RWF Task Group on UV
Straw Ballot
February 5, 2020

Purpose

This straw ballot will revise language relating to low pressure UV lamp testing.

Background

The current standard does not make the distinction between medium and low pressure lamps very clear and treats the application of each technology the same. While there is a clear difference in the output and aging pattern of medium pressure lamps, low pressure lamps have only a 254 and 185 nm peak. This holds true for all manufacturers and designs of the lamp.

In the case of medium pressure lamps, testing may be required due to the variations in the output spectrum and aging. In low pressure systems, however, there can be only one frequency that is of any disinfection interest, the 254 nm spike.

In addition, the standard requires a dosimeter and reports the rating of the system based on this dosimeter. It is not clear why alternate low pressure lamps should require testing.

The RWF Task Group on UV met on 8.9.18 to discuss this matter, and agreed to straw ballot r1 language, which is presented here. That ballot drew 3 comments, and the language has been revised twice in response to comments received and discussion during Task Group calls. This r3 language is the culmination of the group's efforts and is presented here for consideration.

This straw ballot will last two weeks.

The grey highlighted portions of the language are proposed additions to the language of the standard.
The ~~strikeout~~ portions of the language are proposed deletions to the language of the standard.

An affirmative (yes) vote on this straw ballot means you agree with the revised language as submitted.

A negative (no) vote on this straw ballot means you disagree with the revised language as submitted. A negative vote must include an explanation of why you disagree with the revised draft.

[Note – the recommended changes to the standard which include the current text of the relevant section(s) indicate deletions by use of ~~strikeout~~ and additions by grey highlighting. Rationale Statements are in *italics* and only used to add clarity; these statements will NOT be in the finished publication.]

NSF/ANSI Standard

Equipment and Chemicals 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

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15 Ultraviolet (UV) light process equipment

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15.18 UV *Cryptosporidium* inactivation and dose determination

Manufacturers of UV systems with a claim to inactivate cysts (such as *Cryptosporidium*, *Giardia*, etc.) shall demonstrate a minimum 3 log (99.9%) or greater inactivation of *C. parvum* in a single pass.

NOTE — Operators of spray parks, spray pads, or interactive water features with no standing water should consider greater inactivation performance of 4 log (99.99%). The local public health authority may select different levels of log inactivation or power delivery for different applications such as competition lap pools, spas, wave pools, wading pools, etc.

15.18.1 Sample selection

When validating a range of aquatic or recreational water use UV systems for inactivation of cysts such as *C. parvum*, each of the following variables shall be used to determine which UV reactor / systems and components shall be tested within the range of product. Select at least two worst case models from the range of products based upon all of the following variables.

— test the unit representative of the worst-case reactor hydraulics and UV dose delivery as determined by computational fluid dynamics modeling, including intensity and flow modeling;

— test the unit with the lowest power to highest flow rate;

— test one unit of each configuration (if family range contains U and S reactors, test each);

— test one unit of each UV lamp type (if alternate lamp types or suppliers, test each); or

— In the case where the UV system utilizes low pressure (LP) lamps, it is sufficient to provide a data sheet of the lamp that includes the expected lamp life. In addition, the following characteristics of the lamp must be the same:

  - lamp length, the length of the lamp from base face to base face, +/- 0.5 in.
  - the arc length, the lit length, +/- 0.5 in.
  - the diameter, +/- 10%
  - the quartz material, fused silica, synthetic quartz, deep UV blocking
  - electrode current, +/- 0.2 A
  - lamp wattage, +/- 5 W
  - output, 185/254 nm or 254 nm
  - mercury source, elemental, spot amalgam, pocket amalgam, and
  - connections, single ended, double ended

— test one unit of each UV sensor type (if alternate UV sensor types or suppliers, test each).

NOTE — The above variables require that multiple UV systems are tested in order to validate a range of products.

15.18.2 Testing

Products shall be tested to confirm single pass inactivation equivalent to 3 log (99.9%) or greater of *C. parvum* in accordance with NSF/EPA ETV – *Generic Protocol for Development of Test / Quality Assurance Plans for Ultraviolet (UV) Reactors*.**Error! Bookmark not defined.** Only full stream testing shall be acceptable, there shall be no partial or side stream treatment testing.

The manufacturer of a reactor validated for performance under one of the following protocols shall submit details of the testing for evaluation and validation:

— US EPA UV DGM;**Error! Bookmark not defined.**
— DVGW, W-294 Parts 1-3;**Error! Bookmark not defined.** or
— ÖNORM, 5873 1 and 2.**Error! Bookmark not defined.**

Validation of a range of reactors with pre-existing test data shall include testing of at least one (1) unit at one (1) set point to evaluate for potential changes in design, suppliers and corroborate previous data.