

Notification of Intent (NOI) to Develop Draft Performance Specifications for High-Efficiency Urinals

I. Introduction

There are currently an estimated 12 million urinals in the United States. Up to 80 percent (9.6 million) of these urinals are inefficient units with flush volumes exceeding the current 1.0 gallon per flush (gpf) maximum flush volume allowed by federal standards by 0.5 gallon to as much as 4.5 gallons per flush. Since the federal standards were enacted, manufacturers have developed even more efficient urinals that use significantly less water than the standard 1.0 gpf fixtures or no water at all. These new fixtures can save an additional 0.5 gallon to 1 gallon of water per flush compared to standard fixtures, resulting in a savings of between 2,300 and 4,600¹ gallons per urinal per year. Replacing older, inefficient urinals with these new fixtures can save even more water.

To capitalize on this tremendous opportunity for potential water savings, and to raise consumer awareness, further improve water efficiency, and promote the use of more efficient urinals, WaterSense® is announcing its intent to develop specifications for labeling water-efficient, high-performing urinals. These specifications, once final, will establish performance criteria to identify and differentiate those products that meet criteria for both water efficiency and performance.

Industry and utilities have already laid much of the groundwork for recognizing more efficient urinals. In the past, any urinal with a flush volume less than the national 1.0 gpf standard was referred to as a “high-efficiency urinal (HEU).” In 2004, the California Urban Water Conservation Council, in conjunction with a select group of its water provider members, developed a definition for HEUs that has become widely recognized and accepted as the plumbing industry standard. An HEU is now defined as a urinal fixture with a flush volume of 0.5 gpf (1.9 liters per flush [lpf]) or less, including non-water urinals.

With growing interest in the promotion of water conservation practices and technologies by water utilities to head off projected water shortfalls and infrastructure cost increases, and the growing popularity of “green” building practices and certifications, a number of manufacturers are marketing an increasing number of flushing and non-water HEUs. According to market research, there are at least six manufacturers offering close to two dozen models of flushing HEUs and at least nine manufacturers offering nearly 30 models of non-water HEUs.

With this NOI, WaterSense has preliminarily identified the water-efficiency and performance criteria it intends to include in draft specifications for HEUs. While the major criteria have been identified, some technical points require further consideration and assessment before draft specifications can be published. To better define these criteria and establish appropriate levels that ensure increased water efficiency and a high level of performance, WaterSense is requesting supporting information and data from all interested parties (e.g., researchers, manufacturers, water utilities, water-efficiency organizations) on the topics discussed in this

¹ 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 assumes urinals are typically used 260 days per year.

NOI. Interested parties are encouraged to submit data and comments to WaterSense regarding any of the issues presented in this notice by submitting written comments to watersense-urinals@erg.com.

II. Scope

The American Society of Mechanical Engineers (ASME) defines a urinal as “a plumbing fixture that receives liquid waste and conveys the waste through a trap seal into a gravity drainage system.”² WaterSense is considering developing specifications for two categories of HEUs—flushing urinals (the standard configuration found in most public restrooms) and non-water urinals. As defined by the American National Standards Institute (ANSI), a non-water urinal is “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.”³ Because of the differences in design, components, how they function (i.e., remove waste), and the standards to which they are subject, WaterSense intends to develop separate specifications for the two categories of HEUs.

WaterSense is considering excluding composting urinals and retrofit devices or other aftermarket retrofit systems from the scope of an HEU specification. 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 will not be addressed because the intent of the specification is to recognize and label complete, fully functioning fixtures or fittings, and not individual components.

III. Water Efficiency

The goal of the WaterSense program is to label products that are at least 20 percent more efficient than their standard counterparts, while ensuring the same or better performance. To achieve the water-efficiency component of this goal, WaterSense seeks to establish a new maximum flush volume for urinals.

At this time, WaterSense is considering establishing in a draft specification for flushing urinals, a maximum allowable flush volume of 0.5 gpf (1.9 lpf). There are several advantages for using this flush volume. First, it represents at least a 50 percent increase in efficiency compared to the current federal standards, significantly exceeding the stated program goal of at least a 20 percent increase in efficiency. Second, this flush volume matches the currently accepted industry definition for HEUs and therefore should be acceptable to water-efficiency stakeholders and manufacturers. Third, several manufacturers are already selling urinals that meet and exceed this flush volume. As stated previously, recent market research shows that at least six manufacturers are selling nearly two dozen models of flushing urinals that would meet this water efficiency requirement, with more anticipated to enter the market in the near future. Many of these products have been on the market for years and have well-documented performance and customer satisfaction records.

² American Society of Mechanical Engineers. ASME A112.19.2.–2003, *Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals*. June 14, 2004.

³ American National Standards Institute. ANSI Z124.9–2004, *American National Standard for Plastic Urinal Fixtures*. February 19, 2004.

Since non-water urinals use no water by definition and are inherently water-efficient, establishing a maximum flush volume is not necessary. As previously discussed there currently are at least nine manufacturers of non-water urinals offering nearly 30 models of non-water urinals that could qualify for the WaterSense label.

IV. Performance

With all of its specifications, WaterSense develops criteria to ensure that labeled products perform as well as or better than their conventional counterparts. All urinals, including flushing and non-water HEUs, are already subject to rigorous national performance standards. Vitreous china flushing urinals are subject to the performance requirements of ASME A112.19.2, while all plastic urinals (flushing and non-water) must comply with ANSI Z124.9. The flushometer valves used on these urinals are subject to American Society of Sanitary Engineering (ASSE) #1037. Vitreous china non-water urinals have a separate standard, ASME A112.19.19, with which they must comply, and plastic non-water urinals are subject to ANSI Z124.9, as previously mentioned. The performance requirements of these national standards have a proven record of ensuring a high level of performance and durability in urinals. For non-water urinals, WaterSense plans to use existing performance standards and is not considering including any additional performance requirements in a draft specification.

For flushing urinals, WaterSense does intend to address in a specification concerns regarding the adjustability and interchangeability of components of flushometer valves. WaterSense is considering a requirement that flushometer valves, in addition to complying with the rigorous ASSE #1037 requirements, be non-adjustable as to flush volume (within some tolerance to be determined); tamper-proof; not contain interchangeable parts that would allow the flush volume to be increased once installed (e.g., interchangeable diaphragms or pistons); and include a non-hold down/automatic shutoff feature. These requirements will help ensure that flush volumes in the field do not exceed the maximum volume allowed by the specification. Many flushometer valves on the market today already incorporate these features. Therefore, these additional requirements should not create technical difficulties in complying with specification criteria and will be valuable additions for preserving the long-term efficiency and performance of labeled products.

V. Certification and Labeling

WaterSense has established a product certification process, described in 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 certification bodies. Manufacturers are then authorized to use the WaterSense label in conjunction with certified products.

One certification and labeling issue to be resolved concerns how the separate components of flushing HEUs (the flushometer valve and the urinal fixture) will be tested and certified, and how the WaterSense label will be displayed in situations when these parts are manufactured by different companies. 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 flushometer valve. The urinal fixtures' specification sheets for these products often indicate which make and model valves are best suited for use with the urinal.

To address this issue, WaterSense is considering the following options:

- Require flushometer valves and urinal fixtures to be tested together.
- Test and label valves and fixtures separately and recommend only labeled components be matched by consumers.
- Test and label flushometer valves only.

Of these options, WaterSense is considering allowing each urinal fixture and flushometer valve to be tested and labeled independently. This approach is the common industry practice and ensures that WaterSense is not significantly increasing the burden associated with the certification of HEUs. It also enables consumers to easily identify labeled HEUs by identifying and matching labeled components, rather than verifying the individual component model numbers for compatibility. 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 intends to further explore these options and is seeking input and recommendations as to the most viable approach, giving consideration to costs, and providing adequate assurance to purchasers and specifiers that the product they purchase will save water and meet their performance expectations.

VI. Other Issues

One currently unresolved issue of concern is the impact that significantly reduced water flows from HEUs might have on buildup of urine solids in the drain line, leading to restricted flow or clogging. This issue primarily has been raised in the context of non-water urinals. The long drain line carries common in commercial, industrial, and institutional settings where urinals are typically installed and the absence of supplementary water flows through drain lines (e.g., from sinks, showers, toilets, other water using appliances) could further compound this problem. One study performed in 2005 at the Gelsenkirchen University of Applied Sciences in Germany examined the performance of six non-water urinals over a two year period and found that drain line buildup was significant enough to reduce waste removal. Manufacturers of non-water urinals in the United States and Canada have challenged the findings and methodology of this study and questioned its relevance to non-water urinals sold in North America.⁴

Regardless of whether this study's findings are transferable to U.S. fixtures, it adds to concern in the field that drain line buildup is a potentially real issue that requires further examination. Currently, there are two ongoing studies⁵ that are assessing the performance of several makes and models of flushing and non-water HEUs, including their impact on drain line buildup. WaterSense will evaluate the results of these studies to determine the significance of this issue

⁴ One manufacturer provided written comments that challenged the researchers' use of non-water urinals with mechanical traps (which do not conform to code in the United States); the design of the study's drain line system, which also would not meet U.S. plumbing codes on several accounts; and the researchers intentionally not maintaining the fixtures according to manufacturers' recommendations. The manufacturer's conclusions are that the drain line system's inadequate design caused the drain line buildup and not the reduced water flows of the non-water urinals.

⁵ Veritec Consulting and Koeller and Company are conducting a study in the Region of Peel, Ontario, Canada and Roger Van Gelder is performing a study sponsored by the Seattle Public Utilities at the University of Washington.

and decide if further research is necessary and if drain line buildup needs to be addressed in its HEU draft specification scope or technical requirements in some manner. In addition, WaterSense is seeking relevant data from interested parties that might help assess and address the drain line buildup issue.

In light of the concerns raised by these studies and other anecdotal evidence submitted to EPA, WaterSense has decided to develop and issue the two separate specifications according to different schedules. Development of the flushing urinal specification will continue on its current schedule. Development of the non-water HEU specification will be delayed until more data can be collected and the drain line issue can be satisfactorily resolved. The specific questions WaterSense needs to resolve before moving forward with a non-water HEU specification include:

1. Is drain line buildup a significant issue that will negatively affect a non-water urinal's long-term performance?
2. Can maintenance according to the manufacturer's instructions prevent drain line buildup and how rigorous does need it need to be?

In addition to drain line buildup, other concerns regarding non-water urinals have been raised, including their long-term cost-effectiveness as a result of increased maintenance requirements and life expectancy of the liquid seal or cartridge. As with all plumbing products, there are an unlimited number of design and technical approaches to achieving increased water efficiency. While some designs and approaches are more expensive to procure and maintain than others, they can still meet the WaterSense program's goals of increasing water efficiency and maintaining a high level of performance. With these specifications, WaterSense does not intend to limit manufacturers' options or be design restrictive in any way. Ultimately, it is up to consumers to weigh all the associated costs and benefits of each technology and decide for themselves whether it is the optimal system for their operations. WaterSense will engage in a proactive education and outreach campaign to provide consumers with the knowledge to help make informed purchasing decisions. At this time, WaterSense is seeking relevant data from interested parties that might help further assess the issue of long-term cost-effectiveness.

References

American National Standards Institute. ANSI Z124.9–2004, *American National Standard for Plastic Urinal Fixtures*. February 19, 2004.

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