



3/21/24

To whom it may concern:

Regarding current NSF testing standards that apply to the use of ultraviolet disinfection generators in recreational water applications, there are two that currently represent the industry, Supplemental Disinfection and Secondary Disinfection. These standards are described by NSF as follows:

NSF 50 for Supplemental Disinfection	<i>Product has met the requirements of NSF/ANSI 50, Annex H.1: Disinfection Efficacy for the ≥ 3 log reduction of <i>Enterococcus faecium</i> [ATCC #6569] and <i>Pseudomonas aeruginosa</i> [ATCC #27313]. This product is intended for supplemental disinfection and should be used with registered or approved disinfection chemicals to impart residual concentrations in accordance with state and local regulations.</i>
NSF 50 for Secondary Disinfection	<i>This product has been tested to confirm a minimum inactivation equivalent of 3 log (99.9%) <i>Cryptosporidium parvum</i> in accordance with NSF 50 and the US EPA UV DGM. Consult the manufacturer's Installation and Operating Instructions for the performance operating parameters. This product has met the requirements of NSF/ANSI 50, Annex H.1: Disinfection Efficacy for the \geq minimum of a 3 log (99.9%) reduction of <i>Enterococcus faecium</i> [ATCC #6569] and <i>Pseudomonas aeruginosa</i> [ATCC #27313]. This product is intended for secondary disinfection and should be used with registered or approved disinfection chemicals to impart residual concentrations in accordance with state and local regulations.</i>

The important consideration when reviewing the two standards, is understanding how the testing is completed.

- Supplemental Disinfection. This standard has no mechanism for testing the effective inactivation of cryptosporidium. This test is the original test standard offered through NSF for UV Disinfection and tests a UV generator's performance based on 6 turnovers of the pool.
- Secondary Disinfection. This standard directly tests the UV generator's potential of inactivating cryptosporidium however, the test allows for only a single pass through the UV generator to accomplish this feat. This is a much more difficult test to pass and is appropriately viewed as the preferred standard to ensure full protection.

Armed with this knowledge, when rating a UV disinfection system for use in spray features and spray parks, it is crucial to understand that systems rated for Supplemental Disinfection only will be inferior to those rated for Secondary Disinfection and can present the risk of failing to protect patrons from various chlorine tolerant microorganisms that threaten today's aquatics facilities, such as cryptosporidium.

As such, it is my opinion that the verbiage in section 454.1.6.5.16.6 can benefit from review. Specifically with points 3 and points 4 as envisioned on the following page:



3. UV equipment must be certified for secondary disinfection per NSF 50-2020. Secondary certification is defined by NSF as follows:

This product has been tested to confirm a minimum inactivation equivalent of 3 log (99.9%) cryptosporidium parvum in accordance with NSF 50 and the US EPA UV DGM. Consult the manufacturer's Installation and Operating Instructions for the performance operating parameters. This product has met the requirements of NSF/ANSI 50, Annex H.1: Disinfection Efficacy for the \geq minimum of a 3 log (99.9%) reduction of Enterococcus faecium [ATCC #6569] and Pseudomonas aeruginosa [ATCC #27313]. This product is intended for secondary disinfection and should be used with registered or approved disinfection chemicals to impart residual concentrations in accordance with state and local regulations.

4. UV equipment that is not certified for Secondary Disinfection per NSF 50–2020 shall alternatively be validated via qualified third party in accordance with the USEPA Ultraviolet Disinfectant Guidance Manual dated November 2006, publication number EPA 815-R-06-007. The validation shall list the minimum effective RED (reduction equivalent dose) to provide a 3-log reduction of cryptosporidium. The UV equipment must be capable of maintaining this minimum UV Dose until end of lamp life (EOLL).

Commenting on the absence of the 40mj minimum UV Dose in point number 4, 40mj is a baseline UV Dose target when validating UV systems per the German standard DVGW. This is a “good for most” UV Dose that doesn’t represent a specific target microorganism. The required minimum dose for a 3-log reduction of cryptosporidium is often less than that. USEPA based validations will confirm the minimum UV Dose required to provide a 3-log inactivation of cryptosporidium based on the specific UV generator being tested.

An effective UV Disinfection system should provide adequate disinfection in a single pass. As UV technology does not contribute a residual to the water that can be sampled and tested, it requires an effective means to monitor performance of the system. An additional point to consider would also be:

UV Equipment must have a validated means to effectively monitor and display UV performance (UV Dose) in real time as to provide operators and regulators a way to quickly ascertain proper UV system performance.

It is with these changes that I feel we can effectively ensure that when UV equipment is selected for these applications, they are sized and tested accordingly.

Thank you for your consideration.

Greg Manier

UV Product Specialist

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