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American National Standard

NSF/ANSI 62 - 2017

Drinking Water Distillation Systems

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Chair, Joint Committee on Drinking Water Treatment Units
c/o NSF International
789 North Dixboro Road, P. O. Box 130140
Ann Arbor, Michigan 48113-0140 USA
Phone: (734) 769-8010 Telex: 753215 NSF INTL
FAX: (734) 769-0109
E-mail: info@nsf.org
Web: http://www.nsf.org

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NSF International Standard/
American National Standard
for Drinking Water Treatment Units –

Drinking water treatment units – Aesthetic effects

Standard Developer

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Contents

Foreword[2]

The purpose of this Standard is to establish minimum requirements for materials, design, construction, and performance of drinking water treatment units that are designed to reduce specific aesthetic-related contaminants in public or private water supplies. This Standard specifies the minimum product literature and labeling information that a manufacturer must supply to authorized representatives and system owners. Lastly, the Standard provides minimum service-related obligations that the manufacturer must extend to system owners.

This edition of the Standard contains the following revisions:

Issue 87

This revision addresses sample collection for systems containing multiple potable water outlets under section 4.2.3.

Issue 90

An alternative use pattern was added to the methods for point of entry devices.

Issue 91

An optional iron influent challenge of 10 mg/L was added.

Issue 93

A method for exposure of fine media was incorporated.

Issue 94

Normative references were updated.

Issue 95

The EPA Method 521 reference for analyzing nitrosamines in the materials extraction testing was included in section 4.

Issue 96

Evaluation criteria columns from tables 4.1, 4.2, and 4.3 were removed and now reference the evaluation criteria in Annex D, Table D.1 in NSF/ANSI 61.

This Standard was developed by the NSF Joint Committee on Drinking Water Treatment Units using the consensus process described by the American National Standards Institute.

Suggestions for improvement of this Standard are welcome. This Standard is maintained on a Continuous Maintenance schedule and can be opened for comment at any time. Comments should be sent to Chair, Joint Committee on Drinking Water Treatment Units at standards@nsf.org, or c/o NSF International, Standards Department, P.O. Box 130140, Ann Arbor, Michigan 48113-0140, USA.

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NSF/ANSI Standard
for Drinking Water Treatment Units –

Drinking water treatment units –
Aesthetic effects

1 General

1.1 Purpose

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

1.2 Scope

The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private) considered to be microbiologically safe and of known quality. Systems covered under this Standard are intended to reduce substances affecting the aesthetic quality of the water or to add chemicals for scale control, or both. Substances may be soluble or particulate in nature at concentrations influencing public acceptance of the drinking water. It is recognized that a system may be effective in controlling one or more of these substances but is not required to control all. Systems with components or functions covered under other NSF or NSF/ANSI standards or criteria shall conform to the applicable requirements therein.

1.3 Alternate materials, designs, and construction

While specific materials, designs, and construction may be stipulated in this Standard, systems that incorporate alternate materials, designs, and construction may be acceptable when it is verified that such systems meet the applicable requirements stated herein.

1.4 Chemical and mechanical reduction performance claims

1.4.1 All NSF/ANSI 42 performance claims shall be verified and substantiated by test data generated under the requirements of NSF/ANSI 42.

1.4.2 When performance claims are made for substances not specifically addressed in the scope of this Standard or for substances not specifically addressed but falling under the scope of NSF/ANSI 42, such claims shall be identified as not specifically addressed in the Standard.

1.5 Minimum requirements

This Standard establishes minimum requirements.

A system as defined in this Standard shall meet the applicable requirements of 4, 5, 6, and 8, and at least one performance claim as described in 7.

A component as defined in this Standard shall meet the requirements of 4 and 8. If the component is pressure-bearing, it shall also meet the applicable requirements of 5.

A commercial modular system as defined in this Standard shall meet the applicable requirements of 4, 5, 6, and 8, and at least one performance claim as described in 7. Manifolds of commercial modular systems shall meet the requirements of 4, 5 (if pressure bearing), and 8, and shall be evaluated as stand-alone components. Manifolds shall have a minimum internal diameter such that the water velocity in the manifold will not exceed 3 m (10 ft) per second (which can be calculated based upon the system flow rate and the manifold internal diameter). Individual modular elements evaluated as a manifold and modular element combination shall meet the applicable requirements of 4, 5, 6, and 8, and at least one performance claim as described in 7.

1.6 Treatment train

A system that contains multiple, sequential treatment technologies for a performance claim under this Standard shall meet the applicable requirements as described in Annex G.

2 Normative references

The following documents contain requirements that, by reference in this text, constitute requirements of this Standard. At the time of publication, the indicated editions were valid. All of the documents are subject to revision and parties are encouraged to investigate the possibility of applying the recent editions of the documents indicated below. The most recent published edition of the document shall be used for undated references.

21 CFR §. Parts 170-199. Food and Drugs[3]

APHA, *Standard Methods for the Examination of Water and Wastewater*, twentieth edition[4]

NSF/ANSI 51. *Food Equipment Materials*

NSF/ANSI 53. *Drinking water treatment units – Health effects*

NSF/ANSI 60. *Drinking water treatment chemicals – Health effects*

NSF/ANSI 61. *Drinking water system components – Health effects*

ISO 12103-1:1997. *Road Vehicles – Test dust for filter evaluation – Part 1: Arizona test dust*[5]

USEPA-600/4-79-020. *Methods for the Chemical Analysis of Water and Wastes*, March 1983[6]

USEPA-600/4-84/053. *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, June 1984[6]

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[3] USFDA –CFR Code of Federal Regulations Title 21 <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm>

[4] American Public Health Association (APHA), 800 I Street, NW, Washington, DC 20001 <www.ahpa.org>.

[5] International Organization for Standardization (ISO), Case postale 56, CH-1211 Geneve 20, Switzerland <www.iso.org>.

[6] USEPA, Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268 <www.epa.gov>.

USEPA-600/R-05/054. *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[6]

USEPA-600/R-94/111. *Methods for the Determination of Metals in Environmental Samples*, Supplement 1, May 1994[6]

USEPA-90/020. *Methods for the Determination of Organic Compounds in Drinking Water*, Supplement 1, July 1990[6]

USEPA *Guidelines Establishing Test Procedures for the Analysis of Pollutants*, 40 CFR Part 136[7]

USEPA *National Primary Drinking Water Regulations*, 40 CFR Part 141[7]

USEPA *National Secondary Drinking Water Regulations*, 40 CFR Part 143[7]

3 Definitions

Terms used in this Standard that have a specific technical meaning are defined in NSF/ANSI 330.

4 Materials

4.1 Materials in contact with drinking water

4.1.1 POE drinking water treatment units shall conform to the protocol in NSF/ANSI 61.

4.1.2 POU drinking water treatment units shall conform to the protocol in this section.

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 61 Annex D, Table D.1. Any extractable contaminants not listed in the referenced tables shall be reviewed and shall not exceed criteria developed in accordance with NSF/ANSI 61 Annex A.

4.1.3.2 TIC identification and quantitation shall be conducted in accordance with section 4.3.1.2. Additional TIC identification and quantitation should be verified using a standard of the compound in question or an alternate approved analytical method. Additional TIC identification and quantitation is recommended when the contaminant is a health risk or when the "Probability Based Matching" process in section 4.3.1.2 is inconclusive. When possible, the product manufacturer should assist and support the testing laboratory in the identification of a standard for the compound and an appropriate analytical method, if applicable, so that confirmatory identification and quantification can be performed. If a standard and an adequate alternative analytical method are not available to verify the identification and quantitation of the compound, the TIC shall be evaluated according to section 4.3.1.2.

> NOTE — Manufacturers may not be privy to formulation information, so they may not be able to assist a testing laboratory to identify a standard for the compound that extracted. Refer to Section 4.3.1.2 when the manufacturer does not have material formulation information.

4.1.3.3 Unknown contaminants detected by GC/MS analysis for which identification is unable to be made after performing the steps in 4.3.1 shall be reported in accordance to 4.1.4.2.

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[7] Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402 <www.gpo.gov>.

4.1.3.4 The concentration of active agents or additives used in the drinking water treatment process shall be evaluated in the product water as specified in 6.10. The concentration of active agents or additives used in the drinking water treatment process shall not be evaluated during extraction testing.

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 and Annex A, D, and E of NSF/ANSI 61.

4.1.4 Data reporting

4.1.4.1 All contaminants identified and detected at or above the reporting limit shall be reported with the identification of the contaminant, the concentration, and whether it exceeds the acceptance criteria as required in Section 4.1.3. Contaminants detected at or below the reporting limit shall be reported to the manufacturer as less than the reporting limit’s value.

> Example: If the lab’s reporting limit is 1.0 mg/L for analyte “X” and the concentration was detected at 0.5 mg/L, the lab shall report less than 1.0 mg/L or <1.0 mg/L.

4.1.4.2 If the extractable contaminant cannot be identified following the procedures in 4.3.1 the laboratory shall supply the manufacturer with the approximate molecular weight along with any additional information about the compound.

4.2 Materials evaluation

Complete formulation information on any material not certified as specifically compliant with the sections of the U. S. Code of Federal Regulations, Title 21, listed in table 4.4, shall be reviewed to determine whether the material presents a health effects concern in contact with drinking water and to assess the material's potential for contributing contaminants to the drinking water. As a minimum level of information for those materials requiring submission of formulation information, the complete chemical identity and proportion by weight (in some cases approximate weights or proportions may suffice) and ingredient sources of supply shall be provided.

The following additional information is required when available:

— a list of the known or suspected impurities within the product or material and the maximum percent or parts by weight of each impurity;

— the water solubility, hydrolysis products, and extraction rates of chemicals within the product or material; and

— a list of toxicological studies relevant to the chemicals and impurities present in the product, component, or material.

4.2.1 Analytical methods

All analyses shall be conducted in accordance with the applicable method(s) referenced in 2.

4.2.1.1 The laboratory shall validate the analytical method to the reporting limit (RL) concentration following the procedures established in the referenced method. The laboratory shall evaluate its method detection limit (MDL) in reference to the RL. In all cases, the RL shall be equal or greater than the MDL. When preparing its calibration standards, the lowest calibration point shall be at or less than the RL.

4.2.1.2 For extracted techniques (e.g., USEPA Method 625), regarding the concentration of the lowest calibration point, the laboratory shall apply the concentration factor due to sample preparation. For example, a sample one liter extracted, and the extract concentrated to 1.0 milliliter, for a factor of 1000, if the RL is set to 0.2 ug/L, then the lowest calibration point would be at or less than 0.2 mg/L.

NOTE — See Annex C for additional information on GC/MS and other alternative methods.

4.2.2 Exposure water

Systems and components shall be exposed to locally available tap water that has been adjusted to contain 50 ± 5 mg/L total dissolved solids and 0.5 ± 0.05 mg/L free available chlorine, and to have a pH of 6.75 ± 0.25. Exposure water used to evaluate systems or components shall be 23 ± 2 °C (73 ± 3 °F). Any existing concentrations of extraction testing parameters listed in tables 4.1, 4.2, and 4.3 found to be present in the exposure water shall be subtracted from the values obtained in the analysis of the extractant water.

4.2.3 Exposure

4.2.3.1 The system or component(s) of a system shall be installed, flushed, and conditioned in accordance with the manufacturer's instructions using the exposure water specified in 4.2.2 at an initial inlet static pressure of 340 kPa (50 psig).

4.2.3.1.1 For media finer than 100 mesh, testing shall be conducted in flasks with a ratio of 200 grams media to 1L of exposure water specified in 4.2.2. Testing shall be completed at ambient atmospheric pressure and at a temperature of 23 ± 2 °C (73 ± 3 °F). Sufficient flasks shall be utilized to collect a minimum of 600 mL of water at each pour-off, or the necessary volume for analysis, whichever is greater. The flasks shall be shaken vigorously for one minute and allowed to settle for 24 hours. After 24hrs of exposure, the sample water shall be collected and retained. The flask shall be refilled with the same volume of exposure water that was extracted. The flasks will be shaken vigorously for one minute and allowed to settle for 24 hours. A second water sample shall be collected and the flasks refilled. The flasks shall be shaken vigorously for one minute and allowed to settle for 24 hours. A third water sample shall be collected. All samples collected shall be composited and analyzed in accordance with 4.2.1. One control flask with 2L of exposure water shall be processed in the same manner as above.

4.2.3.2 The system or component(s) shall be refilled with the exposure water specified in 4.2.2 and maintained for 24 h at a temperature of 23 ± 2 °C (73 ± 3 °F). A 2-L water sample shall then be collected in accordance with 4.2.3.3. The system or component(s) shall be flushed according to the manufacturer's instructions, refilled, and maintained for another 24 h at a temperature of 23 ± 2 °C (73 ± 3°F). A second 2-L water sample shall be collected in accordance with 4.2.3.3. The system or component(s) shall again be flushed according to the manufacturer's instructions, refilled, and maintained for a third period of 24 h at a temperature of 23 ± 2 °C (73 ± 3 °F). A third 2-L water sample shall be collected in accordance with 4.2.3.3.

4.2.3.3 A minimum sample volume of 2 L shall be collected at each sample point. If the water-holding volume of the product is greater than 2 L, the entire volume shall be collected in a suitable collection vessel, and a 2-L subsample obtained from this volume. If the water-holding volume of the product is less than 2 L, sufficient samples shall be exposed to provide the required 2-L volume of extractant water. The maximum number of samples exposed shall not exceed 16 with 125 mL of extractant water drawn from each sample. If the components with a water-holding volume that is less than 250 mL and is able to be identified as one that will only occur once in the flow path of dispensed treated water (such as diverters, faucets, RO shutoff valves, or specialty components) then a volume of 250 mL shall be drawn from each sample using a maximum number of 8 samples.

4.2.3.4 All samples collected shall be composited and analyzed in accordance with 4.2.1. For multiple-outlet systems, a composite sample shall be collected from all potable water outlets. The unit volume of the system shall be divided by the total number of potable water outlets and this amount shall be collected from each outlet.