GOOD CHEMISTRY

How chemical feeders, generation systems, flow-through feeders and chemical pumps get tested and certified in accordance with NSF/ANSI Standard 50

For the safest swimming experience your chemical generation and delivery systems need to be NSF Certified to NSF/ANSI Standard 50. For more than 50 years NSF has been evaluating, testing, and certifying chemical generation and feeding systems for pools, spas, and waterparks.

Early recreational waters were not treated as today, therefore they needed to be replaced or drained and refilled. You've heard the saying, "still waters run deep," well, still waters are stagnant and can become dangerous without proper treatment, replenishment or dilution. As contaminants accumulate, microorganisms find conditions to their liking, and propagate creating risk.

Clearly, untreated "still waters" presented risk and something needed to be done to improve health and safety. One approach was the process of draining and refilling a pool (aka make-up water). This would be risky (not as much as still waters), but let's assume it could be viable provided there were large quantities of clean water available and financial and environmental costs were not too great. It would be better than "still waters" from a health perspective. But this approach still left far too much to chance.

Ultimately, filtering contaminants and sanitizing the water was found to be the most effective way to prevent microorganism growth and protect swimmer health. In 1960, to help ensure pool and spa operators used appropriate equipment and practices, NSPI, the trade association for the pool industry requested that NSF create standards to evaluate pool and spa products such as chemical feeders and chemicals. Concurrently, NSF was approached by the American Public Health Association (APHA) and other health official and engineering groups about needs for public health protection and safety for public pools. The goal of all groups was robust and appropriate testing and certification of products based upon product end-use, inherent risks of each product, and meeting user and facility operator needs.

The industry knew such work would be contentious and it needed to be performed by a competent, fair and trustworthy third party arbiter to help resolve disagreements. NSPI didn't want manufacturers or other industry insiders such as trade association members to manage the standards writing nor conduct the testing and certification due to concerns about motives, confidentiality, and conflict of interest. They sought someone they could trust to get the job done right. NSF also had an excellent reputation with public officials.

A history of public health protection,

NSF was formed by the University of Michigan, School of Public Health in 1944 by public health officials to help manufacturers, facility managers, and public officials agree to mutually acceptable requirements for product functionality and safety in various industry segments. NSF had established a track record in the food, beverage, and restaurant industry for developing consensus, creating rigorous criteria, effectively managing a research and product testing laboratory as well as operating a product certification program. This reputation for ethical stewardship and getting results made NSF the logical choice.

Therefore the industry chose NSF as the truly independent, fully accredited, third party to write standards and make sure products were safe and would perform as needed during use. From this request NSF created NSF/ANSI Standard 50 with industry and public health official support as part of NSFs equal and balanced voting membership between three groups: Public Officials, Manufacturers, and Product Users. Due to this history, the work outlined here, and the trust in NSF, many states require the use of NSF Certified products and equipment at public use facilities to ensure the highest levels of protection for swimmers.

NSF evaluation, selection and testing

To ensure the highest levels of performance and safety NSF reviews the technical details of manufacturers' products and claims, then obtains detailed supplier information including material formulations. With this information, NSF staff evaluate all system designs to select products that would represent the most aggressive conditions or "worst case units" for testing. If the worst-case units pass all NSF evaluation and testing requirements, then other units or products may be justified for NSF Certification as well. This approach is important because it focuses upon highest risk, yielding the most cost effective way to assess a range of products for performance and protection of public health and safety.

Water safety requires maintenance of water chemistry

Water safety for swimmers is dependent upon maintenance of water chemistry. Use of NSF certified chemical generation and feeding systems enables product users to rely upon NSFs work to investigate and validate manufacturer claims so that the buyer of the product gets what is being advertised. NSF certification makes products better by forcing them to be independently evaluated and tested. Think of it like this, NSF is the acid test or litmus test for the recreational water industry. Products are put through their paces at NSF to help prevent people from having problems with products at pools and spas. As NSF Standard 50 has changed,

NSF Chemical Generator/Feeder Evaluation Criteria

NSF Recreational Water Chemical Generator and Feeder Evaluation Criteria	Flow Through Chemical Feeder Granular, Stick, Tablet	Mechanical Feed Pump Liquid/Dry Slurry Single or Adjustable Rate	In-Line Electrolytic Chlorine & Bromine System	Brine or Batch type Electrolytic Chlorine & Bromine System	Copper and or Silver Ion Generating System
Material formulation - health and safety	•	•	•	•	•
Design and construction durability	•	•	•	•	•
Corrosion resistance - dissimilar metals	•	•	•	•	•
Installation of piping diagram, valves, parts list	•	•	•	•	•
Assembly of piping systems to enable repair	•	•	•	•	•
Cleanability-access, maintenance	•	•	•	•	•
Flow meter, flow indicating device capability	•	•	•	•	•
Performance indication			•	•	•
Operational protection, automatic shut-off			•	•	•
Warning devices, alarms, alarm conditions			•	•	•
Pressure/head loss claim validation, curve			•	•	•
Chemical-resistant materials	•	•	•	•	•
Design pressure 1.5 x max operating pressure	•	•	•	•	•
Verification of chemical output mass/volume	•	•	•	•	•
Output rate adjustable 4 increments over range	•	•*	•		
Delivery/Uniformity of output, 10-20% of setting	•	•	•	•	•
Life test, 3 units for 3,000 hour, high output	•*	•	•	•	•
Tubing life test 500hr or 120% of mfr. claim		•			
Disinfection efficacy for copper/silver systems					•
Salt level ppm/output testing verification			•	•	
Testing kit accuracy for copper and silver					•
Erosion resistance slurry/dry chemical feeding		•*			
Shielding moving parts or motor requirements	•	•			
Suction lift testing		•			
Protection against overdosing instruction/drain		•			
Installation and operating instructions	•	•	•	•	•
Data plate marking requirements	•	•	•	•	•

* If applicable to product

expanded, and improved so too have the products that are Certified by NSF. Users of the products benefit from having greater choice in product types that have been proven as effective and durable. Product users can then help protect swimmers with safer water conditions.

Products and NSF Evaluation Criteria

Here is a brief overview of evaluation and test criteria, by product type, to help you understand how product testing yields better products and safer conditions for swimmers.

Flow-Through Chemical Feeders are tested with specific chemical types, brands, and sizes to achieve the NSF Certified chemical output as noted within the NSF Official Listing. During the intensive testing, the chemical type, configuration and brand must be specified. Using the wrong brand, type or size of chemicals in a feeder can result in serious risk to facility operators and swimmers. If different chemicals are mixed in a chemical feeder an explosion could occur as certain chemicals should never be combined (example if Trichlor + Cal Hypo are combined a dangerous exothermic reactions occurs generating toxic gases, heat, and a potential explosion).

NSF Listings note important restrictions to prevent harm and minimize danger,

- Follow manufacturer's instructions for the installation and operation of this equipment.
- Any modifications, including the use of chemicals other than those recommended by the manufacturer, will void the NSF Certification.

Mechanical Chemical Feed Pumps are also tested with specific chemicals to ensure performance and verify chemical resistance, pressure safety, chemical output, tubing durability, system durability, and many other factors as noted in the table. NSF tests and certifies fixed rate mechanical chemical feeding pumps for use with automatic controllers and other users. NSF also tests and certifies adjustable chemical feeding pumps.

Batch Chlorination and Bromination Systems

Electrolytic chemical generators function by using pre-cursors such as dissolved compounds or minerals in the water to create an electrical-catalyzed reaction to develop specific chemicals. A common approach is to dose sodium chloride or salt (NaCl) in pool or spa water, then apply an electrical current to a catalytic plate to 'break' the chemical bonds within the salt molecule and create hypo-chlorous acid (the highly oxidative and disinfecting form of chlorine in water).

NSF conducts extensive evaluation and testing to thoroughly assess these products (as noted in the table). The testing addresses chemical output and performance, these factors depend upon the concentration of sale in the water. You will find the chemical generation level noted in the NSF Official Listings.

Please note that as with any electrical or chemical generating device, there are inherent risks to modifying products, wiring, and not following manufacturer instructions. NSF tests products with specific components and chemicals. Use of other parts invalidates NSF Certification. Some of the risks of product manipulation or modification include:

- Electrical burn or shock from direct current, don't modify-stay out of the power supply cabinet
- Use of non-OEM cells can fail under pressure, burst and cause harm
- Use of non-OEM cell can have different pressure loss characteristics and impact flow of system
- Use of non-OEM cell or wiring configuration can damage power supply
- Use of non-OEM cell can lead to lower or higher chemical output
- Use of non-OEM cell plates materials, distances, coating thickness, etc. can result in corrosion and rapid or early failure of the cell ■

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