for spa shell, exterior, and cover;
− Instructions for prevention of freezing and winterizing; and
− Vacation care instructions.

19.12.6 Water quality and maintenance instructions

Water quality instructions shall include, at a minimum:

− Methods for testing the spa water (test kit methods should be based on Standard Methods for the Examination of Water and Wastewater, APHA, 20th Edition (or latest edition), 1998);
− Methods for adding chemicals to the water;
− Methods for maintaining the proper water chemistry;
− Recommended water quality parameters; as shown in Annex O, O.1;
− Basic chemical safety guidelines;
− Recommended test frequency;
− Statement specifying use of EPA registered chemicals for spa sanitation;
− Statement reading “Maintaining your sanitizer at the recommended levels at all times will decrease the occurrence of unsafe bacteria in your spa water” (or equivalent).

NOTE - Recommended water quality parameters are shown in Annex O, O.1.

19.12.7 Service information

Service information shall include, at a minimum:

− Troubleshooting guide;
− Warranty;
− Contact information for manufacturer;
− List of serviceable components/parts; and
− Statement that consumer should not attempt to repair non-serviceable components.