

WaterSense® Notice of Intent (NOI) to Develop a Draft Specification for Flushometer-Valve Toilets

I. Introduction

Flushometer-valve toilets (e.g., “water closets”) are tankless fixtures with either wall- or floor-mounted bowls attached to a flushometer valve activated by a lever, pedal, handle, or electronic sensor that releases a specific volume of water at a flow rate that enables proper operation. A pressurized water supply line releases water directly into the bowl to remove (i.e., flush) waste. Flushometer-valve toilets are typically employed in commercial and public use settings, including: schools; dormitories; airports; bus and train terminals; stadiums and arenas; restaurants; office buildings; industrial facilities; shopping centers and malls; and other types of public restrooms. They are occasionally used in residential applications. Currently, an estimated 26 million flushometer-valve toilets are installed in the United States.¹

The Energy Policy Act (EPAAct) of 1992 established a maximum allowable flush volume of 1.6 gallons per flush (gpf) [6.0 liters per flush (lpf)] for all toilets sold in the United States. This includes all gravity tank-type, flushometer-tank, electromechanical hydraulic, and flushometer-valve toilets. EPAAct required flushometer-valve toilets to achieve compliance with the 1.6 gpf maximum by January 1, 1997. Some older, less efficient models that were installed prior to 1997 have flush volumes between 3 and 7 gallons. It is estimated that there are approximately 8 million of these less efficient, non-EPAAct-compliant toilets still installed across the country.² Approximately 56 billion gallons of water could be saved annually by replacing all existing flushometer-valve toilets with high-efficiency models, defined as toilets that flush at 1.28 gallons or less.³ To capitalize on this water savings opportunity and promote more efficient flushometer-valve toilets in the marketplace, the U.S. Environmental Protection Agency’s (EPA’s) WaterSense program is announcing its intent to develop a specification for water-efficient, high-performing flushometer-valve toilets.

WaterSense is confident in moving forward with a draft specification for flushometer-valve toilets for many reasons. Manufacturers are marketing an increasing number of high-efficiency toilets (HETs) that function at 1.28 gpf (4.8 lpf) or less for use in commercial applications. According to WaterSense research, there are at least 10 manufacturers offering HET flushometer valves and at least 16 manufacturers offering HET bowls. The design of flushometer-valve toilets has also improved significantly since the 1990s. Even when various bowls and valves are mixed and matched, the performance of many flushometer-valve toilet combinations meet and often exceed the performance of residential toilets. Nearly 250 HET flushometer-valve toilet

¹ Based on projections from D&R International, et al. *Plumbing Fixtures Market Overview: Water Savings Potential for Residential and Commercial Toilets and Urinals*. September 30, 2005.

² *Ibid.*

³ Based on calculations involving data from the U.S. Census Bureau; Department of Labor Statistics; *The Handbook of Water Use and Conservation* (Amy Vickers, 2001); *Waste Not, Want Not: The Potential for Urban Water Conservation in California* (Pacific Institute, 2003); and *Plumbing Fixtures Market Overview: Water Savings Potential for Residential and Commercial Toilets and Urinals* (D&R International, 2005).

combinations have been tested to Maximum Performance (MaP) testing requirements, which assess advanced performance of plumbing fixtures.⁴ In addition, a recent drainline carry study performed by the Plumbing Efficiency Research Coalition (PERC), a collaborative network of six plumbing stakeholders,⁵ indicates that drainline blockages are not of significant concern at flush volumes of 1.28 gpf,⁶ a potential issue that was previously raised by WaterSense stakeholders.

As with all of its specifications, WaterSense intends to include performance criteria to ensure that labeled flushometer-valve toilets perform as well or better than standard flushometer-valve toilet models on the market. The combination of performance and efficiency criteria will allow consumers, facility managers, and purchasers to easily identify high performing, efficient flushometer-valve toilets by looking for the WaterSense label.

With this notice of intent (NOI), WaterSense has preliminarily identified the water efficiency and performance criteria it intends to consider in developing a draft specification for flushometer-valve toilets. While the major criteria have been identified, some technical points require further consideration and assessment before a draft specification can be developed. To establish and better define these criteria, EPA is requesting supporting information and data from all interested parties (e.g., researchers, manufacturers, testing laboratories, water utilities, water-efficiency organizations) on the topics discussed in this NOI. All interested parties are encouraged to submit written information and comments regarding any of the concepts or issues presented in this NOI to watersense-products@erg.com. Comments and information on the issues presented in this NOI are welcome and will be taken into consideration as WaterSense develops a draft specification for flushometer-valve toilets.

II. Scope

For the purposes of a WaterSense draft specification, flushometer-valve toilets are a combination of a flushometer valve and a toilet bowl. The American Society of Mechanical Engineers (ASME) defines a toilet fixture (bowl) as “a device that receives water, waste matter, or both and directs these substances to the drainage system.”⁷ The American Society of Sanitary Engineers (ASSE) defines a flushometer valve as “a valve attached to a pressurized water supply pipe and so designed that when actuated, it opens the line for direct flow into the fixture at a rate and quantity to properly operate the fixture and then gradually closes in order to

⁴ MaP. “Maximum Performance of Toilet Fixtures—Flushometer Valve/Bowl Combinations.” July 9, 2013. <http://www.map-testing.com/assets/files/2013-07-09-Flushometer_toilet_combinations.pdf>.

⁵ The six stakeholder groups that comprise PERC include the Alliance for Water Efficiency (AWE), the International Association of Plumbing and Mechanical Officials (IAPMO), the International Code Council (ICC), the Plumbing-Heating-Cooling Contractors (PHCC) Association, American Society of Plumbing Engineers (ASPE), and Plumbing Manufacturers International (PMI).

⁶ PERC. *The Drainline Transport of Solid Waste in Buildings*. Draft 2.0. November 2012.

<www.plumbingefficiencyresearchcoalition.org/wp-content/uploads/2012/12/Drainline-Transport-Study-PhaseOne.pdf>.

⁷ ASME/Canadian Standards Association (CSA) Standard. ASME A112.19.2-2008/CSA B45.1-08, *Ceramic Plumbing Fixtures*.

avoid water hammer.”⁸ Because the flushometer valve and the toilet bowl both play an integral role in ensuring the efficiency and effectiveness of the toilet, WaterSense intends to develop a specification that addresses both the flushometer valve and toilet bowl. It should be noted that neither the receiving bowl nor the flushometer valve separately constitutes a complete, fully functioning toilet.

Similar to the *WaterSense Specification for Tank-Type Toilets*, WaterSense intends to include dual-flush flushometer-valve toilets in its draft specification. Sections III and IV of this NOI include more information on water efficiency and performance requirements WaterSense is considering for dual-flush toilets.

WaterSense intends to exclude retrofit devices or other aftermarket retrofit systems from the scope of its draft flushometer-valve toilet specification, because the intent of the specification is to recognize and label complete, fully functioning fixtures or valves, not individual components.

III. Water Efficiency

General

The WaterSense label is meant for products that are at least 20 percent more water-efficient and perform as well or better than standard models. To achieve the water efficiency component, WaterSense is considering establishing a maximum allowable flush volume of 1.28 gpf (4.8 lpf) in its draft specification for both single-flush and dual-flush flushometer-valve toilets. There are several advantages for using this flush volume. First, it represents a 20 percent improvement in efficiency compared to the current federal standard. This maximum allowable flush volume is also consistent with the *WaterSense Specification for Tank-Type Toilets*. In addition, this flush volume matches the currently accepted industry standard for HETs and therefore should be acceptable to water efficiency stakeholders and manufacturers. Several manufacturers are already selling flushometer-valve toilets that meet this flush volume. Many of these products have been on the market for years and have well-documented performance and customer satisfaction records.

Further, PERC supports the development of a WaterSense specification for flushometer-valve toilets with a maximum allowable flush volume of 1.28 gpf, based on the findings from the PERC drainline carry study mentioned earlier. The study found that, at 1.28 gpf, drainline blockages are not anticipated in new commercial construction. For retrofit applications, PERC recommends inspecting drainlines for potential physical defects or sagging, and repairing any defects found within the drainline prior to retrofitting toilets with HETs. In all test runs completed using 1.28 gallons, the test media were successfully cleared from the drainline apparatus.⁹

⁸ ASSE Standard #1037-1990, *Performance Requirements for Pressurized Flushing Devices (Flushometer) for Plumbing Fixtures*.

⁹ PERC, *op. cit.*

Dual-Flush Toilets

WaterSense is also considering a new approach for establishing the maximum water use for dual-flush flushometer-valve toilets. The draft specification would set a maximum allowable flush volume of 1.28 gpf for the full flush of a dual-flush flushometer-valve toilet, regardless of the flush volume of the reduced flush. Although this approach is different from the *WaterSense Specification for Tank-Type Toilets*, in which the *effective* flush volume (i.e., the average of one full and two reduced flushes) must not exceed 1.28 gpf, WaterSense has determined that this modification is necessary to ensure the target water savings associated with dual-flush flushometer-valve toilets is achieved. Under this approach, the volume of the full flush (not the effective flush volume) must be 1.28 gpf or less and will dictate whether the dual flush flushometer-valve toilet meets the water-efficiency requirements of the specification.

Water savings from dual-flush toilets are largely based on user behavior and can be influenced by lack of user education, as well as design considerations (e.g., whether the reduced flush option requires the user to pull up or push down on the handle). To date, water savings from dual-flush flushometer-valve toilets has not been fully researched or documented. In a recent study performed at the University of Missouri, one dual-flush flushometer model only yielded a water savings of 12.1 percent, even after additional education materials were posted within the stall.¹⁰ Further, unlike tank-type toilets, potential water savings from flushometer-valve toilets are mainly limited to women's restrooms, due to the fact that men typically utilize urinals rather than toilets for liquid waste in commercial restrooms. In considering all of these factors together, the most effective way for WaterSense to ensure water savings of at least 20 percent compared to standard models, while not restricting manufacturer design or innovation, is to require the maximum flush volume of a dual-flush flushometer-valve toilet, regardless of flush mode, be equal to or less than 1.28 gpf.

IV. Performance

With all of its specifications, WaterSense establishes performance criteria to ensure that labeled products perform as well or better than standard models, and that user satisfaction is not sacrificed in order to achieve water savings. All toilets, including flushometer-valve HETs, are already subject to rigorous national performance standards. Vitreous china toilet fixtures are subject to the performance requirements of ASME A112.19.2/CSA B45.1 (*Ceramic Plumbing Fixtures*), while all plastic and stainless steel toilet fixtures must comply with American National Standard Institute (ANSI) Z124.4 (*Plastic Water Closet Bowls and Tanks*) and ASME A112.19.3/CSA B45.4 (*Stainless Steel Plumbing Fixtures*), respectively. WaterSense is considering incorporating the requirements from these standards by reference in its draft specification.

Dual-flush toilet fixtures are currently also subject to ASME A112.19.14-2006 (*Six-Liter Water Closets Equipped with a Dual Flushing Device*). This performance standard defers to A112.19.2/CSA B45.1 when testing the performance of the full flush. However, ASME

¹⁰ Arocha, Jade S. and Laura M. J. McCann. *Behavioral Economics and the Design of a Dual-Flush Toilet*. University of Missouri Department of Applied Agricultural Economics. October 15, 2012.

A112.19.14 defines additional performance requirements for ensuring the performance of the reduced flush.¹¹ WaterSense is considering incorporating the requirements from this standard, aside from the water efficiency requirement described in Section 3.2.2 (Reduced Flush Volume Test) of the standard, by reference in its draft specification.

Flushometer valves are currently subject to ASSE Standard #1037 (*Performance Requirements for Pressurized Flushing Devices [Flushometer] for Plumbing Fixtures*). WaterSense is also considering incorporating the requirements from this standard by reference in its draft specification.

These national standards have a proven record of ensuring a high level of performance and durability in toilets, and will serve as a good foundation for a WaterSense specification for flushometer-valve toilets. In addition, WaterSense has identified several other performance factors not currently addressed by these standards that it is considering including in its draft specification, as discussed below.

Interchangeability and Adjustability

Consistent with the *WaterSense Specification for Flushing Urinals*, WaterSense intends to address concerns regarding the adjustability and interchangeability of components of flushometer valves.

Flush Volume Adjustability

WaterSense is considering including a requirement that flushometer valves be adjustable as to flush volume to only a limited degree, such that the flush volume cannot vary by more than a specified amount. The *WaterSense Specification for Flushing Urinals* states that the flushing device must not contain a flush volume adjustment that allows the flush volume to vary by more than ± 0.1 gpf (± 0.4 lpf) of the rated flush volume. In addition, the specification states that the manufacturer is not allowed to provide instructions on any packaging or marking directing users to an alternative flush volume setting that would override the rated flush volume. WaterSense is seeking input regarding the specific flush volume adjustability tolerance that should be allowable for flushometer-valve toilets.

With this flush volume adjustability requirement, WaterSense does not intend to preclude products that are designed to ensure the toilet and the plumbing system continue to operate properly and efficiently over the long term. In many cases, adjusting the flush volume may be necessary to facilitate maintenance of specific fixtures or the entire flushing system. Examples of these products include flush valves that can be electronically altered with remote sensors and products that allow a periodic higher volume clearing flush. These products can program a flush of greater volume to assist in routine maintenance and clear any potential drainage build-up in the plumbing system. However, WaterSense has concerns that these types of products can also be marketed or used in a way that will instruct and encourage facility managers to alter the flush volume of toilets permanently, such that they will no longer meet requirements of a WaterSense

¹¹ ASME Standard. ASME A112.19.14-2006, *Six-Liter Water Closets Equipped With a Dual Flushing Device*.

specification and jeopardize the long-term water savings associated with the WaterSense label. While it is unlikely that this is the intended use of these products, WaterSense is considering whether the availability of this type of flush-volume adjustment (beyond the rated flush volume and normal range of flush-volume variability) should impact the ability of a flushometer valve to obtain the WaterSense label. WaterSense seeks input on how to balance the benefits of adjustability to facilitate maintenance with ensuring the long-term water savings. In addition, WaterSense seeks input on whether the specification should consider the availability and use of aftermarket devices, such as remote controls that can be added to a flushometer valve to adjust its rated flush volume.

Non-Hold Open Actuator

Consistent with the requirements in the *WaterSense Specification for Flushing Urinals*, WaterSense is considering a requirement that the flushometer valve must not exceed the rated flush volume of water, even if the primary actuator is maintained in the flush position. This would require the flushometer valve's primary actuator to be a 'non-hold open' design.

Interchangeable Parts

WaterSense is also considering requiring that flushometer valves not contain interchangeable parts that would allow the flush volume to be increased from its original rated flush volume once installed (e.g., interchangeable diaphragms or pistons). Similar to the requirements in the *WaterSense Specification for Flushing Urinals*, WaterSense may require manufacturers to attest that the flushometer valve is designed such that replaceable or maintainable parts are not intended to be interchangeable with parts that would cause the device to exceed its rated flush volume. Product operation and maintenance documentation would need to be clearly marked with specific maintenance instructions and identify the replacement parts that should be used to ensure that the flushometer valve will not exceed its original flush volume. In addition, manufacturers will, under no circumstances, provide instructions or advertise the use of replacement parts that would override the rated flush volume. Finally, to help prevent interchangeable parts from being used as replacement parts, WaterSense is contemplating requiring flushometer valves to be marked with their rated flush volumes. This marking requirement is discussed in detail in Section VII.

These adjustability and interchangeability requirements will help ensure the longevity of water savings associated with WaterSense labeled flushometer-valve toilets.

Additional Performance Requirements

WaterSense is aware that ASME/CSA is currently in the process of revising A112.19.2-2008/CSA B45.1-08 to include the flush performance requirements and testing procedures from the *WaterSense Specification for Tank-Type Toilets* (i.e., performance testing that utilize a soybean paste meant to imitate human waste), and that the requirements in the revised standard will also apply to flushometer-valve toilets.

While WaterSense agrees that these flush requirements will be a good addition to the standard to help ensure toilet performance, it is concerned that flushometer-valve toilets in commercial and public settings frequently must flush more difficult waste loads than would normally be found in residential settings. Therefore, WaterSense is considering requiring additional testing procedures and/or test media above and beyond what is currently being proposed in the revisions to the ASME A112.19.2/CSA B45.1 standard. Items WaterSense is considering include, but are not limited to, additional toilet paper, seat covers, paper towels, feminine products, and flushable wipes, either alone or in some combination. WaterSense is also aware that MaP is in the process of developing new testing requirements for toilets used in commercial restrooms.¹² WaterSense will closely monitor the implementation of the new MaP requirements, as this effort could inform the additional performance requirements included in its flushometer-valve toilet specification. In the meantime, WaterSense is seeking input regarding the types and amounts of additional test media it should include in its draft specification.

Cased Versus Uncased Test Media

As discussed above, revisions to ASME A112.19.2-2008/CSA B45.1-08 will likely include the flush performance testing from the *WaterSense Specification for Tank-Type Toilets*; however, one marked difference is that the standard will likely allow the soybean paste to be either cased or uncased. The *WaterSense Specification for Tank-Type Toilets* specifies that soybean paste used for performance testing be uncased. Feedback received during the development of the tank-type toilet specification indicated that uncased media more realistically simulates human waste. WaterSense is seeking input and additional information regarding whether it should specify uncased media, consistent with the tank-type toilet specification, or leave it up to the licensed certifying body to decide which type of media to use, in accordance with proposed revisions to the ASME/CSA standard.

V. Certification and Labeling

WaterSense has established a product certification process, described in the *WaterSense Product Certification System*¹³. Under this process, products are certified to conform to applicable WaterSense specifications by accredited third-party certification bodies. Manufacturers are then authorized to use the WaterSense label in conjunction with certified products.

At this time, WaterSense is considering certifying and labeling flushometer valves and toilet bowls separately, consistent with the certification and labeling scheme used for WaterSense labeled urinals. This means that not every potential combination of flushometer valve and bowl would be tested together, but that the combination of any labeled flushometer valve and labeled bowl, when used together, would meet the requirements of the WaterSense specification for water efficiency and performance. With flushometer-valve toilets, it is not uncommon for a company to manufacture only the toilet bowl and to require the use of another company's

¹² MaP. <www.map-testing.com/about/maximum-performance/flushometer.html> Last accessed July 22, 2013.

¹³ *WaterSense Product Certification System*. September 29, 2011.
<www.epa.gov/WaterSense/docs/cert_system_508.pdf>.

flushometer valve. WaterSense therefore intends to provide a label that reflects how these products are sold in the marketplace.

WaterSense is proposing this approach to certify and label flushometer valves and bowls separately, because of the advancements in performance seen in the market over the past several years. A 2005 study of the effects on performance of mixing and matching different models of flushometer valves and bowls indicated that all of the different combinations were able to meet performance expectations.¹⁴ In addition, MaP has verified performance of more than 370 valve and bowl combinations.¹⁵

There are additional advantages to labeling valves and bowls separately, including the fact that this approach is the common industry practice and ensures that WaterSense is not significantly increasing the burden associated with the certification of flushometer-valve HETs. It also enables purchasers to easily procure labeled HETs by identifying and matching labeled components, rather than verifying the individual component model numbers for compatibility. This approach will also facilitate the licensed certifying bodies' management of and compliance with product registry and reporting requirements.

VI. Product Testing

Because WaterSense intends to separately certify and label flushometer valves and toilet bowls, it must determine how these products will be tested to ensure water efficiency and effective performance. ASME A112.19.2/CSA B45.1 and ASSE Standard #1037 address product testing requirements differently. Under ASME A112.19.2/CSA B45.1, the current practice is to test bowl fixtures with the flushometer valve sample that is submitted by the manufacturer, or a standard valve that the laboratory has on hand, whichever option the manufacturer chooses to pursue. Under ASSE Standard #1037, all pressurized flushing devices must be tested with representative bowls from three different manufacturers to determine conformance with flushing performance standards.

WaterSense requests input on how flushometer valves and toilet bowls should be tested. Options that WaterSense is considering include, but are not limited to, the options described below.

1. Test products in accordance with their currently applicable standards (i.e., sampling would be done differently for valves and bowls). Valves would be tested with representative bowls from three different manufacturers. Toilet bowls would be tested with one flushometer valve, provided either by the manufacturer or by the licensed certifying body.
2. Require valves and bowls to be tested with representative counterparts from three different manufacturers (i.e., both valves and bowls would be tested in accordance with the current methodology presented for valves in ASSE Standard #1037).

¹⁴ Veritec Consulting, Inc. *Testing of Popular Flushometer Valve/Bowl Combinations: Final Report*. Revised August 2005. <www.cwwa.ca/pdf_files/fv%20revised%20final%20report%20aug.23.pdf>.

¹⁵ MaP. "Maximum Performance of Toilet Fixtures—Flushometer Valve/Bowl Combinations," *op. cit.*

In addition, as part of the *WaterSense Specification for Flushing Urinals*, manufacturers are required to provide three samples of the fixture model or flush valve model to be tested. Of those, the licensed certifying body must choose at least one sample at random for testing to the requirements of the specification. WaterSense requests input on whether this requirement is necessary for flushometer-valve toilets, or if choosing any single random sample from the production line will be sufficient in testing the product.

VII. Marking and Product Documentation

Since flushometer-valve toilet bowls may be labeled under the specification, WaterSense is seeking input on how bowls should be marked to indicate their rated flush volume. Currently, many manufacturers market toilet bowls that can be used with both 1.6 gpf and 1.28 gpf flush valves, as well as dual-flush flush valves. Under the current marking scheme, products may be marked with their maximum rated flush volume of 1.6 gpf, even though they are also compatible with 1.28 gpf valves. This type of marking could make it seem as though the bowl is falsely labeled or that the bowl and valve are not compatible to meet the WaterSense specification requirements for efficiency and performance.

WaterSense does not intend to cause undue burden on manufacturers and recognizes that some bowls can perform across a range of flush volumes. It may be unnecessarily burdensome to require manufactures to produce separate product markings for the same product. As a result, WaterSense is considering allowing bowls to be marked in a way that indicates compatibility with a range of flush volumes, provided that this range clearly includes the rated flush volume consistent with the WaterSense specification. For example, if a toilet bowl is compatible with a both 1.28 gpf and 1.6 gpf flushometer valves, the bowl may be marked as 1.28 gpf to 1.6 gpf. As long as the bowl has been tested to meet the specification requirements, and the rated flush volume (e.g., 1.28 gpf) falls somewhere within the range of rated flush volumes marked on the product, the bowl can obtain the WaterSense label.

However, allowing a range of flush volumes to be marked on toilet bowls may inadvertently lead to the use of incorrect flushometer valve inserts during flushometer valve maintenance. For this reason, WaterSense is considering requiring the actual rated flush volume (e.g., 1.28 gpf) to also be marked on the body of the flushometer valve. This will help specifiers, purchasers, facility managers, and maintenance personnel easily identify the correct flush valve inserts to order to preserve the flushometer valve's original flush volume, without relying on the toilet bowl for guidance.

Consistent with the *WaterSense Specification for Flushing Urinals*, WaterSense also intends to require product documentation to clearly identify that the part (flushometer valve or bowl) be used with a WaterSense labeled counterpart in order to ensure that the complete system meets the requirements of the specification for water efficiency and performance.

WaterSense requests input from manufacturers of these products, as well as utilities, specifiers, or end users, regarding the feasibility or any potential purchasing/end use concerns associated with these product marking approaches.

VIII. Summary of Information Requests

Although WaterSense is requesting feedback on all aspects of this notice, the specific outstanding issues, questions, and concerns that must be addressed prior to the release of a draft specification for flushometer-valve toilets are summarized below. All interested parties are encouraged to submit information and comments to watersense-products@erq.com.

Water Efficiency

- Is the proposed maximum flush volume of 1.28 gpf for dual-flush toilets a reasonable approach for ensuring water savings associated with these products?

Performance

- What should the maximum allowable flush volume variation be for flushometer valves?
- How should WaterSense address concerns regarding features and/or products that allow for adjustment of flush volume, but that assist in maintenance of plumbing systems? What requirements should WaterSense pursue to ensure long-term water savings associated with toilets equipped with these features or products?
- Should WaterSense consider in its specification the availability of aftermarket products that can allow the flushometer valve to be adjusted beyond its rated flush volume?
- Is the proposed requirement for addressing the interchangeability of flushometer valve parts sufficient to ensure long-term water savings associated with these products?
- What additional items should be considered for testing toilet performance? Some possible waste items to consider include additional toilet paper, toilet seat covers, paper towels, feminine products, and flushable wipes.
- Should WaterSense specify the use of uncased media or leave it up to the licensed certifying body to decide whether to use cased or uncased media?

Product Testing

- Which product testing option for flushometer valves and bowls should WaterSense pursue to balance testing costs and burden with the assurance that the products will meet performance and efficiency requirements? Should WaterSense remain consistent with the current requirements of the ASME and ASSE standards, or should WaterSense require the both valve and bowl to be tested with three representative counterparts?
- How many products should WaterSense require manufacturers to submit for testing to sufficiently ensure a random sample of the product was performance tested?

Marking and Product Documentation

- Should WaterSense allow bowls to be marked in a way that indicates compatibility with a range of flush volumes? If so, is ensuring that the flush volume compatibility range clearly includes the rated flush volume consistent with the WaterSense specification (e.g., 1.28 gpf to 1.6 gpf) sufficiently clear to avoid confusion in the field?
- Are there any issues or concerns associated with requiring manufacturers to mark the flushometer valve body with the rated flush volume?

IX. Schedule and Next Steps

WaterSense plans to accept feedback on the information requested above, and will consider all comments and information provided by stakeholders and the general public. In addition, WaterSense will hold a public meeting to discuss the information presented in this NOI and any stakeholder feedback received as part of the NOI review.

WaterSense tentatively plans to publish a draft specification for flushometer-valve toilets in 2014; however, the release will be contingent upon the schedule for incorporating the relevant revisions from updates to the ASME/CSA A112.19.2-2008/CSA B45.1 standard (as discussed in Section IV), as well as adequate resolution of the questions and issues presented in this NOI.

X. References

American National Standard Institute (ANSI). ANSI Z124.4-2006, *Plastic Water Closet Bowls and Tanks*.

American Society of Mechanical Engineers (ASME)/Canadian Standards Association (CSA) Standard. ASME A112.19.2-2008/CSA B45.1-08, *Ceramic Plumbing Fixtures*.

ASME/CSA Standard. ASME A112.19.3-2008/CSA B45.4-08, *Stainless Steel Plumbing Fixtures*.

ASME Standard. ASME A112.19.14-2006, *Six-Liter Water Closets Equipped With a Dual Flushing Device*.

American Society of Sanitary Engineering (ASSE) Standard #1037-1990, *Performance Requirements for Pressurized Flushing Devices (Flushometer) for Plumbing Fixtures*.

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