TO: Joint Committee on Drinking Water Treatment Units

FROM: Dr. Robert Powitz, Chair of the Joint Committee

DATE: November 22, 2022

SUBJECT: Proposed revisions to NSF/ANSI 42: *Drinking Water Treatment Units – Aesthetic Effects* (42i126r1)

Revision 1 of NSF/ANSI 42 issue 126 is being forwarded to the Joint Committee for consideration. Please review the proposal and **submit your ballot by December 15, 2022** via the NSF Online Workspace <www.standards.nsf.org>.

Please review all ballot materials. When adding comments, please include the section number applicable to your comment and add all comments under one comment number whenever possible. If you need additional space, please use the attached blank comment template in the reference documents and upload online via the browse function.

Purpose

The proposed revisions will update normative references, correct a temperature conversion, update the NIST mass spectral library version, change normative language from “must” to “shall” and make minor grammatical updates.

If you have any questions about the technical content of the ballot, you may contact me in care of:

Dr. Robert Powitz
Chair, Joint Committee on Drinking Water Treatment Units
c/o Monica Milla
Joint Committee Secretariat
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[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 gray highlighting. Rationale statements are in *italics* and only used to add clarity; these statements will NOT be in the finished publication.]

NSF/ANSI Standard
for Drinking Water Treatment Units –

Drinking Water Treatment Units – Aesthetic Effects

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2 Normative references

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NSF/ANSI/CAN 600, *Health Effects Evaluation and Criteria for Chemicals in Drinking Water*

ISO 12103-1:1997, *Road Vehicles – Test dust for filter evaluation – Part 1: Arizona test dust* ~~SAE J726-1993, *Air Cleaner Test Code*~~[5]

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EPA-600/4-82-057~~EPA-600/4-84-053~~, *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, May 2002~~June 1984~~[6]

NIST Standard Reference Database 1A (NIST/EPA/NIH Mass Spectral Library with Search Program), NIST20/NIST v20)[7]

Rationale: Adds NSF/ANSI/CAN 600 which is mentioned in the standard, adds an ISO document which supersedes an SAE document, corrects the document number and publication year of an EPA document, and adds a normative reference for the NIST mass spectral library.

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4.3.1.1 Target compounds shall be validated in accordance with the requirements of the referenced method. US EPA Methods 524.2 and 625**Error! Bookmark not defined.** have specific validation requirements including precision and accuracy requirements as well as demonstration of sensitivity (Method Detection Limit Study or MDL).

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— (e.g., base / neutral, base / neutral / acid, acid) shall be allowed to fall outside the range of 70% to 130% (outlier) of the true value. None of the concentrations shall be allowed to fall below 50% or above 200% of the true value. If a positive sample analyte result is identified for any outlier, a second CCC shall be performed. If the second CCC determines the sample analyte result no longer to be an outlier, the sample shall be reanalyzed. However, if the second CCC also determines the analyte to be an outlier, a new calibration curve shall be determined and the sample shall be reanalyzed.

NOTE — At the laboratory's discretion, a calibration may be performed specifically for the compound in question, with the reporting of its data from this second calibration. It should be understood, that if the laboratory utilizes this approach (calibrating for the specific analyte) all method requirements as specified by Method 625 ~~shall~~ should be achieved.

[5] International Organization for Standardization. Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland. <www.iso.org> ~~SAE International. 400 Commonwealth Drive, Warrendale, PA 15096. <www.sae.org>~~

[6] US Environmental Protection Agency. 1200 Pennsylvania Avenue NW, Washington, DC 20004. <www.epa.gov>

[7] National Institute of Standards and Technology. 100 Bureau Drive, Gaithersburg, MD 20899. <www.nist.gov>

Rationale: Notes cannot contain normative language, so changes "shall" to "should".

4.3.1.2 TICs are identified by comparison of the spectrum of the unknown to the mass-spectral reference library utilizing "probability-based matching" (as available from instrument manufacturers) as well as interpretation by the analyst. The laboratory shall report the TIC with the best match factor (the match factor shall not be reported) except in the following circumstances:

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— the library used during the analysis shall be National Institute of Standards and Technology (NIST) ~~2007~~ NIST20 or most current version. Additional spectral libraries may be used to assist in the identification of unknown compounds. For TICs, the concentration is estimated by comparison of its total ion area response to the total ion area response of the nearest internal standard. For TICs, a response factor of "1" (one) shall be utilized for the purposes of calculating the TICs estimated concentration.

Rationale: Updates the NIST mass spectral library version and corrects "spectra" or "spectral".

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6.9 Active agents and additives

Where an active agent or additive is used in the drinking water treatment process, the product water shall not contain that substance (or its degradation products) at a concentration of toxicological significance as given by the US EPA *Primary Drinking Water Regulations*,**Error! Bookmark not defined.** by the Health Canada *Maximum Acceptable Concentrations*,[2] by any US Federal regulatory agency, or at a concentration that exceeds constituent limits of the US EPA *Secondary Drinking Water Regulations***Error! Bookmark not defined.** for all sample points. If the substance does not have a maximum drinking water concentration established by US EPA or Health Canada, a TAC shall be established according to the requirements of NSF/ANSI/CAN 600, Section 3. ~~NSF/ANSI/CAN 61, Annex A.~~

Rationale: Updates to the current standard.

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7.3.2.6.6 Chloramine formation

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In order to ensure optimal monochloramine formation, the molar concentration of ammonium ion in the challenge water shall be greater than the molar concentration of chlorine in the challenge water.

WARNING – Monochloramine preparation procedures may produce hazardous reaction products. Adequate ventilation must be provided, and appropriate safety precautions ~~must~~ shall be taken.

a) The challenge water shall first be adjusted for all other water characteristics as specified in Section 7.3.2.5 before the formation of monochloramine.

b) Ammonium chloride, NH_4Cl, shall be added to the challenge water to a concentration of 6 mg/L.

c) A 12% w/w sodium hypochlorite, NaOCl, shall then be added to achieve a concentration of 0.037 mL/L in the challenge water. The sodium hypochlorite solution shall be diluted at least 10:1 prior to adding to the challenge water.

WARNING – Do not combine ammonium chloride and sodium hypochlorite directly. The ammonium chloride ~~*must*~~ shall be diluted into the challenge water before the addition of sodium hypochlorite. If this procedure is not followed, hazardous reaction products may be formed.

Rationale: Updates normative language from "must" to "shall".

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8.2.2.3.1 Allowance for chlorine and/or monochloramine claims:

— in the specific case where chlorine and monochloramine are the only claims made with a rated capacity in liters (gallons) for a unique model number designation, the rated capacity / rated service life in liters (gallons) shall be separately and uniquely identified for chlorine and monochloramine claims, if requested by the manufacturer; and

— wherever a rated capacity is stated which is greater than the minimum claimed capacity, all rated capacities, rated service flow(s), and their associated claim shall be presented in the same type size and font in immediate proximity. The only additional claims allowed for a unique model number designation under Section 8.2.2.3.1 are those claims that do not have a volumetric rated capacity associated with them (e.g., ~~i.e.,~~ particulate, cyst).

Rationale: Updates "i.e." ("that is" or "in other words") to "e.g." ("for example").

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Normative Annex 2

Test method for evaluating mouth drawn water treatment units

N-2.1 Scope and purpose

It is the purpose of this protocol to evaluate mouth drawn drinking water treatment devices for elective performance claims. The product ~~must~~ shall be designed that the only method of generating treated water for consumption is by drawing from the unit by the user's mouth (by creation of a vacuum). If the product can be squeezed to dispense water (squeeze bottle as defined by NSF/ANSI 330) as well as mouth drawn, the squeeze bottle protocol shall be used.

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Normative Annex 5

Evaluation methods for systems with multiple technologies – Treatment train

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The minimum performance criteria are applied from all NSF/ANSI standards used in the evaluation of the system. The first stage influent (as required) and the final stage effluents are used to evaluate the performance of the system and ~~must~~ shall successfully meet all performance criteria.

N-5.1 Example application of treatment train option C

In this example the same system as shown above in Figure 6 is used with the change that the postfilter is a cartridge intended to remove Arsenic III. The contaminant claims sought for this system is Arsenic III reduction as Arsenic V reduction can be achieved by option A under NSF/ANSI 58. The postfilter is designed to remove arsenic III, but only in a low TDS environment without the significant presence of other competing ions. This qualifies this test to be performed under option C because the RO system will not effectively reduce arsenic III and the postfilter will not effectively reduce arsenic III under the test water conditions in NSF/ANSI 53 without the RO being present upstream. To adequately evaluate the performance of this system, it ~~must~~ shall be evaluated under option C.

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Normative Annex 6

Preparation of TOC solution using tannic acid

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N-6.3 Safety

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N-6.3.1 THIS IS A VERY EXOTHERMIC REACTION! Caution ~~must~~ shall be taken to control the heat generated.

Rationale: Updates normative language from "must" to "shall".

N-6.3.1.1 Take care when weighing out the dry tannic acid to avoid creating tannic dust in the air.

N-6.3.1.2 Use an ice bath to keep the temperature below 30 °C (~~54~~86 °F). Place a thermometer in the solution to monitor the temperature throughout the procedure.

N-6.3.1.3 Add the tannic acid slowly over time to ensure the ice bath can dissipate the heat properly.

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N-6.6 Solution preparation

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d) Set up a thermometer in the bleach so you can constantly monitor the temperature of the reaction. Keep the temperature below 30 °C (~~54~~86 °F).

e) Weigh out 93 g of tannic acid and slowly start adding it to the bleach in about 10 g increments every 5 to 10 min. You can add it faster as long as the temperature does not go over 30 °C (~~54~~86 °F). You can scale up the reaction if necessary, as long as you keep the ratio of tannic acid / bleach the same (100 g tannic acid / gal bleach).

Rationale: Corrects a temperature conversion.