



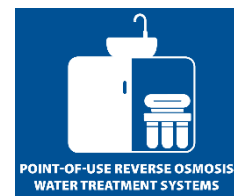
WaterSense® Performance Overview: *Point-of-Use Reverse Osmosis Systems*



Because WaterSense labeled products are certified for both efficiency and performance, ensuring performance is vital for maintaining program integrity and consumer confidence in the WaterSense label. As part of specification development, the U.S. Environmental Protection Agency (EPA) also evaluates whether high-efficiency products will have other environmental or economic impacts. This includes whether there will be unintended or negative impacts to overall system performance, which may affect user satisfaction, health, and safety.



As part of its [specification development process](#), EPA involves many WaterSense stakeholders, including manufacturers, certifying bodies, testing laboratories, standards development organizations, trade organizations, water utilities, energy utilities, and water efficiency experts and advocates. Each of these stakeholders offers a unique perspective and has dedicated technical expertise and resources that have helped EPA develop performance criteria to ensure WaterSense labeled products perform as well or better than standard products on the market.



This overview details EPA's process for developing performance test methods and criteria for point-of-use reverse osmosis (RO) systems to earn the WaterSense label. EPA released the [WaterSense Specification for Point-of-Use Reverse Osmosis Systems](#) associated supporting statement in November 2024.¹

Summary of Performance Requirements

Table 1 on page 2 summarizes the performance requirements included in the *WaterSense Specification for Point-of-Use Reverse Osmosis Systems*, either directly or by reference to an applicable standard. Table 1 also describes the purpose of each performance requirement, the applicable standard the WaterSense specification references, and any specific requirements or deviations from the referenced standard. Unless noted, WaterSense labeled RO systems must meet the specific performance requirements outlined in the applicable referenced standard.

¹ More information on EPA's rationale for establishing its efficiency and performance criteria for point-of-use RO systems can be found in the supporting statement, response to comments, and other specification development documents found at www.epa.gov/watersense/product-background-materials.

Table 1. Summary of Performance Criteria in the *WaterSense Specification for Point-of-Use Reverse Osmosis Systems*

Performance Requirement	Purpose	Referenced Standard (if applicable)	Applies to Conventional Models*	Applies to WaterSense Labeled Models
Membrane life	Ensures the RO membrane can maintain adequate efficiency and performance for at least one year before requiring replacement.	ASSE 1086 <i>Performance Requirements for Reverse Osmosis Water Efficiency—Drinking Water</i> The percent recovery shall be on average a minimum of 30 percent. No sample readings may be less than 23 percent. The final percent recovery measurement shall be a minimum of 30 percent.		✓
Total dissolved solids (TDS) reduction	Ensures the RO system can remove at least 75 percent of TDS—which includes minerals, salts, metals, and organic matter—as a performance baseline.	NSF/ANSI Standard 58 <i>Reverse Osmosis Drinking Water Treatment Systems</i>		✓
Elective performance claims	Ensures the RO system is adequately tested to verify all contaminant reduction claims the manufacturer advertises.	NSF/ANSI Standard 58 <i>Reverse Osmosis Drinking Water Treatment Systems</i>		✓

* While some manufacturers choose to pursue NSF/ANSI 58 or ASSE 1086 certification for RO system models, there are no federal or state standards that require RO systems to meet these reference standards.

Development of Performance Requirements

EPA worked with several stakeholder groups, including RO system manufacturers, licensed certifying bodies, and standards development committees, to identify relevant test methods and performance criteria for its WaterSense point-of-use RO systems specification. Based on research and discussions with stakeholders, EPA identified contaminant reduction and membrane and filter lifespan as essential contributors to RO system performance. From a consumer’s perspective, an effective RO system should substantially reduce drinking water contaminants while being easy to maintain. These qualities provide convenience for the consumer and assurance that their drinking water is adequately treated.

To address contaminant reduction, EPA requires RO systems to be certified to NSF/ANSI 58, the primary referenced standard in the United States for point-of-use RO system that was developed by a joint committee of manufacturers, regulators, and other treatment experts. NSF/ANSI 58 includes requirements for total dissolved solids (TDS) reduction and elective performance claims. TDS, which include dissolved solids such as minerals, salts, metals, and organic matter in the water, are a common indicator used to determine the general quality of drinking water. Like NSF/ANSI 58, the WaterSense labeling specification requires a minimum TDS reduction of 75 percent to establish a contaminant removal baseline. Any additional performance claims the manufacturer advertises beyond TDS must be verified according to the applicable test methods and requirements in NSF/ANSI 58. EPA found the requirements in NSF/ANSI 58 sufficient for ensuring TDS removal and verifying contaminant reduction claims. NSF/ANSI 58 is maintained by its joint committee and republished approximately annually, so it remains relevant and representative of current water treatment concerns in the United States.

During specification development, EPA received feedback that increasing the efficiency of RO systems can have a detrimental effect on the RO membrane lifespan. Therefore, to address potential concerns about membrane life, EPA adopted the ASSE 1086 membrane life test (with modifications). ASSE 1086 is an American National Standard that was developed to specifically address water efficiency and membrane life of RO systems. The membrane life test must be performed over a minimum of 20 days to produce a total product volume of at least 1,000 gallons. The procedure calls for use of a difficult challenge water that places more stress on the membrane than typical tap water. This test is meant to be representative of a year of water treatment under challenging conditions. EPA considered increasing the test length and/or minimum treatment volume to make the test representative of a longer period of use. However, because the test uses a difficult challenge water, EPA believes the current requirements provide a reliable benchmark upon which to measure membrane longevity. Systems that can achieve these criteria will likely last longer than one year in real-world applications that have higher quality and less contaminated influent water.

EPA modified the ASSE 1086 criteria to align with the specification's water efficiency requirements. ASSE 1086 requires the system to achieve an average percent recovery of at least 40 percent, with no sample readings less than 30 percent, and a final reading of at least 40 percent. Instead, EPA modified these criteria to require an average percent recovery of at least 30 percent with no sample readings less than 23 percent, and a final reading of at least 30 percent. The membrane life test also requires the TDS reduction to be a minimum of 75 percent each day, thus ensuring that the membrane can maintain both contaminant reduction and efficiency during its lifespan.

By aligning with existing RO system standards, the WaterSense specification can conform to industry practices and test procedures. Further, it ensures that WaterSense labeled RO systems perform as well as their more water-intensive counterparts.

Performance at a Glance

To make it easy for consumers to determine which contaminants a given system is certified to reduce, all labeled systems must display a performance summary table on their product packaging

and point-of-purchase materials, shown in Table 2. The summary table includes the system’s verified TDS removal rate and indicates whether the system has been verified to remove arsenic (pentavalent); chromium (hexavalent); chromium (trivalent); lead; nitrate/nitrite; and total per- and polyfluoroalkyl substances (PFAS). WaterSense consulted with the EPA Office of Ground Water and Drinking Water to identify this subset of priority drinking water contaminants for RO system consumers. The table uses a standard format to make it easy for consumers to compare RO systems side-by-side when shopping for a water treatment device that will fit their needs.

Table 2. Water Efficiency and Performance at a Glance Table Template

Water Efficiency and Performance at a Glance			
<i>This system has been tested according to NSF/ANSI 58 for daily production rate, efficiency, and contaminant reduction. A system without verified reduction claims for a listed contaminant has not been verified to remove that contaminant under NSF/ANSI 58.</i>			
Daily Production Rate (DPR)			
[DPR Placeholder in gallons per day or liters per day]			
Efficiency and Water Use			
This system has a [XX] percent efficiency rating in the production of treated water. Efficiency rating means the percentage of the water going into the system that becomes available to the user as reverse osmosis treated water. This means that the system will send [Y.Y gallons or liters] of water down the drain for every [gallon or liter] of treated water it produces.		<p>[Y.Y]:1 Waste-to-Treated Water Ratio</p>	
Contaminant Reduction			
Contaminant	Is this system verified to remove the listed contaminant?		
	YES	If yes, what is the verified reduction?	NO
Total Dissolved Solids (TDS)	✓	[% Reduction]	
Arsenic (Pentavalent) at [50 or 300 parts per billion]	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
Chromium (Hexavalent)	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
Chromium (Trivalent)	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
Lead	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
Nitrate/nitrite	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
Total Per- and Polyfluoroalkyl Substances (PFAS)	[✓] or [Blank]	[% Reduction] or [Blank]	[✓] or [Blank]
More Information on System Claims			
All contaminants reduced by this system are listed in the performance data sheet. Scan the QR code or visit [manufacturer website or product URL] to view the system’s performance data sheet.			
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> Placeholder for optional QR code to performance data sheet. </div>			