



**Response to Public Comments Received on
December 2014 *WaterSense® Draft Specification
for Flushometer-Valve Water Closets***

December 17, 2015



Background

This document provides the U.S. Environmental Protection Agency's (EPA's) responses to public comments received on the *WaterSense Draft Specification for Flushometer-Valve Water Closets*. For purposes of this document, the comments are summarized. The verbatim comments can be viewed in their entirety at www.epa.gov/watersense/docs/FVtoilets_comments508.pdf.

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I. Comments on Section 1.0: Scope and Objective

Inclusion of Blowout Toilets

- a. One commenter suggested that no distinction should be made between blowout fixtures and other fixtures compatible with flushometer valves and that blowout toilets should be eligible for obtaining the WaterSense label for flushometer-valve water closets. The commenter indicated that industry standards have not made any distinction in performance requirements for blowout toilets, except in specifying a different minimum operating pressure at which the performance tests specified in the standard will be conducted. In addition, the current track of excluding blowout toilets from any WaterSense performance specification will have the effect of creating three categories of toilets by potentially establishing a third specification and performance requirements for blowout toilets (separate from tank-type and flushometer-valve water closets). The commenter believes that doing so would cause confusion in the marketplace and put manufacturers of blowout toilets at a disadvantage if products are not eligible for the WaterSense label.

The commenter goes on to recommend that EPA should take one of three approaches to address this issue, in order of preference. Firstly, the commenter recommends that EPA place all water closets under the same specification, as is done in the *American Society of Mechanical Engineers (ASME) A112.19.2/Canadian Standards Association (CSA) B45.1* standard. The commenter's second preferred option is to place blowout toilets within the *WaterSense Specification for Tank-Type Toilets*. The third option is to treat both siphonic and blowout toilets the same under the specification for flushometer-valve water closets.

Response: EPA initially intended to exclude blowout water closet fixtures (i.e., bowls) under the specification for flushometer-valve water closets because they are held to different maximum flush volume standards under the Energy Policy Act (EPAct) of 1992. Under EPAct 1992, blowout water closets can have a flush volume up to 3.5 gallons per flush (gpf), whereas other fixtures compatible with flushometer valves (e.g., siphonic fixtures) must have a flush volume of 1.6 gpf or less. Based on the information provided by the commenter, it became apparent that other than this distinction made in EPAct 1992, blowout fixtures function in a similar way to other types of water closet fixtures and are compatible with the same flushometer valves. In addition, the commenter indicated that existing industry standards do not make any distinction between the performance requirements for both types of fixtures, aside from a different minimum operating pressure at which the performance tests specified will be conducted. Finally, there are blowout fixtures currently on the market that are rated at or below the maximum allowable flush volume identified in the *Specification for Flushometer-Valve Water Closets*.

EPA does not agree that all water closets (i.e., tank-type, flushometer-valve, and blowout) should be included under the same specification, however. EPA differentiates between tank-type and flushometer-valve-type water closets because these types of toilets have different flush mechanisms that are subject to different standards. In addition, tank-type and flushometer-valve water closets are typically sold in different markets and are intended for different applications. Because of this distinction, EPA determined it is important to continue to distinguish between these two product categories for the purpose of the WaterSense program. In addition, EPA does not agree that blowout water closets should be included under the *WaterSense Specification for Tank-Type Toilets*, as blowout water closet fixtures do not utilize tank-type technologies to operate, but rather use a pressurized flushing device (i.e., flushometer valve).

EPA has revised Section 1.0 to state that its specification for flushometer-valve water closets applies to both siphonic and blowout water closet fixtures (bowls) that use water from a flushometer valve to convey waste through a trap seal into a gravity drainage system. With this clarification, blowout fixtures and combinations consisting of a flushometer valve and blowout fixture will be eligible to obtain the WaterSense label, provided that they can meet all requirements, including the water efficiency and performance criteria, identified in the *Specification for Flushometer-Valve Water Closets*. By including blowout fixtures within the *Specification for Flushometer-Valve Water Closets*, EPA is maintaining consistency with how these fixtures are classified and handled under *ASME A112.19.2/CSA B45.1*.

Opposition to the Inclusion of Dual-Flush Flushometer-Valve Water Closets

- a. One commenter expressed concerns with the inclusion of dual-flush flushometer valves in this specification. The commenter suggested that this technology is still relatively new to the market, a fact that EPA alludes to in the *WaterSense Draft Specification for Flushometer-Valve Water Closets Supporting Statement* by acknowledging that “To date, water savings from dual-flush flushometer-valve toilets has not been fully researched or documented.” The commenter suggests EPA should not move forward with requirements for dual-flush flushometer valves in the specification without having adequate data supporting their efficiency.

The commenter continues that while the draft specification indicates EPA will mandate that the rated flush volume of a dual-flush valve must not exceed 1.28 gpf, EPA does not put any flush volume requirements or limitations for the reduced flush. EPA has acknowledged that user behavior and familiarity is crucial to the water efficiency of dual-flush products. However, even with increased user knowledge, inadvertent selection of the reduced flush for bulk waste removal could result in a plumbing system failure. Finally, because the water efficiency requirements proposed in the draft specification are different from those which are found within the *WaterSense Specification for Tank-Type Toilets*, the commenter believes EPA could potentially create a situation where

the varying requirements could be confusing to building designers, product specifiers, and manufacturers. For these reasons, the commenter recommends removing reference to dual-flush flushometer valves from the specification, including Sections 2.1.3 and 5.4 of the draft specification.

Response: EPA believes that dual-flush flushometer-valve water closets are a viable technology that can assist commercial facilities in reducing water use. While EPA maintains that the usage patterns of dual-flush water closets remains a subject in need of further study and understanding, EPA does not want to limit product design or innovation for products that have the ability to meet the specification requirements for both efficiency and performance. However, EPA is continuing to maintain that the full flush of a dual-flush flushometer-valve water closet meets the maximum water efficiency requirement of 1.28 gpf. This will ensure savings of at least 20 percent, consistent with the WaterSense program's goals. In addition, as discussed the in response to "Water Efficiency Requirements for Dual-Flush Water Closets" below, EPA is establishing a minimum flush volume of 1.0 gpf, which also applies to the reduced flush of a dual-flush flushometer-valve water closet. This will help ensure that the reduced flush provides the minimum amount of water maintain the effectiveness of a plumbing system.

Retrofit Devices

- a. One commenter suggested that EPA develop a WaterSense specification for component water conservation devices, such as retrofit valves. The commenter went on to say that an affordable water conservation device makes economic sense and would provide environmental benefit.

Response: EPA is maintaining that the *WaterSense Specification for Flushometer-Valve Water Closets* will continue to apply to fully functioning flushometer valves and water closet fixtures. The specification does not apply to component devices, including retrofit valves. EPA is excluding retrofit devices from this specification because there are no applicable standards against which such devices must be tested to ensure their performance. Without such standards, there is no method to evaluate whether performance requirements and water savings will be achieved.

Definition of Flushometer-Valve-Type Technologies

- a. Four commenters asked for a definition of what constitutes a "flushometer-valve-type technology." The commenters suggested that a clear definition is needed to determine applicability of various technologies to the specification. One commenter suggested that EPA align the definition with the existing definitions found in the newly tri-harmonized *American Society of Sanitary Engineering (ASSE) 1037/ASME A112.1037/CSA B125.37*, or remove this covered equipment from the specification. Three commenters suggested including the following definition:

“Any other technology that serves the function of a flushometer valve, falls within the scope of *ASSE 1037/ASME A112.1037/CSA B125.37*, and which meets these performance specifications.”

Response: EPA agrees with these comments and has revised the specification language to account for any technologies currently in the marketplace that are not defined as a flushometer valve but that function in a similar way and are compatible with siphonic or blowout water closet fixtures. EPA has clarified in Section 1.0 that the specification also applies to any other non-tank-type technology that serves the function of a flushometer valve, falls within the scope of *ASSE 1037/ASME A112.1037/CSA B125.37*, and that meets the requirements within the specification.

Applicability of Specification to Flushometer Valves and Fixtures

- a. One commenter suggested EPA revise Section 1.0 of the specification to better clarify that the specification applies to both high-efficiency toilet fixtures and flushometer valves. Specifically the commenter suggested the following updates to Section 1.0:

“This specification establishes the criteria for a high-efficiency flushometer-valve water closet fixture and a high-efficiency flushometer valve under the U.S. Environmental Protection Agency’s WaterSense program.”

Response: EPA agrees with this comment and has revised Section 1.0 of the specification to clarify that it is applicable to both the flushometer valve and water closet fixtures, as suggested.

II. Comments on Section 2.0: Water Efficiency Criteria

Minimum Flush Volume

- a. Four commenters suggested that the specification should include a minimum threshold for water consumption, below which a flushometer valve would not be eligible for the WaterSense label. The reason for this suggestion is that there is an unknown threshold where drainline performance and subsequently health and safety can be negatively impacted. Results from *The Drainline Transport of Solid Waste in Buildings* study prepared by the Plumbing Efficiency Research Coalition (PERC) indicates that the flush volumes between 1.28 gpf and 0.8 gpf need to be evaluated further to determine where this threshold might be. The commenters fear that the specification will create an incentive to design and market water closets or flushometer valves that could result in drainline blockage failures in commercial buildings.

Three of the four commenters suggested establishing a minimum flush volume at 1.0 gpf for both single-flush flushometer valves and the reduced flush of a dual-flush flushometer valve.

Two of the commenters suggested the following revision to Section 2.1.1 of the draft specification:

“The manufacturer shall specify a rated flush volume ~~of~~ for the flushometer valve or water closet fixture, which ~~must~~ shall be equal to ~~or less than~~ 1.28 gallons per flush (gpf) (4.8 liters per flush [Lpf]), and not less than 1.0 gpf (3.8 Lpf).”

One commenter suggested the following revisions to Section 2.1.1 of the draft specification:

“2.1.1 The manufacturer shall specify a rated flush volume of the flushometer valve or water closet fixture, which must be equal to or less than 1.28 gallons per flush (gpf) (4.8 liters per flush [Lpf]). Flushometer valves must also discharge 1.0 gallons per flush (gpf) (3.8 Lpf) minimum when tested in accordance with the requirements in 2.0.

2.1.2 The water consumption, determined through testing and when evaluated in accordance with the sampling plan contained in the Code of Federal Regulations (CFR) at *10 CFR 429.30*, shall ~~not exceed~~ meet the ~~rated~~ flush volumes specified in Section 2.1.1 and 2.1.2.

2.1.3 For flushometer valves with dual-flush capabilities, these maximum water efficiency requirements shall apply to the full-flush mode.”

The commenter also went on to suggest related edits to Section 4.2 of the draft specification as follows:

“The flushometer valve must ~~not exceed the rated~~ meet the flush volume ~~of water requirements~~ specified in Section 2.1.1 even if the primary actuator is maintained in the flush position (i.e., device’s primary actuator must be a non-hold-open design).”

One commenter suggested that both the maximum flush volume and minimum flush volume of the specification be established at 1.28 gpf, as this would ensure that users will achieve a 20 percent water savings, while also maintaining a level of performance that the industry is confident will provide an effective flush. Specifically, the commenter suggested the following change to Section 2.1.1:

“The manufacturer shall specify a rated flush volume of the flushometer valve or water closet fixture, which ~~must~~ to be equal to ~~or less than~~ 1.28 gallons (4.8 liters) per flush.”

Response: EPA waited to finalize the *WaterSense Specification for Flushometer-Valve Water Closets* in anticipation of the release of PERC Phase 2.0 research on the impact of water-efficient water closets on drainline performance. Upon review of the study findings, EPA has determined that, at this time, it is necessary to establish a minimum flush volume for flushometer-valve water closets. The specification establishes a minimum rated flush volume for flushometer valves and water closet fixtures of 1.0 gpf, consistent with the minimum recommended flush volume identified by some of the commenters. The PERC Phase 2.0 study indicates that at flush volumes at 1.0 gpf and below, drainline performance becomes chaotic and can result in drainline blockages or performance issues. This requirement has been added to Sections 2.1.1 and 2.3 of the specification. EPA has also made clear in the specification that the minimum flush volume requirement applies to the reduced flush of a dual-flush flushometer-valve water closet.

While EPA does not intend to limit the development of potentially successful water-efficient products, establishing a minimum will help protect the WaterSense brand and address potential performance and health and safety concerns related to drainline blockages. However, this measure is intended to be a transitional requirement until the applicable standards committees have a chance to respond to findings of the PERC Phase 2.0 study and make adjustments, as appropriate and necessary, to the relevant national standards. Currently, the applicable national standards or plumbing codes have not established a minimum flush volume for flushometer-valve (or other) water closets. EPA maintains that it is ultimately the responsibility of the plumbing standards committees, to determine if a minimum flush volume is necessary, and if so, establish the appropriate level that is required to maintain effective drainline performance and ensure public health and safety. It is EPA's intent to refer the question of appropriate minimum flush volumes to the ASME A112/CSA standards committees on plumbing materials and equipment. Once the committees have fully considered the issue and made updates to the standard, as necessary, EPA will revisit minimum flush volume requirements in the WaterSense specification and revise it as appropriate.

In establishing a minimum, EPA acknowledges that while the PERC Phase 2.0 Study indicated 1.0 gpf is a flush volume that can achieve effective drainline performance, it might not be effective in all existing buildings and drainline apparatuses. It is still the responsibility of the facility manager and/or plumbing engineer to determine the minimum water closet flush volume that is required to maintain a properly functioning plumbing system.

Water Efficiency Requirements for Dual-Flush Water Closets

- a. Several commenters opposed the requirement to limit the maximum flush volume of dual-flush water closets to 1.28 gpf.

Two commenters indicated that it was not a reasonable approach for the specification to only accept a maximum flush volume for dual-flush water closets, and to establish the maximum flush volume at the same level as for single-flush water closets. The commenters stated that the decision to use the two small flushes and one large flush to determine the effective flush for dual-flush water closets was made several years ago with the concurrence of manufacturers, regulators, and non-governmental organizations. Furthermore, the behavioral studies that have been conducted on dual-flush water closets were limited in scope and do not form the basis for such a significant change. The commenters continued that the 2:1 flush ratio that is used to establish the effective flush volume is allowed in the *WaterSense Specification for Tank-Type Toilets* and has been included by reference in legislation in California, Texas, Georgia, Florida, Colorado, New York City, and Los Angeles, as well as the green plumbing codes. The commenters indicated that considerable resources have gone into the design, marketing, and installation of dual-flush water closets to inform and promote the technology in both the residential and commercial markets. EPA's intentions to only recognize the full-flush mode of a dual-flush water closet would significantly disrupt this technology's viability in the marketplace.

Based on information provided in the supporting statement of the draft specification, the commenters believe elimination of the currently accepted and published dual-flush option of 1.6 gpf full flush/1.1 gpf reduced flush can have a deleterious effect on the potential replacements of the pre-1992 EPAAct water closets. The draft supporting statement establishes that these older fixtures will yield 85 percent greater water savings if they are replaced with WaterSense labeled products. Because these older existing fixtures all occur in commercial buildings with older infrastructure, including drainlines and water supplies, the dual flush option is necessary to encourage building owners to replace these fixtures. The commenters argue that if the efficiency convention for dual-flush toilets that is currently allowed in the *WaterSense Specification for Tank-Type Toilets*, numerous plumbing codes, and legislation is prohibited from the specification for flushometer-valve toilets, it will likely result in these older fixtures not being replaced at all.

One of the commenters expressed concern that a redefinition of dual-flush performance that only recognizes the maximum flush rate might push the small flush design of water closets with a 1.28 gpf maximum into an area of questionable system performance. It has been acknowledged by the PERC Phase 1 research that there is a lower limit of water consumption in commercial settings that could lead to catastrophic drain blockages. Without any solid evidence to change the performance aspect of dual-flush water closets which would significantly disrupt the overall marketplace, the 2:1 flush ratio for dual-flush water closets should be maintained.

One of the commenters also stated that, as indicated in the draft supporting statement, replacing the 28 percent of older water closets will yield three times as much water savings and this should therefore be encouraged by EPA. The

commenter provides example rebate applications and criteria from various utilities, all of which are WaterSense partners that currently provide financial incentives for commercial customers to replace 3.5-gpf-or-greater fixtures with high-efficiency models. These include San Francisco Public Utilities Commission, East Bay Municipal Utility District, Metropolitan Water District of Southern California, Portland Water Bureau, Denver Water, Soquel Water, and Rock River Texas. These financial incentives are only offered for the replacement of pre-1992 EPAAct fixtures, as replacement of these will yield more water savings for both the customer and the water agency. All of these water agencies consider a dual-flush flushometer-valve water closet to be a high-efficiency fixture, as they have considered and are aware that older fixtures are in older structures, with drainlines that can be very large in diameter, have a sag or interruption in the slope, or have considerable solid buildup that has occurred over time. The dual-flush option at 1.6 gpf/1.1 gpf still offers efficiency and water savings, but it also provides the additional water that can be necessary to overcome these adverse conditions in the old drainage system. Therefore, the commenter believes that the draft specification needs to retain the full range of efficient products available as suitable fixture replacements within these older buildings.

Finally, both commenters presented two additional studies that were not cited in the supporting statement for the draft specification. The studies were *Flush: Examining the Efficacy of Water Conservation in Dual-Flush Toilets*, published by Masaye Harrison in 2010, and *Dual-flush Toilet Project*, published by the Canada Mortgage and Housing Corporation in 2002. The commenters state that these studies found ratios of reduced flush to full flush that were consistent with the industry accepted ratio of 2:1. The 2010 study indicated a 1.9 to 1 ratio, while the 2002 study found a 1.7 to 1 ratio for commercial buildings.

The commenters suggested the following language change to Section 2.1.3 of the draft specification:

“The effective flush volume shall not exceed 1.28 gallons (4.8 liters) when evaluated in accordance with the sampling plan contained in *10 CFR 429.30*. For dual-flush toilets, the effective flush volume is the average flush volume of two reduced flushes and one full flush. Full flush volumes shall be tested in accordance with *ASME A112.19.2/CSA B45.1* and *ASME A112.19.14*. ~~For flushometer valves with dual flush capabilities, these water efficiency requirements shall apply to the fully flush mode.~~”

Several commenters similarly indicated that they felt flushometer valves with dual-flush capabilities should be required to meet the same water efficiency requirements as WaterSense labeled dual-flush tank-type toilets. The *WaterSense Specification for Tank-Type Toilets* requires that the effective flush volume of a dual-flush toilet must not exceed 1.28 gpf (4.8 liters). The effective flush volume of a dual-flush toilet is defined as the average flush volume of two reduced flushes and one full flush.

One commenter suggested revising Section 2.1.3 of the draft specification as follows:

“For flushometer valves with dual-flush capabilities, these water efficiency requirements shall apply to the effective flush volume. The effective flush volume is the average flush volume of two reduced flushes and one full flush.”

A fourth commenter indicated that if EPA insists on moving forward with its specification, it should leave the current 1.6/1.1 dual-flush product in the specification because 1) it works in today’s market, 2) it will parallel the requirements in the *WaterSense Specification for Tank-Type Toilets*, and 3) while it might not provide as much water savings as the WaterSense program might like (20 percent), it allows the use of 1.6 gpf when necessary. The minor additional savings obtained by using a 1.28 gpf maximum device is not worth the risk.

- b. One commenter also indicated that a wide variety of tank-type water closets that incorporate different design options for the dual-flush mechanism have been third-party certified to both the *ASME A112.19.14* standard and *WaterSense Specification for Tank-Type Toilets*. While there might be some that feel that buttons work better than levers or vice versa, or that a particular design is more intuitive to the user, there should be no discrimination against any design that can meet the requirements of the national consensus standard and the specification. The commenter went on to say that while WaterSense asserted in both the Notice of Intent (NOI) and the *WaterSense Draft Specification for Flushometer-Valve Water Closets Supporting Statement* that water savings are “largely based on ...design considerations,” the fact is that the referenced standard (*ASME A112.19.14*) for dual-flush water closets requires proper identification of the flush mode options, or shall be “intuitively apparent.” Therefore, EPA has already acknowledged through the adoption of the *WaterSense Specification for Tank-Type Toilets* that all types of designs are acceptable. The commenter provided photographic examples of various dual-flush mechanisms. The commenter indicated that EPA is correct to reference the same national standard (*ASME A112.19.14*) for the specification pertaining to flushometer-valve water closets, but they should also include the water efficiency criteria already established in the *WaterSense Specification for Tank-Type Toilets*. The commenter emphasized that it is inappropriate for EPA to single out one particular design and to utilize a single study on that design to arrive at this discrepancy. In exactly the same manner that EPA allows for a wide variety of designs for dual-flush tank-type water closets that meet the specification to be certified, EPA should include the full options in this specification.

Response: EPA is retaining the maximum water consumption of 1.28 gpf for all WaterSense labeled flushometer-valve toilets, including the full flush of a dual-flush flushometer-valve toilet. As stated in the *WaterSense Specification for Flushometer-Valve Water Closets Supporting Statement*, water savings in

commercial restrooms 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 mode requires the user to pull up or push down on the handle). EPA acknowledges the two additional studies submitted by the commenters (*Flush: Examining the Efficacy of Water Conservation in Dual-Flush Toilets*, published by Masaye Harrison in 2010, and *Dual-flush Toilet Project*, published by the Canada Mortgage and Housing Corporation in 2002). However, upon further review of the studies, neither confirmed the 2-to-1 ratio that is currently used to determine the effective flush volume of a dual-flush toilet. These studies found full- to reduced-flush volume ratios of 1.6 to 1 and 1.7 to 1, respectively, for dual-flush flushometer-valve water closets in commercial restrooms. Neither of these ratios are sufficient to achieve 20 percent savings that is consistent with WaterSense's goal.

In addition, the U.S. Department of Energy (DOE) proposed a test method to account for the reduced average water use of a dual-flush water closet in a 2012 Notice of Proposed Rulemaking (NPR) to amend the test procedures for showerheads, faucets, water closets, urinals, and pre-rinse spray valves. The test method would have allowed manufacturers to calculate the average representative water use (i.e., the effective flush volume) using the composite average of two reduced flushes and one full flush. Commenters argued against the test method, stating that the weighted average approach was unproven and the particular ratio required further evaluation to confirm its representativeness. As a result of these and other comments, DOE ruled in 2013 that there was not sufficient evidence to base a test procedure for the average representative water use for dual-flush water closets.¹ In declining to adopt such a test procedure, manufacturers, distributors, retailers, and private labelers are not permitted to make any representations of water use that reflects an average of the full- and reduced-flush modes for dual-flush water closets. Essentially, DOE is prohibiting the use of an effective flush volume to market dual-flush water closets. By establishing the full-flush mode maximum at 1.28 gpf, EPA is guaranteeing at least 20 percent savings and is eliminating the need for an effective flush volume calculation.

With this specification, EPA does not intend to restrict certain designs of dual-flush flushometer-valve water closets from obtaining the WaterSense label, as long as the flushometer valve is capable of meeting the requirements of this specification. By establishing the maximum flush volume for the full-flush mode of a dual-flush water closet at 1.28 gpf, EPA is simply ensuring the projected water savings regardless of the design and associated marking.

EPA acknowledges that significant marketing and research has gone into the current convention for dual-flush water closets that have a full flush of 1.6 gpf and

¹ U.S. Department of Energy. Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Test Procedures for Showerheads, Faucets, Water Closets, Urinals, and Commercial Pre-rinse Spray Valves. Docket No. EERE-2011-BT-TP-0061. Federal Register, Volume 78, No. 205. October 23, 2013. www.gpo.gov/fdsys/pkg/FR-2013-10-23/pdf/2013-24347.pdf

a reduced flush of 1.1 gpf. EPA also acknowledges that this convention was developed by consensus and has been incorporated into the national plumbing standards. However, the WaterSense label is meant to recognize those models that are more efficient than conventional products on the market. As such, adopting the current convention for dual-flush flushometer-valve water closets offers no savings over the standard approach for dual-flush flushometer-valve water closets. Adopting more efficient requirements for dual-flush flushometer valve toilets will drive further innovation and efficiency for those products and guarantee savings of at least 20 percent for WaterSense labeled products. Further, there are dual-flush flushometer-valve water closets currently available that have a full flush of 1.28 gpf, indicating there is a market for this technology.

In addition, EPA has determined that it is appropriate to maintain differing conventions for dual-flush tank-type and flushometer-valve water closets. These products are intended for different markets, and therefore experience different use patterns. In a residential setting where tank-type toilets are prominent, users are more likely to use the full-flush and reduced-flush modes as intended. In commercial settings, as stated previously, behavior can be more erratic and influenced various factors, including valve design. WaterSense is less certain of the use patterns in commercial settings and limited research suggests that toilets are not used at a ratio of 2 reduced flushes to 1 full flush, which would be necessary to provide 20 percent savings for conventional dual-flush flushometer-valve water closets.

EPA also acknowledges the concern that setting the maximum flush volume for the full flush of a dual-flush flushometer-valve water closet at 1.28 gpf might push the reduced flush to beyond the minimum that is generally agreed upon as safe and required to ensure performance in properly designed and functioning plumbing systems. EPA understands as well that some municipalities and water utilities offer rebates for the replacement of flushometer-valve water closets with existing flush volumes of 3.5 gpf or greater and there are concerns that reducing the full flush from 1.6 gpf to 1.28 gpf might discourage replacement of these older inefficient fixtures, particularly in older systems which would be more likely to have adverse conditions within the drainage system. Further EPA acknowledges the impact this change might have on existing legislation, codes, and rebate programs. EPA maintains that the WaterSense program, and the product specifications associated with the program, are voluntary. As such, it is up to each individual local government, municipality, and/or utility to decide whether to adopt this specification and its associated requirements into local codes and rebate programs, or to continue to allow dual-flush flushometer-valve water closets that claim an effective flush volume of 1.28 gpf. Further, with this specification, EPA has established a minimum flush volume of 1.0 gpf, which also applies to the reduced flush of a dual-flush flushometer-valve water closet. This minimum flush volume should help mitigate potential performance and health and safety concerns related to potential drainline blockages.

Finally, EPA reiterates that it is the responsibility of the facility manager and/or plumbing engineer to determine the appropriate minimum flush volume at which their plumbing system function effectively. EPA is confident moving forward with a specification for labeling high-efficiency flushometer-valve water closets and has determined that these products, when installed, can be an effective way to reduce facility water use and maintain high performance. However, EPA is not recommending high-efficiency models, particularly models flushing below 1.28 gpf, for use in all existing applications where flushometer-valve water closets are installed. Facility managers and/or plumbing engineers should use caution when deciding whether to implement high-efficiency flushometer-valve water closets into an existing commercial facility, first assessing the physical conditions of the existing drainlines to ensure they are suitable for this type of retrofit. Drainlines should be inspected for adequate slopes (ideally greater than one percent) and for defects, root intrusions, sagging, or other conditions that could result in blockage with lower flush volumes. In addition, high-efficiency flushometer-valve water closets with flush volumes below 1.28 gpf should be situated downstream of additional long-duration flows from other water-consuming appliances, plumbing fixtures, and other devices that are available to assist with the drainline transport of solid wastes.

Authorities (e.g., states, local municipalities, code organizations, water utilities) intending to require or provide incentives for the installation of WaterSense labeled flushometer-valve water closets in regulations, building codes, or other mandates should consider offering an exemption or allowance for existing buildings that have been deemed unsuitable for retrofit with high-efficiency flushometer-valve water closets are excluded from the requirements. The authority may wish to require a review of the drainline system by a plumbing engineer before issuing the exemption. Similarly, utilities offering rebate programs or other entities promoting the installation of WaterSense labeled flushometer-valve water closets may want to determine whether the prospective installers are aware of and have assessed their plumbing systems to ensure compatibility with high-efficiency water closets.

III. Comments on Section 3.0: General Water Closet Fixture Requirements

Fixture Testing With Multiple Flushometer Valves

- a. Five commenters indicated that EPA has no basis for requiring manufacturers of water closet fixtures to test their product(s) with flushometer valves from three different manufacturers. The commenters stated that EPA had no evidence to demonstrate that by using three different manufacturer's flushometer valves that are certified to *ASSE 1037/ASME A112.1037/CSA B125.37* will improve the performance and efficiency beyond the testing requirements contained in the applicable consensus standards for water closets. Since all flushometer valves will be required to be certified to *ASSE 1037/ASME A112.1037/CSA B125.37*,

the valves will perform relatively the same. The additional testing requirements will increase the amount of time and cost for manufacturer product testing.

The commenters indicated that EPA should only reference the applicable consensus standards for water closets (*ASME A112.19.2/CSA B45.1*, *ASME A112.19.3/CSA B45.4*, or *CSA B45.5/International Association of Plumbing and Mechanical Officials [IAPMO] Z124*) to ensure that necessary performance and efficiency requirements are met. The commenters suggested removing the requirement for testing water closet fixtures with multiple flush valves throughout Section 3.0.

Response: EPA has reassessed the requirement included in the draft specification that would require water closet fixtures to be tested with three representative flushometer valves from different manufacturers. Based on the comments provided, EPA has determined that flushometer valves certified to *ASSE 1037/ASME A112.1037/CSA B125.37* will perform similarly, thus making the requirement to test fixtures with three representative flushometer valves redundant. To reduce burden on manufacturers and eliminate potential redundancy, EPA has removed this requirement, and instead will reference the applicable consensus standards for water closet fixtures (*ASME A112.19.2/CSA B45.1*, *ASME A112.19.3/CSA B45.4*, or *CSA B45.5/IAPMO Z124*). These standards require that each fixture be tested with one flushometer valve.

IV. Comments on Section 4.0: General Flushometer Valve Requirements

Interchangeability of Replaceable or Maintainable Parts

- a. Three commenters requested that EPA clarify the intent of the requirements in Section 4.4 of the draft specification related to the interchangeability of replaceable or maintainable parts. These commenters requested that EPA align its requirements with the clarification statement made on January 24, 2013, in regards to the requirements for interchangeability of replaceable and maintainable parts in the *WaterSense Specification for Flushing Urinals*. The commenters asked for clarification, as they do not believe EPA intends to require that manufacturers must have physical differences within the valve body that would prevent parts from being interchangeable, as such a requirement would be cost-prohibitive for the producer in today's manufacturing environment. One commenter suggested removing Section 4.4 of the draft specification, as the intent of this section seems to be covered in Section 6.2.1. The other commenters suggested the following language changes to Section 4.4 of the draft specification:

“The manufacturer, at a minimum, must provide documentation that is clearly marked with specific maintenance/replacement part instructions and identification of correct replacement parts that should be used to

~~ensure attest that the flushometer valve is designed such that replaceable or maintainable parts (e.g., pistons, diaphragms) are not intended to be interchangeable with parts that would cause the device to will not exceed the rated flush volume specified in Section 2.1.1.”~~

Two additional commenters supported EPA’s intention to limit the adjustability and interchangeability of flushometer valve parts, as this is critical to maintain water-saving efficiencies throughout the life of the valve.

One of the commenters recommended the following changes to Section 4.4 of the draft specification:

~~“The manufacturer must attest that~~ The flushometer valve ~~shall be is~~ designed such that ~~interchangeable~~ replaceable repair or maintainable parts (e.g., pistons, diaphragms, repair kits) ~~are not intended to be interchangeable with parts that would~~ that are offered for sale by the manufacturer do not cause the device flushometer valve to exceed maximum the rated flush volume specified in Section 2.1.1.”

The other commenter suggested the following change to Section 4.4 of the draft specification:

“The manufacturer shall provide documentation with the product that details a list of replacement parts that will maintain the rated flush volume specified in Section 2.1.1.”

Response: EPA maintains that requirements to ensure that replacement parts and maintenance instructions preserve the rated flush volume is vital to ensure the longevity of water savings associated with these products. However, it was not EPA’s intent to require that this be achieved through physical differences within the product.

During the development of language to clarify the intent of Section 4.4 of the draft specification, EPA determined that requirements related to the interchangeability of replaceable or maintainable parts are more aptly covered in Section 6.0: Product Marking, as the requirements are related to the packaging and marking of products and the associated product documentation. EPA has clarified language within Section 6.0 to identify specific requirements manufacturers must meet to achieve the intent of these requirements. EPA has subsequently removed Section 4.4 (in the draft specification) from the final specification.

V. Comments on Section 5.0: Flush Performance Criteria

Removal of Sections 5.1 and 5.2

- a. Two commenters stated that the text in Sections 5.1 and 5.2 of the draft specification are not clear and are unnecessary for proper application and enforcement of the specification. The commenters indicated that the specification already requires testing to be conducted in accordance with *ASSE 1037/ASME A112.1037/CSA B125.37* for flushometer valves and these sections can be deleted.

Response: EPA has removed Sections 5.1 and 5.2 of the draft specification as a result of these comments. Flushometer valves tested in accordance with *ASSE 1037/ASME A112.1037/CSA B125.37* and evaluated in accordance with the sampling plan contained in *10 CFR 429.30* have been verified to have a water consumption consistent with their rated flush volume and no adjustment should be necessary. These sections were removed from the specification to eliminate potential confusion.

Opposition to Inclusion of a Seat Cover in Performance Testing

- a. Four commenters opposed the inclusion of an unwaxed paper water closet seat cover within waste extraction and flush performance testing of both single-flush and dual-flush flushometer-valve water closets.

Three of the four commenters indicated that the inclusion of a seat cover has not been vetted through the applicable standard development process. In addition, EPA has not provided any evidence to show that the existing performance testing requirements within *ASME A112.19.2/CSA B45.1* and *ASME A112.19.14* are flawed. The commenters requested that EPA present data supporting the inclusion of additional test media to the appropriate ASME task group for consideration. The commenters therefore recommended that EPA remove the seat cover requirement from performance testing. One of the commenters suggested that this change would allow EPA to remove Section 5.0 of the draft specification in its entirety, as the flush performance requirements are already covered in Sections 3.0 and 4.0.

One commenter also indicated that while the specification identifies the length and width requirements of the unwaxed seat cover, it does not account for different paper stocks and various designs that are on the market, thus allowing manufacturers and test labs to procure different products. In addition, the commenter was not aware of any testing that has been conducted to verify the repeatability of the testing using the draft test procedure.

Response: EPA maintains that the use and disposal of a single water closet seat cover is a likely occurrence for water closets in commercial restrooms. A test that includes the addition of a paper seat cover is more representative of real-world conditions and provides some additional level of assurance for flushometer-valve toilet performance. Further, EPA has been made aware through stakeholder comments during the NOI phase of the specification development process and through anecdotal research that some fixtures and flushometer valve combinations are not capable of successfully clearing a seat cover. EPA is also concerned that toilet performance testing has been focused on bulk solid waste removal and that this focus might be at the detriment of other areas of performance, such as bowl washdown and the ability to remove a seat cover on a consistent basis. EPA wants to ensure that performance testing is adequately assessing bowl washdown and the ability to remove a seat cover, in addition to its ability to remove bulk waste. Double flushing resulting from water closets' inability to remove a seat cover on the first flush can result in lost water savings.

However, EPA agrees that the additional test media and testing protocol should be vetted through the ASME and CSA committees and considered for inclusion in future revisions of the applicable performance standards. Anecdotal research indicates that the way in which the seat cover is added to the bowl (e.g., how much of the seat cover comes into contact with bowl surface) impacts the water closet's ability to flush the seat cover. This suggests that the testing methodology, as proposed in the draft specification might not be repeatable. As a result, EPA has removed the seat cover testing requirements from the specification for both the full and reduced flush. EPA will, however, maintain Section 5.0 of the specification to ensure that the flush performance requirements for all WaterSense labeled models are met. EPA has included the flush performance requirements by reference to the applicable sections within *ASME A112.19.2/CSA B45.1* and *ASME A112.19.14*.

Although EPA has removed the seat cover testing requirement from the final specification, it will work with the ASME/CSA standards committee to address the issue through the standards development process. This will ensure that the testing protocol is prepared such that it is repeatable and reproducible in a manner to ensure consistent testing done among laboratories. EPA could then reference such a standard in future revisions to the specification.

Seat Cover Clarification

- a. One commenter asked for clarification on the phrase "WaterSense labeled models must pass additional tests, such as the ability to flush a toilet seat cover." The commenter believed this was an unintentional error, as no toilet is capable of flushing a seat and cover.

Response: Under the draft specification, EPA did not intend for a water closets to be able to flush a toilet seat and cover that is used to cover the bowl when it is not in use. Instead, EPA intended that flushometer-valve water closets be

capable of flushing disposable paper seat covers that are commonly used in commercial restrooms for hygienic purposes.

Regardless, EPA has removed the inclusion of the disposable seat cover from the flush performance testing. Therefore, no changes were made to the specification resulting from this comment.

VI. Comments on Section 6.0: Product Marking

Redundant Requirements for Flushometer Valve Product Marking

- a. Three commenters stated the Sections 6.2.1 and 6.2.2 of the draft specification include the same requirements, which makes the requirements unclear. The commenters suggested revising the language within Section 6.2.1 to include the requirements of Section 6.2.2 and reduce redundancy.

Two commenters suggested the following change to Section 6.2.2 of the draft specification:

~~“Product documentation shall be clearly marked with specific maintenance or replacement part instructions and identification of correct replacement parts that should be used to ensure that the device will not exceed its rated flush volume. Under no circumstances can manufacturers provide maintenance instructions or advertise the use of any replacement parts that would cause the flushometer valve to exceed its rated flush volume.”~~

The third commenter suggested the following change to Section 6.2.2:

~~“The flushometer valve and its included product documentation must not provide instruction directing the user to specific maintenance or replacement parts that would cause the flushometer valve to exceed its rated flush volume specified in Section 2.1.1.”~~

Response: With sections 6.2.1 and 6.2.2, as written in the draft specification, EPA was attempting to convey two different intents: 1) to ensure that the manufacturer does not provide any instructions related to the product that would advise the user on how to override the rated flush volume; and 2) to require the manufacturer to provide clear instructions regarding maintenance regimes and repair parts that should be used and followed to maintain the rated flush volume. EPA has combined the two requirements into one section of the specification to clarify these points. The language in the final specification states:

6.2.1 Product documentation shall be clearly marked with specific maintenance instructions and shall identify replacement parts (e.g., pistons, diaphragms, repair kits) that should be used to

ensure that the device maintains its rated flush volume. The flushometer valve shall also not be packaged, marked, or provided with instructions directing the user to an alternative flush volume setting that would override the rated flush volume specified in Section 2.1.1.

VII. Comments on Section 9.0: Definitions

Include Definition for Canadian Standards Association

- a. Two commenters pointed out that EPA did not include a definition for the Canadian Standards Association (CSA). As CSA's standards are referenced throughout the specification, a definition should be included.

Response: EPA agrees that the definition "CSA: Canadian Standards Association" should be include in the specification and has added it to Section 9.0. The exclusion of a definition for CSA from the draft specification was an oversight.

VIII. General Comments on the Specification

General Specification Support

- a. One commenter supported EPA's decision to develop a specification for flushometer-valve water closet fixtures and flushometer valves.

Response: EPA thanks the commenter for their support of this specification.

General Specification Opposition

- a. One commenter stated that the draft specification provides no user benefit above current products and is unnecessary. Furthermore, because of some local jurisdiction requirements, the specification might force some property owners to retrofit a high-efficiency model onto an older system that is ill-equipped to handle it. Some older plumbing systems might not function properly with lower flush volumes, resulting in costly maintenance and repairs, and compromising public health and safety. In addition, the commenter stated that there are flushometer-valve water closets already certified to the same national performance standards referenced in the draft specification. The only notable difference between the current certification requirements and the draft specification is the addition of a toilet seat cover in the waste extraction test. The commenter argues that certified products are able to process this additional media in the field every day, and this slight testing difference does not create "a high level of user satisfaction" any different than current products. The specification would only burden manufacturers with additional testing, certification and annual compliance costs with no added benefit to the consumer. Therefore, the commenter suggests that

EPA should discontinue development of the specification for flushometer-valve water closets.

- b. Two commenters expressed opposition to the release of a specification for flushometer-valve water closets. The commenters indicated that EPA has presented little evidence to show that the existing national standards do not sufficiently address efficiency and performance for flushometer-valve water closets that are comparable to what EPA has proposed. The commenters questioned EPA's decision to use the results of the PERC Phase 1 study as justification for this specification, even though the PERC technical committee explicitly recommended that EPA consider the results of PERC Phase 2.0 before making a final decision on the requirements of the specification. The commenters believe that more data is required to justify the need for this specification, and should wait until the results of PERC Phase 2.0 are published before moving forward with specification development.
- c. One commenter expressed concern that release of this specification could impact EPA's reputation on an otherwise successful WaterSense program. The commenter indicated that the risk is not worth the reward; that is, the projected 20 percent savings by moving from 1.6 gpf to 1.28 gpf in a commercial setting is not worth the potential negative impact that could result from such change. Instead, EPA should work with industry to focus its efforts on converting all existing 3.5-gpf-and-greater water-consuming commercial flushing devices to 1.6 gpf—the savings and impacts of a plan like that will product far greater water savings than moving from 1.6 gpf to 1.28 gpf.

The commenter indicated industry has general concern with moving to a 1.28 gpf flush volume for commercial use. The commenter supports this concern and said that systems in the commercial market present several challenges not found in the residential market, including but not limited to how the products are used, frequency of use (including periods of non-use), items flushed, and length of drainlines. The commenter further indicated that available data suggest that as flush volumes are lowered there is a direct correlation to the distance of drainline carry. This could result in drainline blockages in commercial markets where longer drainlines are utilized.

The commenter indicated general support for the WaterSense program but suggested waiting until additional research information is available to move forward with the specification.

Response: In May 2014, the Government Accountability Office released a report that indicated 40 of 50 states expected water shortages in some portion of their states under average conditions in the next 10 years.² In light of this information, and with droughts in California and other areas throughout the country, there is considerable interest in advancing water conservation. As indicated in the

² United States Government Accountability Office. "Freshwater. Supply Concerns Continue, and Uncertainties Complicate Planning. May 2014. <http://www.gao.gov/assets/670/663343.pdf>

WaterSense Draft Specification for Flushometer-Valve Water Closets Supporting Statement, EPA conservatively estimates that if all 7 million old, inefficient 3.5 gpf flushometer-valve water closets nationwide were replaced with WaterSense labeled models, nearly 39 billion gallons could be saved annually. Furthermore, replacing existing 1.6-gpf flushometer-valve water closets with WaterSense labeled models could save nearly 15 billion additional gallons annually. Therefore, EPA maintains that labeling high-efficiency flushometer-valve water closets will provide measurable water savings nationwide. In addition, while existing national standards currently ensure performance of flushometer-valve water closets, the WaterSense label is used to recognize those products that improve water efficiency and provide assurance to consumers about performance. The WaterSense label will help further differentiate high-efficiency flushometer-valve water closets in the market, and is intended to help encourage purchasers to choose labeled models.

EPA acknowledges that there are concerns within industry related to how water efficiency impacts plumbing system performance. However, the PERC Phase 1 study states, “Based on the findings from this study, the PERC [Technical Committee] recommends that the U.S. EPA WaterSense Program expand their specification on toilets to include commercial flushometer-valve operated [high-efficiency toilets].”³ To obtain greater assurance of the requirements of the specification, EPA postponed the release of this specification until the findings of the PERC Phase 2.0 study were released to the public. As a result of the PERC Phase 2.0 study, and as indicated in the “Minimum Flush Volume” section, above, EPA has included a minimum flush volume, below which products will not be eligible to obtain the WaterSense label. Establishing a minimum flush volume should ensure that in most plumbing systems, the products will maintain effective drainline performance. In addition, as discussed in the “Cautionary Statement for Installing High-Efficiency Fixtures and Fittings in Renovations” section below, EPA will include a cautionary statement within the specification supporting materials, as appropriate, encouraging facility managers and building owners to consult with a plumbing engineer and assess the condition and limitations of the existing drainline infrastructure before installing high-efficiency flushometer-valve water closets, particularly models that flush below 1.28 gpf. It is the responsibility of the facility manager and a plumbing engineer to understand the limitations of the existing plumbing system and balance that with the right fixtures and flush volumes to maximize water efficiency and ensure their plumbing system functions effectively.

Consistency with State Commercial Code Requirements

- a. One commenter asked EPA to confirm that all components of the specification will meet commercial code requirements in states with the strictest standards. The commenter noted that federal agencies in those states will be required to

³ PERC. November 2012. *The Drainline Transport of Solid Waste in Buildings*.
www.plumbingefficiencyresearchcoalition.org/wp-content/uploads/2012/12/Drainline-Transport-Study-PhaseOne.pdf

meet the code in their state, while also being required to purchase WaterSense labeled products.

Response: The *WaterSense Specification for Flushometer-Valve Water Closets* references all existing, applicable standards relevant to flushometer-valve water closets, and should therefore meet plumbing code requirements.

Cautionary Statement for Installing High-Efficiency Fixtures and Fittings in Renovations

- a. Two commenters said that a statement should be added to the specification that provides guidance to building owners, managers, or designers to have a qualified engineer determine if their specific structure can accommodate the installation of high-efficiency plumbing fixtures and fittings. In EPA's supporting documentation, it is noted that 28 percent of existing flushometer-valve water closets that are installed in commercial structures have flush volumes that exceed the current federal standards. Even though most newer commercial structures will not have any issue with 1.28 gpf water closets, there are those structures with aging sanitary drainage systems where high-efficiency fixtures and fittings could result in system failures, potentially resulting in public health and safety concerns. The commenters suggests a statement cautioning installation of high-efficiency fixtures and fitting in renovations without a qualified engineer's approval would protect the WaterSense brand. Specifically, the commenters suggested adding the following language to Section 1.0:

“For renovations and/or retrofits where the use of high-efficiency plumbing fixtures and fittings are being considered, the structure should first be assessed by a qualified plumbing engineer to determine if the sanitary system can accommodate such fixtures and fittings.”

One commenter also suggested adding such language to the fact sheet and other applicable documents on the WaterSense website.

Response: In response to concerns related to the impact of reduced flush volumes on existing building drainage systems, EPA will include a statement within the specification supporting materials, as appropriate, that encourages facility managers and building owners to consult with a plumbing engineer and assess existing drainline infrastructure for potential defects or issues before installing WaterSense labeled flushometer-valve water closets. The statement will be consistent with the findings of the PERC Phase 1 study, which states “In retrofit applications, it is suggested that drainlines first be inspected for defects, root intrusions, sagging or other physical conditions that could result in clogging with lower flush volumes.”⁴ EPA will also recommend that authorities (e.g., states, local municipalities, code organizations, water utilities) intending to require or provide incentives for the installation of WaterSense labeled

⁴ PERC. November 2012. *The Drainline Transport of Solid Waste in Buildings*.
www.plumbingefficiencyresearchcoalition.org/wp-content/uploads/2012/12/Drainline-Transport-Study-PhaseOne.pdf.

flushometer-valve water closets in building renovations or other retrofit applications include an exemption or allowance for buildings where a plumbing engineer has certified that the existing drainline is not suitable for high-efficiency models. Similarly, utilities offering rebate programs or other entities promoting the installation of WaterSense labeled flushometer-valve water closets should ensure that the prospective installers are aware of and have assessed their plumbing systems to ensure compatibility with high-efficiency water closets. EPA acknowledges that WaterSense labeled flushometer-valve water closets are not suitable for all existing plumbing systems. However, it is the responsibility of the facility manager to ensure that retrofitting with high-efficiency flushometer-valve water closets will not result in drainage system malfunctions.

PERC Phase 1 Study Not Definitive

- a. Two commenters said that EPA should be cautious basing its entire rationale for establishing a 1.28 gpf maximum on the results of the PERC Phase 1 drainline study. While PERC Phase 1 began the conversation of “How low can we go?” PERC Phase 1 did not conclude that all plumbing systems can operate safely at 1.28 gpf, but instead cautioned against basing any decisions on the results. PERC has only begun to identify the impact of low-flow fixtures and fitting in the building environment and their impact on drainline carry. The comment suggested that EPA postpone the specification until results of the PERC Phase 2.0 study have been documented and reviewed by EPA.

One commenter also suggested EPA should delay implementation of this product specification until some additional research on the topic of drainline carry is available—most noteworthy, that the next phase of the PERC study is being conducted by industry. The commenter indicated that the first phase of the PERC study produced some interesting information that confirmed the use of 1.28 gpf devices for residential use, but it cautioned against using the data to make additional decisions until further research could take place.

Response: EPA has evaluated the PERC Phase 2.0 study results as part of its final specification development. Based on the results of the PERC Phase 2.0 study, EPA has established a minimum flush volume at 1.0 gpf, as indicated in the response to “Minimum Flush Volume,” above. Flushometer valves and water closet fixtures intended for flush volumes below this level will not be eligible for the WaterSense label at this time.

Following review of the PERC Phase 2.0 study results, EPA remains confident in establishing a specification for flushometer-valve water closets with a maximum flush volume of 1.28 gpf.

Availability of Reference Standards

- a. One commenter expressed concern over the availability of reference standards in the specification. The commenter indicated that it is inappropriate for

publications written by private organizations and standard committees and available only through purchase to be included within federal laws and codes. The commenter goes on to say that the net effect of this is that most stakeholders are completely ignorant of everything in the laws other than the requirements which are freely available.

Response: Standards that are referenced within this specification are similar to those that have been referenced in other existing WaterSense specifications. As WaterSense is a voluntary program and not a federal law, it is not required for EPA to make these standards or testing protocols available free of charge. Referenced documents are copyright protected by the standards organizations that developed them, which therefore prohibits EPA from making them available free of charge.

Standard References

- a. Several commenters recommended updating all references to the *IAPMO/American National Standards Institute (ANSI) Z124.4* for plastic plumbing fixtures to also include the appropriate *CSA B45.5* standard to reflect the fact that these standards have been harmonized.

Response: EPA thanks the commenters for calling attention to the update to the standard for plastic plumbing fixtures. EPA has updated all applicable references to this standard such that they now reference *CSA B45.5/IAPMO Z124*.

- b. Several commenters indicated that EPA had made an editorial error when referencing the tri-harmonized standard for pressurized flushing devices, *ASSE 1037/ASME A112.1037/CSA B125.37*. In the draft specification, the “A” before “112.1037” was omitted.

Response: EPA thanks the commenters for identifying this editorial error. EPA has updated all references to the tri-harmonized standard for pressurized flushing devices such that they now reference *ASSE 1037/ASME A112.1037/CSA B125.37*.

Sewer Back-Up Overflow

- a. One commenter said that there is no national plumbing code or Occupational Safety and Health Administration regulation requiring that the public be alerted when and where a sewer back-up overflow has occurred. Hundreds of gallons of potable water are wasted in the cleanup of sewer back-up overflows. Increased response time can effectively save water and reduce damage to the ecosystem and community health. The commenter also commented that flushometer valves are cost-effective and sanitary.

Response: EPA agrees that flushometer-valve water closets can be a cost-effective and sanitary option for sewer systems. However, codes and regulations

related to exposure to sewage and public notification of sewer overflow are outside of the scope of this specification.

Inlet Pipe for Flushometer Valves

- a. One commenter expressed concern with maintaining volume to the flushometer valves that require inlet pipes that are three-fourths of an inch in diameter. With a minimum line pressure of 45 pounds per square inch (psi), some buildings will require increasing pipe size. The commenter notes that non-water urinals are not selling well, as plumbers do not like that those fixtures are susceptible to contamination. The commenter also states that plumbers are not trained for exposure to biohazards from bodily fluids in drain systems.

Response: EPA appreciates the comments. All flushometer valves are required to be tested to *ASSE 1037/ASME A112.1037/CSA B125.37 for Pressurized Flushing Devices for Plumbing Fixtures*. Pressurized flushing devices, including flushometer valves, are required to function at supply pressures between 20 and 125 psi. Performance tests within this standard, and included by reference in the *WaterSense Specification for Flushometer-Valve Water Closets*, ensure flushometer valves are able to maintain flush volume at these pressures. Similarly, water closet fixtures must also conform to applicable ASME and other national standards. These standards ensure the products meet code and are compatible with compliant plumbing systems.

IX. Comments on Appendix A of the Specification and Supporting Documentation

Appendix A of the Specification and Product Notification Template

- a. One commenter asked how a complete system (combination of a flushometer valve and a water closet fixture) is to be identified when they are from different manufacturers. The commenter noted that the Product Notification Template does not reflect this information. The commenter requested that the Product Notification Template and Section 3.0 of Appendix A be updated to accommodate this information.

Response: EPA's understanding of the market for these products is that combinations of flushometer valves and water closet fixtures from different manufacturers that are sold under a common brand are not a common or likely occurrence, and that manufacturers typically make their flushometer valve or water closet fixture available for mixing and matching. At this time, EPA has decided not to update the Product Notification Template to accommodate certification of a complete system where the flushometer valve and water closet fixtures are from different manufacturers. If demand for this type of certification becomes apparent, EPA will consider updated the Product Notification Template at a later date.