MEMORANDUM

TO: Joint Committee on Drinking Water Treatment Units

FROM: Robert Powitz, Chairperson

DATE: November 5, 2020

SUBJECT: Proposed revision to NSF/ANSI 42 – Drinking Water Treatment Units - Aesthetic Effects (42i108r1)

Revision 1 of NSF/ANSI 42 issue 108 is being forwarded to the Joint Committee for balloting. Please review the changes proposed to this standard and submit your ballot by November 30, 2020 via the NSF Online Workspace. <www.standards.nsf.org>

When adding comments, please identify the section number/name for your comment and add all comments under one comment number where possible. If you need additional space, please upload a word or pdf version of your comments online via the browse function.

Purpose

The proposed revision will correct the improper use of requirements (i.e., “shall”) in notes and informative annexes, update normative references, and correct minor typos.

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

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Chairperson, Joint Committee
c/o Monica Leslie
Joint Committee Secretariat
NSF International
Tel: (734) 827-5643
Email mleslie@nsf.org
NSF/ANSI Standard
for Drinking Water Treatment Units –
Drinking Water Treatment Units –
Aesthetic Effects

2 Normative references

EPA-600/4-79-020, Methods for the Chemical Analysis of Water and Wastes, March 1983

EPA-600/4-84-053, Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, June 1984

EPA-600/R-05/054, Method 521: Determination of Nitrosamines in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography with Large Volume Injection and Chemical Ionization Tandem Mass Spectrometry (MS/MS), September 2004

EPA-600/R-94/111, Methods for the Determination of Metals in Environmental Samples, Supplement 1, May 1994

EPA-600/4-90/020, Methods for the Determination of Organic Compounds in Drinking Water, Supplement 1, July 1990

Rationale: Designation for normative reference corrected.

1 US Environmental Protection Agency. 1200 Pennsylvania Avenue NW, Washington, DC 20004. <www.epa.gov>
4 Materials

4.1.3 Acceptance criteria

4.1.3.1 Materials in contact with drinking water shall not impart levels of target compounds or tentatively identified compounds (TICs) that exceed the total allowable concentration (TAC), maximum contaminant levels (MCL), or maximum acceptable concentration (MAC) criteria specified in NSF/ANSI/CAN 61, Annex D, Table D.1 600, Table 4.1. Any extractable contaminants not listed in the referenced Tables shall be reviewed and shall not exceed criteria developed in accordance with NSF/ANSI/CAN 61, Annex A 600, Section 3.

4.1.3.5 Whole system or component assembly extraction testing may be waived if components, when separately tested, meet the requirements of this Standard and are assembled in a manner that does not introduce any new components or materials, increase the surface area-to-volume ratio of previously evaluated components, or present potential concern based on cumulative factors. The reported extractable concentrations for components shall be arithmetically added to ensure that the whole system or component assembly meets the allowable levels in accordance with Tables 4.1, 4.2, and 4.3, NSF/ANSI/CAN 61, and NSF/ANSI/CAN 600, Annexes A, D, and E of NSF/ANSI/CAN 61.

Rationale: In 2018, Annexes A and D were removed from NSF/ANSI/CAN 61 and moved to the newly created standard NSF/ANSI/CAN 600.

5 Structural performance

5.2 Acceptance

Each test of structural integrity (cyclic pressure and hydrostatic pressure) shall be performed on a separate system. If the complete water treatment system is tested, a separate test of the system pressure vessel is not required.

Complete systems, pressure vessels, and components shall be tested for structural integrity in accordance with Section 5.4 at the pressures specified in Table 5.1. When more than one pressure is specified in Table 5.1, testing shall be done at the higher pressure.

Complete systems, pressure vessels, and components shall be watertight when tested for structural integrity under Section 5.4.

NOTE—Weepage shall be considered acceptable at the beginning of a test, but weepage shall not begin in the middle of a test.

Rationale: Removed “note” from normative language.
7 Elective performance claims – Test methods

7.1.2 Apparatus

A test apparatus capable of providing specified flow rates and static pressures shall be used. Refer to Figure 2 for an example diagram.
Any suitable pressure or delivery system

NOTE 1 — Faucet-attached systems and portable systems are shall be placed after control valves.

NOTE 2 — Solenoid valves are shall be controlled by appropriate timer(s).

NOTE 3 — Mechanical filter is shall be a particulate reduction, Class I, without any adsorptive or absorptive media.

**Figure 2**

*Example test apparatus*
Rationale: This is an example of an apparatus and not normative itself so “shall be” was revised to “are.”

7.3.2 Chloramine reduction testing

7.3.2.1 Chloramine reduction claims

Claims for the reduction of chloramine may be made for drinking water treatment systems when tested in accordance with Section 7.3.2. The system shall reduce an average influent challenge of 3.0 ± 0.3 mg/L monochloramine (measured as Cl₂/L) so that, prior to the 100% sampling point, 90% of the product water sample concentrations are less than or equal to 0.5 mg/L monochloramine (measured as Cl₂/L). Samples collected at the 100% sample point shall be less than or equal to 0.5 mg/L monochloramine (measured as Cl₂/L).

NOTE — The acceptable single point influent concentration is 3.0 ± 0.5 mg/L (measured as Cl₂/L).

Upon the determination of a reduction capacity for chloramine, systems may also claim reduction of chlorine to the same reduction capacity as that demonstrated for chloramine.

Table 7.2
Chloramine reduction requirements

<table>
<thead>
<tr>
<th>Compound</th>
<th>Average influent challenge concentration</th>
<th>Individual influent sample point limits¹</th>
<th>Percent reduction requirement Concentration</th>
<th>Maximum effluent concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>chloramine²</td>
<td>3.0 mg/L ± 10%</td>
<td>3.0 ± 0.5 mg/L</td>
<td>0.5 mg/L</td>
<td>monochloramine</td>
</tr>
</tbody>
</table>

¹ Equals average influent challenge concentration variability plus one of the following, in order of availability:

1. Acceptable continuing calibration verification (CCV) limits stated in the appropriate US EPA Method.
2. Acceptable spike recoveries as stated in the appropriate US EPA Method.

² As monochloramine (measured as Cl₂/L).

Rationale: Corrected header in Table 7.2 to reflect requirement provided in table.

7.2.3.3 POE test water

A public water supply or equivalent with a minimum temperature of 20 °C (68 °F) shall be used. Test water shall comply with US EPA Primary and Secondary Drinking Water Regulations.

NOTE — The test water shall be protected from light to minimize algal growth.

Rationale: Removed “note” from normative language.
7.3.2.3.2 Monochloramine analysis

Analyses for monochloramine reduction testing shall be performed in accordance with either the DPD Ferrous Titrimetric Method (4500-Cl F) or the DPD Colorimetric Method (4500-Cl G) in Standard Methods for the Examination of Water and Wastewater. The method used for monochloramine analysis shall be validated for the challenge water used (see Section 7.3.2.5). A challenge water sample shall be split for analysis by both the selected method and the HPLC Method defined in Annex N-1. A minimum of seven analyses shall be generated from the split sample using both the selected analytical method and the HPLC method. The monochloramine results from both methods shall be compared using a Student’s $t$ test, and no significant difference shall be observed at the 95% confidence level. Subsequent monochloramine analysis shall be according to the selected method after successful validation.

NOTE 1 — When significant changes to the challenge water chemistry occur (e.g., change from municipal to synthetic water), revalidation of the selected monochloramine method shall be performed.

Rationale: Removed “note” from normative language.

NOTE 2 — As an alternative, the HPLC method in Annex N-1 may be used for all monochloramine analyses.

7.3.2.7.1 Plumbed-in systems and faucet mounted systems

Two systems shall be conditioned in accordance with the manufacturer's instructions and Section 7.3.2.7. The systems shall be tested at the manufacturer's rated service flow rate or a higher flow rate specified by the manufacturer. The systems shall be tested at an initial dynamic pressure of 410 kPa (60 psig), unless a higher pressure is required to attain the specified flow rate. The pressure shall be increased as necessary to a maximum of 620 kPa (90 psig) to maintain the specified flow rate. The flow rate shall be additionally controlled by a control valve installed downstream of the test systems.

NOTE — If the manufacturer's rated service flow rate cannot be maintained at 620 kPa (90 psig), the test shall be concluded.

Rationale: Removed “note” from normative language.

7.3.2.7.3 POE systems

One system shall be conditioned in accordance with the manufacturer's instructions and Section 7.3.2.7. The system shall be tested using the appropriate influent challenge at the manufacturer's rated service flow rate and an initial dynamic pressure of 410 ± 20 kPa (60 ± 3 psig). The pressure shall be increased as necessary to a maximum of 620 kPa (90 psig) to maintain the specified flow rate. The flow rate shall be additionally controlled by a control valve installed downstream of the test systems. The system shall be operated continuously 16 h per 24 h period followed by an 8 h rest under pressure or if requested by the manufacturer the systems shall be operated on a 50%-on / 50%-off basis, 16 h per 24 h period, followed by an 8 h rest under pressure. The cycle time shall be no shorter than 20 min.

NOTE — If the manufacturer's rated service flow rate cannot be maintained at 620 kPa (90 psig), the test shall be concluded.
Rationale: Removed “note” from normative language.

7.3.4.6 Influent challenge

7.3.4.6.1 Hydrogen sulfide and phenol reduction test water

A water supply with the following specific characteristics shall be used.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.5 ± 0.5</td>
</tr>
<tr>
<td>temperature</td>
<td>20 ± 3 °C (68 ± 5 °F)</td>
</tr>
<tr>
<td>TDS</td>
<td>200 to 500 mg/L</td>
</tr>
<tr>
<td>TOC</td>
<td>≥ 1.0 mg/L</td>
</tr>
<tr>
<td>total chlorine</td>
<td>&lt; 0.02 mg/L</td>
</tr>
<tr>
<td>turbidity</td>
<td>&lt; 1 NTU</td>
</tr>
</tbody>
</table>

NOTE — For hydrogen sulfide testing, the test water shall be protected from exposure to air.

Rationale: Removed “note” from normative language.

7.3.6.6 Influent challenge

7.3.6.6.1 pH adjustment test water

A water supply with the following specific characteristics shall be used.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>temperature</td>
<td>20 ± 3 °C (68 ± 5 °F)</td>
</tr>
<tr>
<td>TDS</td>
<td>200 to 500 mg/L</td>
</tr>
<tr>
<td>TOC</td>
<td>≥ 1.0 mg/L</td>
</tr>
<tr>
<td>turbidity</td>
<td>&lt; 1 NTU</td>
</tr>
</tbody>
</table>

NOTE — If precipitation of heavy metals occurs, deionized water should be substituted for the public water supply, and magnesium or calcium salts should be added to provide the desired TDS. In this case it is permissible to waive the TOC requirements shall be waived, and modify the pH requirement shall be modified accordingly.

Rationale: Revised note to specify a recommendation rather than a normative requirement.

7.3.7.6 Influent challenge
7.3.7.6.1 Zinc reduction test water

A water supply with the following specific characteristics shall be used.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.5 ± 0.5</td>
</tr>
<tr>
<td>temperature</td>
<td>20 ± 3 °C (68 ± 5 °F)</td>
</tr>
<tr>
<td>TDS</td>
<td>200 to 500 mg/L</td>
</tr>
<tr>
<td>TOC</td>
<td>≥ 1.0 mg/L</td>
</tr>
<tr>
<td>alkalinity (as CaCO$_3$)</td>
<td>20 to 40 mg/L</td>
</tr>
<tr>
<td>turbidity</td>
<td>&lt; 1 NTU</td>
</tr>
</tbody>
</table>

NOTE — If precipitation of heavy metals occurs, deionized water should be substituted for the public water supply, and magnesium or calcium salts should be added to provide the desired TDS. In this case it is permissible to waive the TOC requirements, and modify the pH requirement accordingly.

Rationale: Revised note to specify a recommendation rather than a normative requirement.

7.4.2 Nominal particulate reduction (85%) claims

Claims for nominal particulate reduction (85%) shall be made using the classes specified in Table 7.8. In order to receive a specific class rating, the system shall reduce the number of particles in the tested particle size range by at least 85% when tested in accordance with Section 7.4. The system’s rating shall be consistent with the smallest particle size effectively removed as determined by the test. A claim for a greater percent reduction, if made, shall be substantiated by testing.

NOTE — Nominal particulate reduction (85%) systems shall not claim a rated capacity due to the broad variation in the quantity of particulate matter found in drinking water.

Rationale: Exemption for listing treatment capacity moved to the product literature requirements under section 8.

7.5.5 Scale control test water

A water supply with the following specific characteristics shall be used.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.5 ± 0.5</td>
</tr>
<tr>
<td>temperature</td>
<td>20 ± 3 °C (68 ± 5 °F)</td>
</tr>
<tr>
<td>TDS</td>
<td>200 to 500 mg/L</td>
</tr>
<tr>
<td>TOC</td>
<td>≥ 1.0 mg/L</td>
</tr>
<tr>
<td>turbidity</td>
<td>&lt; 1 NTU</td>
</tr>
</tbody>
</table>

Test water shall be modified for systems requiring certain water quality.
NOTE — If precipitation of heavy metals occurs, deionized water should be substituted for the public water supply, and magnesium or calcium salts should be added to provide the desired TDS. In this case it is permissible to waive the TOC requirements, and modify the pH requirement accordingly.

**Rationale:** Revised note to specify a recommendation rather than a normative requirement.

**NOTE 2** Appropriate labeling stating the specified use restrictions shall be provided, as specified in Section 8.

**Rationale:** Removed “note” from normative language.

### 8 Instruction and information

#### 8.1 Installation, operation, and maintenance instruction

**8.1.1** Information setting forth complete, detailed instructions for installation, operation, and maintenance shall be provided with each system. Specific information shall include:

- rated capacity / rated service life in liters (gallons);

**NOTE**

- Each unique model designation shall claim a capacity no greater than the least reduction capacity that has been verified through testing to NSF/ANSI 42, NSF/ANSI 53, or NSF/ANSI 58 section for VOC reduction.
- Nominal particulate reduction (85%) systems shall not claim a rated capacity due to the broad variation in the quantity of particulate matter found in drinking water.

- minimum working pressure in kPa (psig);

**Rationale:** Removed note from normative language and added exemption for nominal particulate claims. Reformatted to include exemptions for rated capacity listing requirement as indented subsection.

**8.2.1.2** Where applicable and appropriate, the following information shall also be included:

- model number of replacement components;
- electrical requirements; and
- statement for activated carbon systems:

  "Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system."


Rationale: Removed “note” from normative language.

8.2.2.3 Where applicable and appropriate, the following information shall also be included:

- rated capacity / rated service life in liters (gallons). If applicable rated capacity / rated service life in liters (gallons) is not included on the modular element data plate, a statement that rated capacity / rated service life in liters (gallons) may be found on the performance data sheet shall be included;

NOTE Each unique model number designation shall claim a capacity or service life no greater than the least reduction capacity or service life that has been verified through testing to NSF/ANSI 42 or 53.

- Nominal particulate reduction (85%) systems shall not claim a rated capacity due to the broad variation in the quantity of particulate matter found in drinking water.

Rationale: Removed note from normative language and added exemption for nominal particulate claims. Reformatted to include exemptions for rated capacity listing requirement as indented subsection.

8.3.2 Where applicable, the following information shall also be included:

- rated capacity / rated service life in liters (gallons);

NOTE Each unique model designation shall claim a capacity or service life no greater than the least reduction capacity or service life that has been verified through testing to NSF/ANSI 42.

- Nominal particulate reduction (85%) systems shall not claim a rated capacity due to the broad variation in the quantity of particulate matter found in drinking water.

Rationale: Removed note from normative language and added exemption for nominal particulate claims. Reformatted to include exemptions for rated capacity listing requirement as indented subsection.

- operating or exchange steps;

- statement that the system conforms to NSF/ANSI 42 for the specific performance claims as verified and substantiated by test data; and

- statement for activated carbon systems:

"Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system."

NOTE Where the physical size of the component does not permit affixing the caution statement to the component, the statement shall be prominently displayed in the literature accompanying the component.
Rationale: Removed “note” from normative language.

8.4 Performance data sheet

8.4.1 A performance data sheet shall be available to potential buyers for each system and shall include the following information:

- rated capacity / rated service life in liters (gallons);

  NOTE Each unique model designation shall claim a capacity or service life no greater than the least reduction capacity or service life that has been verified through testing to NSF/ANSI 42.

- Nominal particulate reduction (85%) systems shall not claim a rated capacity due to the broad variation in the quantity of particulate matter found in drinking water.

Rationale: Removed note from normative language and added exemption for nominal particulate claims. Reformatted to include exemptions for rated capacity listing requirement as indented subsection.

- maximum working pressure in kPa (psig);

- statement for claims:

  “This system has been tested according to NSF/ANSI 42 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.”

  NOTE 1 Minimum substance reductions per NSF/ANSI 42 shall be listed using the values in Tables 8.1 and 8.2.

  NOTE 2 In addition to this statement, advertising materials may show the average percent reduction determined during verification.

  NOTE 3 Average concentrations shall be the arithmetic mean of all reported influent challenge or product water concentrations (the detection limit value shall be used for any nondetectable concentration). The specified average percent reduction shall not be greater than the reduction calculated using the arithmetic means of the influent challenge and the product water concentrations respectively.

Rationale: Removed “note” from normative language.

8.4.3 For commercial systems, in addition to the requirements set forth in Section 8.4.1, additional considerations are as follows:
— a performance data sheet may be developed for each modular element of the system, and/or for a group of modular elements, or both; and

Rationale: Revised phrase from “and/or” per ANSI requirements for normative standard language.

I-1.1 Toxicological evaluation of materials formulations

Formulation information of each material used in the fabrication of the system and/or components should be provided to and maintained on file by the certifying organization. The formulation information should include, at a minimum:

— the complete chemical identity or proportion by weight;
— ingredient sources of supply;
— documentation regarding the health effects concern of each ingredient in the material; and
— documentation regarding the suitability of each ingredient for use in potable water contact material.

Rationale: Revised language from “shall” to “should” as informative annexes do not contain normative requirements.