Quality Assurance

Maintaining proper water chemistry with the help of NSF

Proper water chemistry is the crowning achievement of a well-designed and maintained pool. On the other hand, poor water chemistry can wreak havoc on circulation, equipment and materials, and make swimming less fun. Maintaining proper water chemistry can easily be achieved … in an isolation bubble. But what pool is operated in a bubble? People and animals introduce contaminants into the pool water, such as personal hygiene products, sweat, urine, feces and bacteria. Ever ask yourself why the pool always turns green after it rains? The environment and weather also introduce contaminants. Luckily, pool water test kits can help monitor and maintain proper water chemistry.

In recent years, however, the accuracy of pool water test kits has come into question. Operators, inspectors and patrons depend on the accuracy of test kits. Many of us have heard of tests of the residual sanitizer level with two different test kits that resulted in two very different readings. What if one of the results warranted the closure of the facility but the other was an acceptable reading? In the absence of an industry validation standard for pool water test kits, many states and cities have taken steps to reference requirements in their pool codes. The codes vary in requirements for pool water test kits. Some require a .05 ppm level of accuracy, while others specify the type of test kit that must be used (such as a DPD test kit), reference a standard method for water and wastewater testing, or require that the test kit be approved by that health department. None specify third party-validation of the test kit manufacturers' accuracy claims, even though they are dependent on the various test methods used by the manufacturers.

In 2007, a request came to the NSF Recreational Water Facility Joint Committee to develop a standard for pool water test kits. With broad industry support, the joint committee agreed to create a task group, comprised of government officials, end users and manufacturers, to address the performance validation of water quality testing devices. The NSF WQTD task group also was asked to create a consensus standard for the performance measurement of all pool water test kits. The goal was to not exclude any type of technology but to let the test kit's performance validation determine its use in the industry. The group started by setting the test water parameters and then focused on the performance objectives. To ensure that all test kits can be certified, the group specified three levels of performance for each of the water quality parameters, from L1 for the highest accuracy to L3.

Next, the task group determined the basic evaluation principles, including that performance measures should focus on accuracy, precision and repeatability, and that manufacturers must provide detailed operation and use instructions. The group also defined marking and identification for the test kit and all its components, requiring that the level of certification be included in the marking. To ensure precision and repeatability, multiple test samples from multiple batches are required for test sample selection. The task group also examined another important factor, shelf life. When stored in accordance with the manufacturer's instructions, the test kit must be within 10 percent of its initial performance at the end of its shelf life.

In 2012, the first official requirements for pool water test kits were published in the standard *NSF/ANSI 50*. The water quality parameters included pH and the sanitizers chlorine and bromine. In the same time frame, the U.S. Centers for Disease Control and Prevention began working on the Model Aquatic Health Code. Technical committees developed language to require third-party certified equipment and the use of *NSF/ANSI 50*-certified pool water test kids is now referenced in that code. The WQTD task group continued its work to include additional water quality parameters. They completed the ballot to include language for hardness, total alkalinity, cyanuric acid, TDS and salinity. The 2013 version of *NSF/ANSI 50*, which will be released later this summer, will include these additional parameters.

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