Draft WaterSense High-Efficiency Flushing Urinal Specification Supporting Statement

I. Introduction

The WaterSense program has developed a draft specification for high-efficiency flushing urinals to promote and enhance the market for water-efficient flushing urinals. The intent of this specification is to assist consumers in identifying and differentiating those products that have met EPA's criteria for water efficiency and performance.

This draft specification addresses flushing urinals—urinals that use water to convey waste through a trap seal into a gravity drainage system—and their pressurized flushing devices (flushometer valves). Non-water urinals, composting urinals, and retrofit devices or other aftermarket retrofit systems are not covered by this specification.

II. Current Status of Urinals

There are an estimated 12 million urinals currently in use in the United States, and an additional 300,000 new urinals are sold for installation in new buildings or replacement of aging fixtures each year.[1] Of the 12 million existing urinals, up to 80 percent (9.6 million) are inefficient units with flush volumes exceeding the current maximum flush volume allowed by federal standards—some by as much as 4 gallons per flush. The Energy Policy Act of 1992 established the maximum flush volume for all urinals manufactured in the United States after January 1, 1994, at 1.0 gallons per flush (gpf) (3.9 liters per flush [Lpf]). These requirements are codified in the *Code of Federal Regulations* at 10 *CFR* Part 430 (specifically §430.32(r) Urinals).

Since the federal standards were enacted, manufacturers have developed urinals that use significantly less water than the standard 1.0 gpf fixtures. These high-efficiency fixtures can save at least 0.5 gallons of water per flush compared to standard 1.0 gpf fixtures, resulting in a savings of more than 2,300[2] gallons per urinal per year. Replacing older, inefficient urinals with these new high-efficiency fixtures can save even more water.

WaterSense product research has shown that there are at least eight manufacturers offering more than 30 models of high-efficiency flushing urinals that are expected to meet the requirements of this draft specification and would be qualified to apply for and use the WaterSense label.

[1] Plumbing Fixtures Market Overview: Water Savings Potential for Residential and Commercial Toilet and Urinals. D&R International. September 30, 2005.
[2] According to data from the U.S. Department of Labor Statistics and Amy Vickers, *Handbook of Water Use and Conservation*, Water Plow Press, 2001, it is estimated that the average urinal is flushed 18 times per day. Savings are based on the assumption that urinals are typically used 260 days per year.

III. WaterSense High-Efficiency Flushing Urinal Specification

Scope

The WaterSense program developed this draft specification to address criteria for improvement and recognition of water-efficient and high-performance flushing urinals. It only applies to urinals that use water to convey liquid waste through a trap seal into a gravity drainage system. This includes both the vitreous china or plastic urinal fixture and the pressurized flushing device (i.e., flushometer valve).

Non-water urinals, composting urinals, and retrofit devices or other aftermarket retrofit systems are excluded from the scope of this draft specification. Non-water urinals[3], though often very similar in appearance to flushing urinals, are different in design, components, how they function (i.e., remove waste), and the standards to which they are subject. In the United States, two consensus-based American National Standards Institute (ANSI) standards specify the performance requirements for non-water urinals—American Society of Mechanical Engineers (ASME) A112.19.19–*Vitreous China Nonwater Urinals* and International Association of Plumbing and Mechanical Officials (IAPMO) Z124.9–*American National Standard for Plastic Urinal Fixtures*. These two standards are designed to ensure a high level of performance for non-water urinals. At this time WaterSense has no basis to propose improvements to these existing standards, thus WaterSense has no means to help purchasers distinguish among these products based on either their efficiency or performance. It should be noted that non-water urinals, by design, are inherently water-efficient.

Composting urinals are part of a self-contained engineered system with different design and performance requirements, and as such would require unique specification criteria.

Retrofit devices are not addressed because the intent of the specification is to recognize and label complete, fully functioning fixtures or fittings, and not individual components.

Water-Efficiency Criteria

The water-efficiency component of the draft specification establishes a maximum average flush volume of 0.5 gpf (1.9 Lpf) when tested in accordance with ASME A112.19.2 or IAPMO Z124.9, as applicable. This value represents a 50 percent reduction from the current 1.0 gpf standard and is consistent with WaterSense's stated goal of increasing product water efficiency by at least 20 percent.

WaterSense selected the 0.5 gpf average maximum flush volume as its criteria for water efficiency because this value is consistent with the currently accepted industry definition for high-efficiency urinals and therefore is widely accepted by water-efficiency stakeholders and manufacturers. Also, manufacturers have been selling urinals that meet or exceed this standard for several years.

[3] Defined by the applicable ANSI standards as "a plumbing fixture that is designed to receive and convey only liquid waste through a trap seal into the gravity drainage system without the use of water for such function."

Performance Criteria

Currently, all flushing urinals are subject to national performance standards approved by ANSI. Vitreous china flushing urinal fixtures are subject to the performance requirements of ASME A112.19.2, while plastic urinal fixtures must comply with IAPMO Z124.9. Pressurized flushing devices (e.g., flushometer valves) used on the urinals are subject to American Society of Sanitary Engineering (ASSE) #1037—*Pressurized Flushing Devices (Flushometers) for Plumbing Fixtures*.

In developing this draft specification, WaterSense built upon the existing national standards for the urinal fixtures and pressurized flushing devices. For the urinal fixtures, high-efficiency fixtures must comply with all applicable sections of ASME A112.19.2 or IAPMO Z124.9. The only significant additional requirement for fixtures is the reduced maximum flush volume from the current federal standard of 1.0 gpf to the WaterSense specified 0.5 gpf.

Under this draft specification, pressurized flushing devices, in addition to complying with ASSE #1037, also must meet three new requirements. First, the pressurized flushing device needs to have a non-hold-open actuator to eliminate the ability to increase the device's flush volume by holding the actuator open. Second, the pressurized flushing device must be non-adjustable, meaning it cannot have a means for adjusting the flush volume to allow for it to exceed the 0.5 gpf maximum. Third, the pressurized flushing device cannot have interchangeable parts (e.g., interchangeable diaphragms or pistons) that can be replaced with commonly available parts that would allow the device to flush at a higher volume.

Many pressurized flushing devices on the market today already incorporate these features. Therefore, these additional requirements should not create technical difficulties in complying with the draft specification and will be valuable additions for preserving the long-term efficiency and performance of these WaterSense labeled products.

Potential Water Savings

Half gallon or less high-efficiency flushing urinals have the potential to save significant amounts of water both individually and at the national level. Assuming that the average urinal is flushed approximately 18 times per day and is in use 260 days per year, replacing a single inefficient 1.5 gpf urinal with a WaterSense labeled 0.5 gpf model could save more than 4,600 gallons of water per year (see Equation 1).

Equation 1. Annual Individual Water Savings From Replacing 1.5 gpf Urinals
(18 flushes/day) x (1.0 gallons saved/flush) x (260 days/year) = 4,680 gallons/year

Nationwide, if all 9.6 million older, inefficient urinals were replaced with WaterSense labeled models, more than 44 billion gallons could be saved per year (see Equation 2). It is important to note that many of the existing inefficient urinals have flush volumes significantly higher than 1.5 gpf. Since the exact breakdown of all existing urinals is unknown, WaterSense is assuming a 1.5 gpf flush volume as a conservative estimate. Because of this, the actual water savings potential could be much higher.

Equation 2. Annual National Water Savings From Replacing 1.5 gpf Urinals
(9.6 million inefficient urinals) x (4,680 gallons/year/urinal) = 44.9 billion gallons/year

Cost Effectiveness

Urinals are relatively expensive when compared to other restroom plumbing fixtures, with the fixture cost averaging about $350 and flushometer valve cost averaging about $200 (based upon WaterSense product research). Fortunately, there seems to be very little price difference between high-efficiency fixtures and flushometers and their standard counterparts. In fact, some of the fixtures are sold as 0.5/1.0 gpf fixtures, capable of being used at either flush volume. Similarly, some models of the flushometer valves are available in 0.5 gpf or 1.0 gpf versions at the same price. Because there is no cost difference between the standard and high-efficiency models, installing high-efficiency urinals in new construction or as part of the natural replacement process is cost-effective with immediate payback and realized water cost savings.

Replacing an older, inefficient urinal with a flush volume of 1.5 gpf with a high-efficiency 0.5 gpf urinal will save more than $850 over the useful life of the urinal (see Equation 3)—$300 more than the initial cost of the fixture and flushometer valve. (Assuming the useful life for fixtures and flushometer valves is 30 years and the total of water and wastewater cost is $6.06/1,000 gallons.)

Equation 3. Estimated Lifetime Water Cost Savings From Replacing a 1.5 gpf Urinal
(4,680 gallons/year) x $6.06/1,000 gallons) x (30 years useful life) =$850.82

Without rebates or some other economic incentive, replacing properly functioning 1.0 gpf urinals with high-efficiency 0.5 gpf fixtures might not make sense from a purely economic standpoint. It can, however, when done community wide, significantly contribute to reducing water demand and delaying the need to develop new water supply and treatment capacity and infrastructure.

IV. Certification and Labeling

WaterSense has established a product certification process, described in Appendix A of the *WaterSense Program Guidelines* located at: www.epa.gov/watersense/docs/program_guidelines508.pdf. Under this process, products are certified to conform to applicable WaterSense specifications by accredited third-party licensed certifying bodies. Manufacturers are then authorized to use the WaterSense label in conjunction with certified products.

With flushing urinals, it is not uncommon for a company to manufacture only the vitreous china or plastic urinal fixture and to require the use of another company's pressurized flushing device. The urinal fixtures' specification sheets for these products often indicate which make and model valves are best suited for use with the urinal. Correspondingly, there are some manufacturers that only make flushometer valves that can be used with other manufacturers' urinal fixtures.

WaterSense is proposing to allow each urinal fixture and flushometer valve to be certified and labeled as either a complete system or independently as a urinal fixture or pressurized flushing device. For products certified and labeled separately, WaterSense will require manufacturers to clearly indicate on product documentation that the fixture or pressurized flushing device must be

used with a WaterSense labeled counterpart with the same rated flush volume to ensure that the entire system meets the requirements of this specification for water efficiency and performance. This approach is the common industry practice and ensures that WaterSense is not significantly increasing the burden associated with the certification of high-efficiency flushing urinals. It also enables purchasers to easily identify and match labeled components with the same flush volumes.

One possible drawback of this approach, however, is the potential for variability in performance with certain valve and fixture combinations, as not all possible combinations may be tested. WaterSense is seeking input from stakeholders on whether this is a significant issue of concern, and if so, suggestions for improving the certification and labeling process.

V. Other Issues

WaterSense noted previously some concerns regarding the build up of urine solids in the drain line leading to restricted flow or clogging, raised primarily in the context of non-water urinals. WaterSense sought data and information regarding this issue, but the information received and reviewed was, in total, insufficient to draw any firm conclusions about the build up and subsequent blockage of drain lines resulting from the use of high-efficiency urinals.

VI. Request for Comments and Data

At this time WaterSense is interested in receiving comments on any and all aspects of the proposed draft specification. Comments should be submitted to WaterSense in writing at watersense-urinals@erg.com.