



## A New NSF Standard for Pool Chemicals

By Blake Stark

Swimming pool chlorination is a long-standing practice that helps improve the safety of pools and reduces the incidence of communicable diseases. Many newer techniques to disinfect and treat swimming pool water have recently come on the market, such as chemical disinfectants and other types of chemicals, some of which could be used as alternatives to chlorination. However, while pool and spa disinfectants have been regulated by U.S. EPA, no U.S. regulations addressed the potential health effects of other types of pool chemicals. Some states required pool chemicals to conform to the NSF International standard for drinking water treatment chemicals, NSF/ANSI 60, but that standard isn't ideal for assessing oral exposure to pool water and

lacks the methodology to evaluate dermal and inhalation effects. The overall lack of an adequate method to assess the health effects of pool chemicals prompted public health officials to propose to the NSF/ANSI 50 committee the development of new criteria to assess pool and spa chemicals. A task group was formed in 2012 to develop the criteria and worked with public health professionals, recreational water facility operators, treatment chemical manufacturers, state agencies and officials with the U.S. EPA Office of Pesticides.

These resulting criteria for pool treatment chemicals were incorporated as testing and evaluation requirements in *NSF/ANSI 50: Equipment for Pools, Spas, Hot*

*Tubs and Other Recreational Water Facilities* in fall, 2015. The criteria for pool chemicals in NSF/ANSI 50 focus primarily on health effects, which 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 disinfectants, algaecides and other biocides, which undergo a separate evaluation/registration through the U.S. EPA Office of Pesticides. Disinfectants, algaecides and other biocides that are registered by the agency are not subject to the additional risk assessment criteria of the new requirements in NSF/ANSI 50; however, such chemicals are still tested for contaminants.

## Toxicology Review and Evaluation Procedures for Swimming Pool Treatment Chemicals

NSF/ANSI 50 contains these requirements for evaluating and reviewing swimming pool treatment chemicals:

- > Detailed product formulation information shall be obtained that allows for the identification of all unique chemical components of the product, as well as the concentrations of each component. Additionally, the maximum recommended dose rate of the product shall be provided.
- > Based on formulation information and label or use instructions, the concentration of each swimming pool treatment chemical (and/or contaminants) in the swimming pool water following dosing at the maximum recommended dose rate shall be calculated.
- > As an initial toxicity screening evaluation, any chemical constituent (or contaminant) in the product formulation that has a concentration in the swimming pool water of  $\leq 10\mu\text{g/L}$  at the maximum recommended dose does not require further toxicology evaluation. This threshold value shall not apply to any substance for which available toxicity data and sound scientific judgment indicate a significantly increased risk for an adverse health effect at a swimming pool water concentration at or below  $10\mu\text{g/L}$ . All chemical constituents (or contaminants) that exceed the  $10\mu\text{g/L}$  threshold at or below the maximum recommended dose require additional evaluation.
- > For chemical constituents (or contaminants) with concentrations in the swimming pool water that exceed  $10\mu\text{g/L}$  at or below the maximum recommended dose, an exposure assessment shall be performed utilizing equations and assumptions prescribed in the new standard.
- > Following the determination of exposure levels (in  $\text{mg/kg-day}$ ) for chemical constituents (or contaminants) with concentrations in the swimming pool water that exceed  $10\mu\text{g/L}$  at or below the maximum recommended dose, the procedure defines several approaches that may be utilized to determine the acceptability of the calculated exposure.
- > A determination shall be made as to whether a published (publicly available in printed or electronic format) and peer-reviewed, quantitative risk assessment for the chronic exposure to the substance is available. When a quantitative risk assessment is available, the assessment and its corresponding reference dose shall be reviewed for their appropriateness in evaluating the human health risk of the swimming pool treatment chemical constituent (or contaminant).
- > As an alternative approach, the total allowable concentration (TAC) values as reported in NSF/ANSI 60 and NSF/ANSI 61 may be utilized if available for the specific chemical constituent (or contaminant) by converting the TAC value into a  $\text{mg/kg-day}$  rate by utilizing default body weight and drinking water consumption assumptions (70 kg and 2 L), respectively. The resulting  $\text{mg/kg-day}$  rate may be compared with the estimated exposure at the maximum recommended dose to determine acceptability.
- > If a TAC value or other published risk assessment value is unavailable, a risk assessment for the specific chemical constituent (or contaminant) may be conducted in accordance with the procedures outlined. However, in lieu of determining a TAC value, the identified point of departure may be utilized to conduct a margin of exposure (MoE) analysis.
- > If a TAC value or other published risk assessment value is unavailable and there are insufficient toxicity data from which to perform a risk assessment, the chemical exposure cannot be assessed and presence of the chemical in the formulation is precluded at a concentration in the swimming pool water of greater than  $10\mu\text{g/L}$ .