

June 8, 2020

Mr. Andrew Wheeler
Administrator
US Environmental Protection Agency
Washington, DC

**RE: Comments on Docket ID No. EPA-HQ-OW-2020-0026
 Request for Information on the WaterSense® Program**

Dear Administrator Wheeler:

The Alliance for Water Efficiency (AWE) and the undersigned organizations and businesses write to express our strong support for the WaterSense program at the Environmental Protection Agency (EPA) and to share with you our submitted comments regarding WaterSense. We are filing these comments in response to the Notice of Recent Specifications Review and Request for Information on the WaterSense Program published on April 10, 2020 in the Federal Register. Our comments address the recent EPA review of the WaterSense program, the EPA's decision not to revise any of the WaterSense product specifications, and the specific questions asked within the Federal Register Notice.

Our comments focus on four specific areas of the Request for Information (ROI) in the Federal Register, the details of which are contained in the attached document. Our basic conclusions are as follows:

1. Since its inception in 2006, WaterSense has sought to base its product specifications on measured values of performance that are tested in a laboratory and certified by a third-party certifying organization.
2. Fixture performance has improved since the advent of WaterSense.
3. The Residential End Use Study results for toilet flushing, showering, and faucet use show that over 15 years, as fixtures themselves have become more efficient, customer use of these fixtures has not changed nor has flushing frequency increased.
4. Customer satisfaction criteria do NOT belong in WaterSense product specifications themselves, but there are reasonable uses for customer satisfaction information within WaterSense.
5. Including a vague, non-scientific concept such as customer satisfaction criteria could introduce uncertainty and bias into what has until now been a fair and scientific process for setting WaterSense specifications.
6. Product-specific customer satisfaction research is best left to the marketplace and manufacturers themselves.
7. The scope of customer satisfaction research should be limited to consideration of the WaterSense brand itself and WaterSense partnerships, like the type of customer satisfaction research ENERGY STAR has conducted in the past.

8. Proper uses of customer satisfaction survey results would inform the EPA about Americans' opinion of the WaterSense brand and their experience with WaterSense labeled products in homes and businesses. This information could help EPA guide the direction of the WaterSense brand and program.
9. While we offer no comments on the EPA's decision not to revise any specifications at this time, we nonetheless believe that it is important that specifications move forward and advance over time, based on adequate study and research. WaterSense product specifications should keep up with changing times and technology.

The WaterSense program has been a tremendous success for EPA. Public and private utilities in all 50 states tailor successful water conservation programs around consumer use of WaterSense-labeled products. And because of the nexus between water and energy use, the 3.4 trillion of gallons of water saved by WaterSense since 2006 have resulted in 462.5 billion kilowatt hours of energy that are not used to heat, pump and distribute water. These savings have resulted in a financial benefit to consumers on an average of \$380 annually and \$84.2 billion total in water, sewer, and energy bills since 2006.

Thank you for doing your utmost to ensure this inexpensive, valuable, and effective program that continues to deliver for the American people.

Sincerely,

The Alliance for Water Efficiency
WaterDM

Detailed Comments

1. Should the EPA include customer satisfaction criteria in the WaterSense product specifications and guidelines?

We believe that customer satisfaction criteria do not belong in WaterSense product specifications themselves, but there are reasonable uses for customer satisfaction information within WaterSense. Proper uses of customer satisfaction survey results would inform the EPA about Americans' opinions of the WaterSense brand and their experience with WaterSense-labeled products in homes and businesses. This information could help EPA guide the direction of the WaterSense brand and program. However, it would not be reasonable or correct for EPA to include customer satisfaction requirements within individual product specifications.

ENERGY STAR hired JD Power and Associates and others to conduct customer satisfaction surveys about products that receive the ENERGY STAR label.¹ All of these surveys were focused on satisfaction with partnerships, utility programs, and the ENERGY STAR brand. These surveys did not cover topics like the wattage of light bulbs, the duration of dishwasher cycles, or any product-specific information. Recent JD Power research answered the question, "Does Energy Star Partnership Increase Customer Satisfaction?"

Similarly, WaterSense could use customer satisfaction surveys conducted by independent organizations to evaluate utility partnerships, brand recognition, and overall satisfaction with WaterSense-labeled products. This information could help guide EPA to improve the WaterSense program and could even provide insight and general direction for product categories like toilets, urinals and smart irrigation controllers.

Customer satisfaction is a comparatively vague concept that cannot be measured in a laboratory in the same way as flush volumes and flow rates can. As shown in Figure 1, customer satisfaction research examines the nexus between customer expectations, perceived quality, and perceived value. Customer satisfaction with a plumbing fixture depends greatly on the

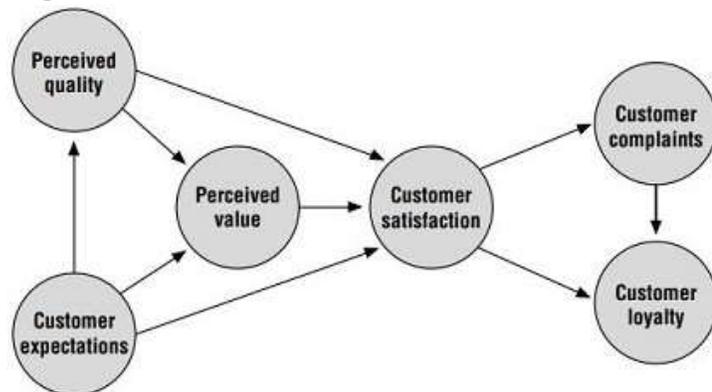


Figure 1: Customer satisfaction research nexus. Source: <https://asq.org/quality-resources/customer-satisfaction>

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https://www.energystar.gov/sites/default/files/asset/document/Schultz_Energy%20Star%20Results_JDPower_2R.pdf

https://www.esource.com/system/files/files/corpcomm_programs-brand.pdf

https://www4.eere.energy.gov/seeaction/system/files/documents/ratepayer_efficiency_customersatisfaction.pdf

quality of manufacturing, the cost of the product, the customers' own expectations, the actual installation of the fixture, the water pressure in the building, and the appearance of the fixture, among other factors. These are all difficult to measure. Including customer satisfaction criteria could introduce uncertainty and bias into what has until now been a fair and scientific process.

Since its inception in 2006, WaterSense has sought to base its product specifications on measured values of performance that are tested in a laboratory and certified by an authorized certification body. These measured values include the volume of water used to flush a toilet, or the maximum flow rate of a showerhead or faucet aerator under specific pressure conditions. These measured test values ensure that products that receive the WaterSense label are tested and are thus capable of meeting established, measurable performance criteria under laboratory conditions. This fundamental adherence to measured performance has provided a level playing field for manufacturers who have produced WaterSense products since 2006. The playing field is level because the measured requirement of each specification is understood by product manufacturers.

Customer satisfaction research is best left to the marketplace and manufacturers themselves. Product manufacturers conduct customer satisfaction research frequently and keep the results to themselves so they can use it strategically to develop their products and brand to competitive advantage. This is truly the proper use of and location for product-specific customer satisfaction research, not with the EPA, but with product manufacturers.

The WaterSense approach of basing specifications on measured values of performance that are tested and certified has had tremendous positive impact on the American economy. Americans can choose from more than 16,000 available models of WaterSense-labeled products for bathrooms, commercial kitchens and irrigation systems. The EPA has estimated that WaterSense-labeled products have saved more than \$84.2 billion on American families' water, sewer, and energy bills. To date more than 1,700 manufacturers, retailers and distributors, water and energy utilities, state and local government, non-profit and trade organizations, irrigation training organizations, and home builders strengthen their businesses through partnerships with WaterSense.

2. How should EPA design studies to inform future reviews that might incorporate customer satisfaction considerations?

Measuring customer satisfaction is a complex task that requires statistical surveying and careful research. It becomes particularly challenging when trying to understand customer satisfaction with a product and to distinguish that from the brand and style and manufacturing of the fixture, the installation of the fixture, the local water pressure, and other factors. The task of measuring customer awareness of and satisfaction with the WaterSense brand as a whole would be quite different than measuring customer satisfaction with specific WaterSense-labeled plumbing fixtures such as toilets or showerheads.

This is not the type of research that can or should be conducted by the EPA itself. To protect WaterSense partners and the integrity of the WaterSense brand, the EPA should rely on the services of professional independent researchers (like JD Power, Edmunds, or KBB) or who specialize in this type of work.

Our recommendation is to limit the scope of customer satisfaction research to consideration of the WaterSense brand itself and WaterSense partnerships, like the type of research ENERGY STAR has conducted. This is much more likely to yield useful information to the EPA. If EPA chooses to conduct customer satisfaction research into specific labeled product categories, it must be designed and conducted by experts with knowledge of both customer satisfaction survey methods and plumbing fixtures.

Superior products will gain market share and it is industry that knows best how to conduct customer satisfaction research. Product category research has been conducted in the marketplace by industry and product manufacturers and distributors who all want this information to make popular products that customers want, to thus gain competitive advantage and market share. Product-specific customer satisfaction research does not need to be and should not be conducted with public funds. Industry may not wish to share the results of the research they have privately conducted, but that is their prerogative. During the WaterSense product specification and review process, information that industry deems relevant can be introduced.

3. What information, data, surveys, and studies are available that to help assess customer satisfaction with WaterSense-labeled products which could help inform future product specification?

In 2002, four years before WaterSense was created, all toilets sold in the US were required to comply with ASME Standard A112.19.2, which required testing with media comprised of plastic “granules”, nylon balls, sponges and kraft paper. In 2003, in response to water utilities’ concerns over the performance of toilets they rebated, engineers John Koeller and Bill Gauley created Maximum Performance Testing (MaP Testing) and began bench-testing toilets using far more realistic test media comprised of dense bean paste. MaP also began publishing testing results on a regular basis so that water utilities could provide toilet fixture performance information to their customers. Manufacturers voluntarily submitted their toilets for MaP Testing so that they could be part of large rebate programs in California, Texas, Georgia, and elsewhere.

By June 2006, when the WaterSense program was introduced, there were already about 500 different tank-type toilet models submitted for MaP Testing, the results of which were released to the public. These toilets could remove an average of 420 grams each (see Figure 2 below). As the WaterSense toilet specification for tank-type toilets was developed, many parties recommended that MaP Testing (or similar testing using realistic test media) be incorporated into the specification and, ultimately, the WaterSense tank-toilet minimum performance specification was set at 350 grams of waste removal using the MaP approach.

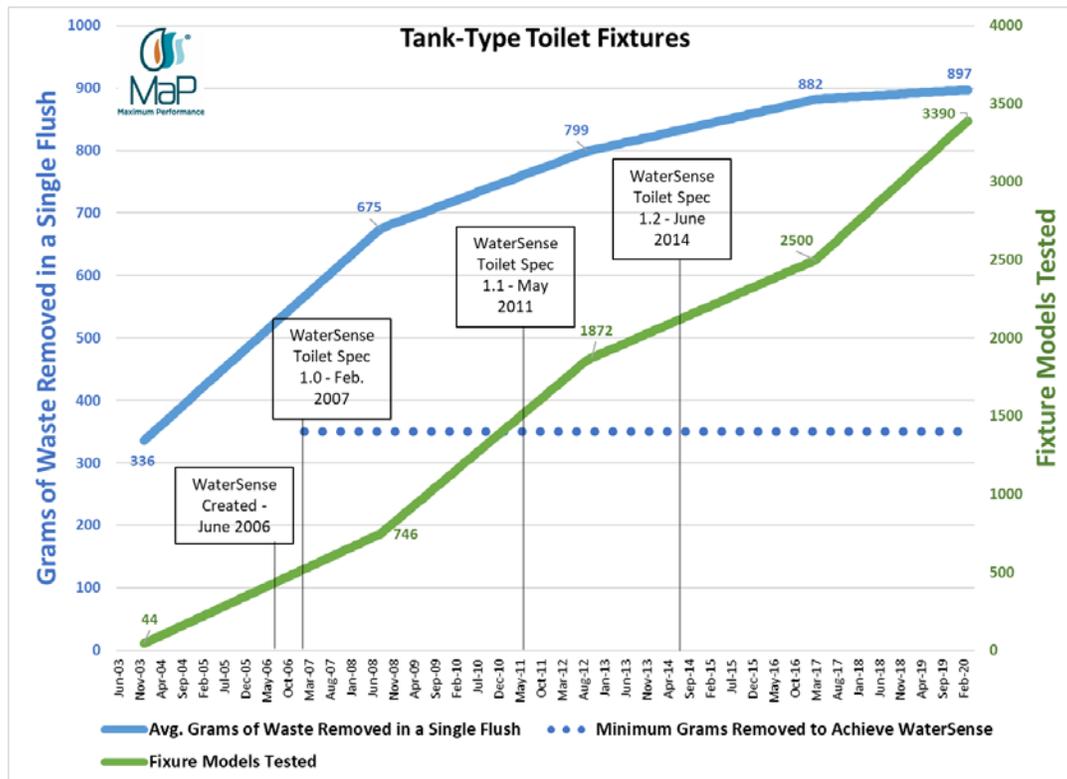


Figure 2: Fixture models tested and average grams of waste removed by tank-type toilets, 2003 – 2020 (Source: MaP Testing)

The WaterSense tank-type toilet specification was released in 2007, and since that time the number of MaP-tested fixture models has gone from 500 to 3,390, and the average flushing performance has improved from 500 grams of waste removed in a single flush to almost 900 grams. To be perfectly clear, 900 grams is nearly two (2) pounds of waste in a single flush, which is over 7 times the median wet weight for daily fecal output by healthy individuals in high income populations (128 grams) and 3.6 times the median wet weight for daily fecal output by healthy individuals in low income populations (250 grams).²

The impact of MaP Testing in improving toilet performance has been so significant that it was incorporated into the national product standard (ASME A112.19.2-2013/CSA B45.1-13) in 2013. Figure 2 shows the progression of fixtures tested and the improvement in average flushing performance since the advent of MaP Testing and WaterSense.

American consumers have expressed a high level of satisfaction with WaterSense-labeled products that have been tested through this and other processes. Customers of the Home

² The Characterization of Feces and Urine: A Review of the Literature to Inform Advanced Treatment Technology, C. Rose, a, A. Parker, a, * B. Jefferson, a and E. Cartmell a – 2015 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4500995/>

Depot were so satisfied with WaterSense products that the company chose to sell WaterSense-labeled products exclusively in all of their stores. At competitor Lowe's, the overwhelming majority of eligible product offered for sale carry the WaterSense label. If there were a problem with customer satisfaction, these retail giants would know it and would offer something different. Home Depot and Lowe's both know that the products carrying the WaterSense label perform better than the competition that is not subject to rigorous performance testing.

WaterSense has operated on a very modest budget since 2006, but nonetheless has become remarkably successful and popular. WaterSense manufacturer partners have produced over 4,200 different WaterSense-labeled tank-type toilet models; 9,300 models of WaterSense-labeled showerheads; and 18,000 WaterSense-labeled lavatory faucet and accessory models³. American consumers have voiced their satisfaction with their purchases. Industry agrees, and more than 1,700 manufacturers, retailers and distributors, water and energy utilities, state and local government, non-profit and trade organizations, irrigation training organizations, and home builders strengthen their businesses through partnerships with WaterSense.

Based on this success, the popularity of WaterSense is expected to grow. Research from Plumbing Manufacturers International found that within the next 15 years, most bathroom sink faucets and showerheads installed in the United States will be WaterSense-certified or meet the requirements of the WaterSense program. Within the next 30 years, most residential tank-type toilets will also be WaterSense-certified or meet the requirements of the WaterSense program. Within the next 40 years, most flushometer-valve toilets and flushing urinals will be WaterSense-certified or meet the requirements of the WaterSense program.⁴

While not addressing customer satisfaction or WaterSense products directly, the 1999 and 2016 Residential End Uses of Water Studies⁵ measured how people use water at home in their daily lives. The studies reveal how frequently people use toilets, faucets, and clothes washers, and to what extent those behaviors have changed over time. This information can be a strong indicator of customer satisfaction. These paired residential end use studies offer the best available measurements of key metrics such as the frequency of toilet flushing, the duration of shower and faucet usage, and the flow rate of these fixtures. This information provides valuable insight about water use patterns and indicates if people are using fixtures the same or more frequently as the flow rates and flush volumes of the fixtures have changed.

The results for toilet flushing, showering, and faucet use show that over 15 years, fixtures themselves have become more efficient, but the use of these fixtures has not changed. The average volume of water used to flush a toilet has decreased, but the average number of

³ Federal Register. April 10, 2020. EPA-HQ-OW-2020-0026 – Request for Information on the WaterSense Program. Vol. 85, No. 70.

⁴ IBID

⁵ DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO.

Mayer, P., W. DeOreo, J. Kiefer, E. Opitz, B. Dziegielewski, and J.O. Nelson. 1999. Residential End Uses of Water. Water Research Foundation, Denver, CO.

flushes per person per day has stayed the same. The average number of minutes spent in the shower has likewise stayed the same. The average faucet use per person per day has also stayed the same. Subsequent analysis on shower patterns using the same Residential End Uses of Water data sets found “on average, people do not compensate for lower flow rates by increasing the duration of their shower and that lower flow rate showerheads do, on average, result in a lower overall shower volume”.⁶

WaterSense has also driven performance improvement for showerheads. ASME industry standards for showerheads have been made more rigorous directly as a result of WaterSense with the addition of spray force and spray coverage test requirements taken directly from the WaterSense specifications.

Under section “V. Request for Information on Consumer Satisfaction” of the April 10 Federal Register Notice it states the following (emphasis added):

“Understanding consumer satisfaction is important to the EPA as the Agency seeks to ensure that our performance criteria review is in fact **ensuring that labeled products are meeting the same standards as products on the market before the WaterSense label was adopted.**”

This statement is problematic for several reasons. First, the statement correctly states that products that achieve the WaterSense label are meeting different standards than products that do not receive the label. Both then and now, all plumbing products and fixtures must meet the same set of basic national product standards established by ASME/CSA A112.19.2-2013/CSA B45.1-13 for fixtures and ASME A112.18.1-2018/ CSA B125.1-18 for fittings. Since 2013, however, the requirements contained within the WaterSense specifications for plumbing products have been incorporated into the relevant ASME/CSA standards. As a result, certification to the national product standard can also result in certification to the WaterSense specification if the manufacturer so desires.

Appendix A shows the current standards that all tank-type toilets must meet in 2020 along with a history of these specifications since 2003.

Second, the statement wrongly implies that customer satisfaction for plumbing fixtures was higher before 2006 when the WaterSense label was adopted and that products met a different standard back then. The tremendous success and popularity of WaterSense-labeled products (described above) is due in large part because WaterSense specifications include measurable performance requirements that result in products that work better for consumers than the products they had before. Achieving the WaterSense label requires that products be tested to a higher standard, and this statement wrongly implies that these don’t meet the same

⁶ Gauley, B. and J. Koeller. 2017. How Showerhead Flow Rates Impact Shower Duration and Volume. www.map-testing.com

minimum basic standards as other fixtures. The confusion evident in this statement in the Federal Register should be corrected.

4. Comments on EPA's recent review of the WaterSense program.

The April 10 Federal Register Notice also included a summary of the review of WaterSense product performance criteria, conducted as required under the authorizing legislation under the America's Water Infrastructure Act (AWIA) of 2018. Based on this review, the EPA made the decision not to revise any specifications.

While we offer no comments on the EPA's decision not to revise any specifications at this time, we nonetheless believe that it is important that specifications move forward and advance over time, based on adequate study and research. WaterSense product specifications should keep up with changing times and technology.

Appendix A – History of Tank-Type Toilet Standards 2003 – 2013



ASME/CSA National Product Standard - Water Closets (toilets) - 2003 to today

	Current Standard		2013 Standard		2008 Standard		2003 Standard	
	ASME A112.19.2-2018/CSA B45.1-18		ASME A112.19.2-2013/CSA B45.1-13		ASME A112.19.2-2008/CSA B45.1-08		ASME A112.19.2-2003	
	Pro-cedure	Requirements	Pro-cedure	Requirements	Pro-cedure	Requirements	Pro-cedure	Requirements
Water consumption	7.3	Maximum flush volumes: Low consumption models: 1.6 gal High-Efficiency models: 1.28 gal Dual-flush models-full flush*: 1.6 gal	7.4	Maximum flush volumes: Low consumption models: 1.6 gal High-Efficiency models: 1.28 gal	7.4	Maximum flush volumes: Water-saving models - 3.5 gpf Low-consumption models: 1.6 gal High-Efficiency models: 1.28 gal	8.4	Two thresholds for maximum flush vol.: Water-saving water closets - 3.5 gpf Low-consumption water closets - 1.6 gpf
Granule and ball test	7.5	2500 granules in bowl - not more than 125 granules visible after flush. 100 Nylon balls (0.25 in. diameter) in bowl - not more than 5 balls visible after flush	7.5	2500 granules in bowl - not more than 125 granules visible after flush. 100 Nylon balls (0.25 in. diameter) in bowl - not more than 5 balls visible after flush	7.5	2500 granules in bowl - not more than 125 granules visible after flush. 100 Nylon balls (0.25 in. diameter) in bowl - not more than 5 balls visible after flush	8.5	2500 granules in bowl - not more than 125 granules visible after flush. 100 Nylon balls (0.25 in. diameter) in bowl - not more than 5 balls visible after flush
Surface wash test (ink line test)	7.6	Ink line around interior circumference of bowl 1 inch below rim - after flushing, remaining line = 2-inch maximum; no segment more than 0.5 inch	7.6	Ink line around interior circumference of bowl 1 inch below rim - after flushing, remaining line = 2-inch maximum; no segment more than 0.5 inch	7.6	Ink line around interior circumference of bowl 1 inch below rim - after flushing, remaining line = 2-inch maximum; no segment more than 0.5 inch	8.6	Ink line around interior circumference of bowl 1 inch below rim - after flushing, remaining line = 2-inch maximum; no segment more than 0.5 inch
Mixed media test	TEST DELETED IN 2018 >>>>		7.7	20 sponges and 8 kraft paper balls (15 lb. paper) in bowl. After flushing, at least 22 sponges/paper balls fully discharged	7.7	20 sponges and 8 kraft paper balls (15 lb. paper) in bowl. After flushing, at least 22 sponges/paper balls fully discharged	8.7	20 sponges and 8 kraft paper balls (15 lb. paper) in bowl. After flushing, at least 22 sponges/paper balls fully discharged
Drainline transport	7.7	100 polypropylene balls (0.75-in. diameter) in bowl. After flushing, average distance traveled in plastic drainline at least 40 ft.	7.8	100 polypropylene balls (0.75-in. diameter) in bowl. After flushing, average distance traveled in plastic drainline at least 40 ft.	7.8	100 polypropylene balls (0.75-in. diameter) in bowl. After flushing, average distance traveled in plastic drainline at least 40 ft.	8.8	100 polypropylene balls (0.75-in. diameter) in bowl. After flushing, average distance traveled in plastic drainline at least 40 ft.
Waste extraction test (MaP test procedure)	7.9	350 gram minimum waste extraction	7.10	350 gram minimum waste extraction	<<<<< REQUIREMENTS ADDED IN 2013			
Consistent water level test (non-pilot-type fill valves only)	7.10	Maintain tank water level at ± 0.5 inches	7.11	Maintain tank water level at ± 0.5 inches				
Fill valve shutoff integrity test with increased water pressure (non-pilot-type fill valves only)	7.11	Maintain tank water level at ± 0.5 inches at 20 to 80 psi	7.12	Maintain tank water level at ± 0.5 inches at 20 to 80 psi				
Adjustability test for tank-type gravity-fed toilets	7.12	Single-flush maximum = 1.68 gal Dual-flush maximum = 2.0 gal (full) and 1.4 gal (reduced)	7.13	Single-flush maximum = 1.68 gal Dual-flush maximum = 2.0 gal (full) and 1.4 gal (reduced)				
*-Maximum flush volume of 1.1 gal for the reduced flush is specified in ASME A112.19.14-2013_R2018, section 3.2.2								