

WaterSense® Specification Development Update: Point-of-Use Reverse Osmosis Systems

I. Introduction

In December 2022, the U.S. Environmental Protection Agency (EPA) published a *WaterSense® Draft Specification for Point-of-Use Reverse Osmosis (RO) Systems*. A point-of-use RO system is a water treatment system connected to a single fixture that uses the RO process to remove contaminants from the incoming water supply. While RO systems can effectively reduce contaminants of concern from drinking water, they can also generate a significant amount of water waste during operation. A typical point-of-use RO system sends five gallons of water or more down the drain for every gallon of treated water it produces. EPA is developing a WaterSense specification for point-of-use RO systems to help consumers identify RO systems that use less water while still providing the water quality that users expect.

Since the release of the draft specification, EPA has received public comments on the draft specification and continues to engage with the NSF International (NSF) Joint Committee on Drinking Water Treatment Units (DWTU) to monitor and propose changes to the NSF/American National Standards Institute (ANSI) 58 *Reverse Osmosis Drinking Water Treatment Systems* standard. This report serves to update interested parties on the progress made to date to finalize the specification.

II. Overview of Draft Specification for Point-of-Use RO Systems

The draft specification proposes criteria for point-of-use RO systems to earn the WaterSense label. In summary, the draft specification includes:

- General requirements – systems must conform with NSF/ANSI 58 and include an automatic shutoff valve.
- Water efficiency requirements – systems with a storage tank must have a recovery rating and efficiency rating of at least 30 percent, and systems without a storage tank must have a minimum recovery rating of 30 percent.
- Performance requirements – 1) systems shall pass a membrane life test from ASSE 1086 *Performance Requirements for Reverse Osmosis Water Efficiency—Drinking Water* to ensure adequate membrane performance for a minimum of one year; and 2) manufacturer's elective contaminant reduction claims must be verified through applicable NSF/ANSI 58 testing.
- Packaging and documentation requirements – require a summary table for conveying water efficiency and performance information to potential buyers on packaging and/or other point-of-purchase documentation and prescribe additional requirements related to product packaging and literature.

III. Public Comment Feedback

EPA received over a dozen public comments on the draft specification.¹ Commenters generally supported the development of a WaterSense specification for point-of-use RO systems.

¹ A compilation of public comments received on the *WaterSense Draft Specification for Point-of-Use Reverse Osmosis Systems* can be reviewed at www.epa.gov/system/files/documents/2023-02/ws-products-RO-draft-spec-comments-feb0923.pdf.

Common topics addressed by commenters included:

- Encouragement for EPA to incorporate planned changes to the NSF/ANSI 58 standard, which remove the term “recovery rating” and introduce testing procedures to verify the efficiency rating of systems that account for water used for automatic system flushing or other operations.
- Emphasis on the need to clarify to consumers that RO systems are inherently water-wasting and even installing a WaterSense labeled system will require additional water use.
- Concern that the 30 percent efficiency rating will result in significant trade-offs to membrane life and contaminant removal.
- Concern about using the ASSE 1086 membrane life test as a means for verifying membrane life.
- Concern that WaterSense’s marking requirements will put manufacturers at a disadvantage compared to competitors that are not required to advertise water use and contaminant removal claims.

In response to public comments, EPA intends to refine the specification to clarify requirements and better align with NSF/ANSI 58. EPA will include a response to public comments with the final specification once it is published.

IV. Path Forward

In response to public comments received on the draft specification, EPA began coordinating with the NSF Joint Committee on DWTU on two primary topics: planned revisions to the NSF/ANSI 58 testing protocol for establishing an efficiency rating for tankless RO systems; and better aligning EPA’s proposed packaging and documentation requirements with those in NSF/ANSI 58.

A. Monitor RO Efficiency Task Group Activity

At the time the draft specification was published, EPA was aware that an RO efficiency task group had been formed under the NSF Joint Committee on DWTU to remove the term “recovery rating” from the standard and modify test procedures within NSF/ANSI 58 related to RO systems with automatic flushing. The purpose of removing recovery rating from the standard is to reduce confusion among industry and promote transparent water use claims in product marketing and promotional materials. The purpose of modifying testing procedures related to RO systems with automatic flushing is to ensure the efficiency rating accounts for water use from flushing. Because EPA intends to reference the NSF/ANSI 58 testing procedures in its specification, EPA has since been monitoring progress with the intention of waiting until the changes were published.

EPA would prefer to publish a final specification after the NSF/ANSI 58 revisions have been finalized and published. However, EPA was recently informed that the relevant updates to NSF/ANSI 58 may not occur by the time the next update to the standard is published (anticipated in March 2024). Because of this uncertainty, EPA no longer wishes to delay the publication of its final specification and is considering options for publishing the specification before the NSF/ANSI 58 revisions have been finalized. EPA is considering including language in the specification that would require systems with automatic flushing to include the flushing scheme in their efficiency rating testing. Additionally, EPA is considering excluding tankless RO systems from the scope of the WaterSense specification to reduce confusion about the

distinction between efficiency rating and recovery rating. Once the NSF/ANSI 58 standard is updated, EPA would then work to quickly revise the specification to include tankless RO systems within the scope. EPA would consider this future revision to be a minor revision, as it would not impact any products that would have already received the WaterSense label.

B. Incorporate Uniform Marking Requirements Into NSF/ANSI 58 Standard

In response to comments about the WaterSense packaging and documentation requirements potentially putting manufacturers of labeled systems at a disadvantage, EPA would like to see packaging and point-of-purchase marking requirements standardized across all NSF/ANSI 58 certified systems.

EPA has updated its proposed packaging and documentation requirements and associated summary table from the draft specification based on public comments. Appendix A includes the summary table proposed in the draft specification and a revised summary table, as well as a discussion of EPA's revisions. EPA is seeking feedback on the revised requirements and summary table and requests that comments be submitted to watersense-products@erg.com by **March 22, 2024**.

EPA intends to continue working with the RO Efficiency Task Group to adopt EPA's packaging and documentation requirements into the NSF/ANSI 58 standard to ensure WaterSense labeled and non-labeled RO systems are required to provide clear information on water use and performance to potential consumers. EPA will work with the RO Efficiency Task Group to incorporate changes to NSF/ANSI 58 to align with EPA's proposed WaterSense requirements, to the extent practicable.

V. Next Steps

EPA appreciates the continued interest in a WaterSense specification for point-of-use RO systems and will keep interested parties informed of its progress throughout the specification development process. If you have any questions or feedback regarding the point-of-use RO systems specification, please email watersense-products@erg.com by **March 22, 2024**.

Appendix A: Point-of-Purchase Documentation Summary Table Revisions

Table 1 shows the draft summary table of water efficiency and performance information for RO systems that was proposed in the draft specification.

Table 1. Draft Specification Summary Table

Water Efficiency and Performance at a Glance		
Water Use		
<p>This system is certified to achieve a XX% [efficiency rating/recovery rating] in the production of treated water. This means that it will send Y.Y gallons of water down the drain for every gallon of treated water it produces.</p>		
Contaminant Removal		
Contaminant	NSF 58 Minimum Required Reduction	Actual Reduction
Arsenic ¹	96.7%	% Removal/Not Tested
Chromium ²	66.7%	% Removal/Not Tested
Lead	96.7%	% Removal/Not Tested
Nitrate/nitrite	66.7%	% Removal/Not Tested
PFOA/PFOS ³	95.3%	% Removal/Not Tested
<ul style="list-style-type: none"> All contaminant removal claims listed above are verified through NSF/ANSI 58 testing. Contaminants listed as “Not tested” have not been verified for removal under NSF/ANSI 58. All contaminants reduced by this system are listed in the performance data sheet. Not all contaminants listed may be present in the water. 		
<p>¹ Pentavalent, at a concentration of 300 parts per billion (ppb) ² Hexavalent and trivalent ³ Perfluorooctanoic acid/perfluorooctane sulfonate</p>		

Table 2 on the next page shows the updated summary table of water efficiency and performance information for RO systems that EPA has updated and refined in response to public comments and to better align with current NSF/ANSI 58 documentation requirements.

Table 2. Revised Summary Table

Water Efficiency and Performance at a Glance			
This system has been tested according to NSF/ANSI 58 for [daily production rate], efficiency, and 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 58.			
Daily Production Rate (DPR)			
[DPR Placeholder]			
Efficiency and Water Use¹			
This system has a XX% efficiency rating in the production of treated water. This means that it will send Y.Y gallons of water down the drain for every gallon of treated water it produces.			
Contaminant Reduction²			
Contaminant	Average Influent Challenge Concentration (mg/L)	Minimum Required Reduction	Verified Reduction³
Total Dissolved Solids (TDS)	750 ± 40 mg/L	75.0%	[✓/!% reduction]
Arsenic (Pentavalent)	0.3 ± 10% OR 0.05 ± 10%	96.3% OR 77.8%	[✓/!% reduction] or [blank]
Chromium (Hexavalent)	0.3 ± 10%	63.0%	[✓/!% reduction] or [blank]
Chromium (Trivalent)	0.3 ± 10%	63.0%	[✓/!% reduction] or [blank]
Lead	0.15 ± 10%	96.3%	[✓/!% reduction] or [blank]
Nitrate/nitrite	30.0 ± 10%	63.0%	[✓/!% reduction] or [blank]
Total Per- and Polyfluoroalkyl Substances (PFAS)	0.00216 ± 20%	98.8%	[✓/!% reduction] or [blank]
<p>¹ Efficiency rating means the percentage of the influent water to the system that is available to the user as RO treated water under operating conditions that approximate typical daily usage.</p> <p>² All contaminants reduced by this system are listed in the performance data sheet. Scan the QR code to view the system's performance data sheet.</p> <div style="border: 1px solid black; width: fit-content; margin: 10px auto; padding: 10px; text-align: center;"> <p>Placeholder for optional QR code to performance data sheet.</p> </div> <p>³ A system without verified reduction claims for a listed contaminant has not been verified to remove that contaminant under NSF/ANSI 58.</p>			

Summary of Revisions

EPA has updated its proposed packaging and documentation requirements and associated summary table from the draft specification based on public comments. EPA incorporated the following modifications to the summary table that it intends to require on product packaging and/or other point-of-purchase documentation:

- In accordance with NSF/ANSI 58 marking requirements, EPA added a statement for claims to the summary table: “This system has been tested according to NSF/ANSI 58 for [daily production rate], efficiency, and 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 58.”
- EPA added a section to report DPR in accordance with NSF/ANSI 58.
- EPA added a footnote with the NSF/ANSI 58 definition for “efficiency rating”: “Efficiency rating means the percentage of the influent water to the system that is available to the user as RO treated water under operating conditions that approximate typical daily usage.”
- In accordance with potential revisions to NSF/ANSI 58 to eliminate use of the recovery rating, EPA removed “recovery rating” from the summary table.
- Based on feedback from manufacturers, EPA included a footnote with a placeholder to add a QR code to enable potential buyers to access the full product performance data sheet.
- EPA revised the Contaminant Reduction table to include an Influent Challenge Concentration column, consistent with Table 8.1 of NSF/ANSI 58. EPA also revised the minimum required reduction values by calculating the percent reduction based on the lowest possible influent challenge concentration.
- For the Verified Reduction column, EPA is considering allowing manufacturers to insert a check mark, rather than reporting the percent reduction, to indicate that the product has been verified to remove that contaminant. EPA also changed the entry for non-verified contaminants from “Not Tested” to blank.
- EPA added a row for total dissolved solids (TDS) reduction. This will ensure all systems have at least one verified reduction claim to report in the summary table and serve as a point of comparison for other elective claims.
- Based on feedback from commenters, EPA revised the Arsenic row to allow manufacturers to report claims for an influent concentration of 300 ppb or 50 ppb. EPA also separated the Chromium row into two rows to represent claims for hexavalent and trivalent chromium respectively.
- Based on updates to NSF/ANSI 58’s protocol for reporting per- and polyfluoroalkyl substances (PFAS), EPA revised the “PFOA/PFAS” row to instead report Total PFAS.