

## WaterSense® Notice of Intent (NOI) to Develop a Draft Specification for Bath and Shower Diverters

### I. Introduction

A bath and shower diverter is a device activated by an end user to divert the flow of water either toward the tub spout (i.e., to the bathtub) or toward a secondary outlet (i.e., the showerhead) in a tub-shower enclosure. This product is commonly found in tub-shower combinations in residences and hotels.

An often-overlooked source of wasted water, many bath and shower diverters continuously leak a small amount of water from the tub spout while they are engaged, and water is being diverted from the bathtub to the showerhead. Over time, the magnitude of these diverter leaks can increase, sometimes substantially, resulting in significant water waste passed down the drain with every shower. In addition, because this water is typically heated, leaking bath and shower diverters can also result in hot water losses, meaning households often unknowingly waste both water and energy, which leads to higher utility bills.

To improve the water efficiency of bath and shower diverters and raise consumer and business awareness about eliminating water and energy waste in this product category, WaterSense intends to develop a specification for labeling water-efficient bath and shower diverters. With this notice of intent (NOI), WaterSense has preliminarily identified the water efficiency and performance criteria that it is considering, as well as outstanding issues that need to be addressed as the program moves forward in developing a draft specification for bath and shower diverters.

In recent years, there have been efforts to limit bath and shower diverter leak rates. The American Society of Mechanical Engineers (ASME)/Canadian Standards Association (CSA) standard, *ASME A112.18.1/CSA B125.1 Plumbing Supply Fittings*, which has been adopted as the basis for many plumbing codes across the country, requires pre-life cycle bath and shower diverter leak rates no greater than 0.1 gallons per minute (gpm) and post-life cycle leak rates (after 15,000 cycles of testing) no greater than 0.2 gpm.<sup>1</sup> However, field studies of bath and shower diverters have found leak rates far exceeding the ASME/CSA standard, likely because the products are used for many years beyond the typical life cycle. One study found that 34 percent of bath and shower diverters assessed had leaks exceeding 0.1 gpm, with an average leak rate of 0.8 gpm and some leak rates as high as 3.0 gpm.<sup>2</sup> Across all field studies identified, EPA estimates that old leaky diverters can waste an average of more than 1,500 gallons of water per year and as much as 4,200 gallons per year.

Manufacturers have made great strides in designing modern, water-efficient bath and shower diverters that can reduce or eliminate leaks, and these products are now more available on the market. With this specification, WaterSense can help heighten consumer and utility awareness about the potential to decrease water waste and increase water efficiency associated with bath and shower diverters.

<sup>1</sup> ASME A112.18.1-2012/CSA B125.1-12 *Plumbing Supply Fittings*

<sup>2</sup> Taitem Engineering, PC, 2011. "Leaking Shower Diverters." *Tech Tip*. New York State Homes & Community Renewal, Weatherization Assistance Program. July 20, 2011. [www.taitem.com/wp-content/uploads/Divertor-Valve-Tech-Tip-2011.7.20.pdf](http://www.taitem.com/wp-content/uploads/Divertor-Valve-Tech-Tip-2011.7.20.pdf).

WaterSense labels products that are at least 20 percent more water-efficient and perform as well as or better than standard models and can realize water savings on a national level. WaterSense and its partners also work to promote the adoption of water-efficient best practices. While manufacturer partners have been proactive in developing new products that can reduce or eliminate leaks from bath and shower diverters, there is opportunity for promotional partners to help transform the market for these products and spur adoption with homeowners and commercial purchasers, such as hotels. WaterSense estimates that there are approximately 145 million existing bath and shower diverters installed in residences and more than three million bath and shower diverters installed in hotels across the United States.<sup>3</sup> Repairing or replacing old leaky diverters could save more than 43 billion gallons of water nationwide every year, equivalent to the annual water needed to serve of more than 500,000 homes.<sup>4</sup>

## II. Technical Background

The ASME/CSA standard classifies bath and shower diverters into two families:

- Tub spout diverter, where the diverter mechanism is embedded in the tub spout itself; or
- Tub-to-shower diverter, where the diverter mechanism is embedded as a valve in the plumbing hidden behind the wall.

Figures 1A and 1B show examples of a tub spout diverter and a tub-to-shower diverter.



**Figure 1A. Example tub spout diverter**



**Figure 1B. Example tub-to-shower diverter**

<sup>3</sup> Based on calculations involving data from the U.S. Census Bureau, *Residential End Uses of Water* (the American Water Works Association [AWWA] 1999), and the American Hotel and Lodging Association ( AHLA).

<sup>4</sup> Based on calculations involving data from the U.S. Census Bureau; *Residential End Uses of Water* (AWWA 1999); *Residential End Uses of Water, Version 2* (Water Research Foundation [WRF] 2016); Tatem Engineering, PC, *op. cit.*; *Bath and shower diverter leak rate data, collected in support of Fort Carson energy savings performance contract* (Johnson Controls, Inc. 2015); Schuldt, March and Debra Tachibana. "Energy-related Water Fixture Measurements: Securing the Baseline for Northwest Single Family Homes." In *Proceedings of the 2008 Summer Study on Energy Efficiency in Buildings*. American Council for an Energy-Efficient Economy (ACEEE), August 2008 (pages 2.235-2.266); Maximum Performance (MaP) Testing. "Leaking Shower Diverters." April 2014.

As mentioned, the ASME/CSA standard requires pre-life cycle bath and shower diverter leak rates no greater than 0.1 gallons per minute (gpm) and post-life cycle leak rates (after 15,000 cycles of testing) no greater than 0.2 gpm.<sup>5</sup>

The *California Code of Regulations, Title 20. Public Utilities and Energy Sections 1601 through 1608* (also known as California Energy Commission [CEC] Appliance Efficiency Regulations) further classifies bath and shower diverters<sup>6</sup> into four types, described in Table 1.<sup>7</sup> These classifications illustrate the common mechanisms for activating a bath and shower diverter. Based on WaterSense's understanding of the product category, the lift- and pull-type diverters are tub spout diverters, and the turn- and push-type diverters are tub-to-shower diverters, per ASME/CSA classifications. However, as WaterSense is considering in a draft specification, the bath and shower diverter product category is not limited to these four types.

**Table 1. CEC Definitions for Types of Bath and Shower Diverters**

Diverter Type	Definition
Lift-type	A tub spout diverter that is operated by lifting the control.
Pull-type	A tub spout diverter that is operated by pulling the control.
Turn-type	A tub spout diverter that is operated by turning the control.
Push-type	A tub spout diverter that is operated by pushing the control. <sup>8</sup>

The CEC regulations also established more stringent water efficiency requirements for bath and shower diverters than the ASME/CSA standard, requiring pre-life cycle leak rates no greater than 0.01 gpm and post-life cycle leak rates (also after 15,000 cycles of testing) no greater than 0.05 gpm.<sup>9</sup> Table 2 summarizes these bath and shower diverter water efficiency requirements.

**Table 2. Summary of Bath and Shower Diverter Efficiency Requirements**

Standard/Regulation	Pre-Life Cycle Diverter Leak Rate	Post-Life Cycle Diverter Leak Rate
ASME A112.18.1/CSA B125.1	0.1 gpm	0.2 gpm
CEC Appliance Efficiency Regulations	0.01 gpm	0.05 gpm

Discussions with several product manufacturers indicate that most products available for purchase nationwide currently meet these stricter CEC regulations. According to the CEC's

<sup>5</sup> ASME/CSA op. cit.

<sup>6</sup> The CEC regulations generally refer to this product category as "tub spout diverters."

<sup>7</sup> CEC. *California Code of Regulations Title 20. Public Utilities and Energy Division 2. State Energy Resources Conservation and Development Commission*. August 2016.

<http://www.energy.ca.gov/2016publications/CEC-140-2016-001/CEC-140-2016-001-REV.pdf>

<sup>8</sup> The CEC regulations reference but do not officially define push-type tub-to-shower diverters. WaterSense inferred this definition from the other three listed types' definitions.

<sup>9</sup> CEC, op. cit.

Modernized Appliance Efficiency Database System (MAEDBS), which records the performance of all products sanctioned for sale within the state, there are nearly 2,500 different bath and shower diverter models that currently meet the CEC regulations. However, in recent years, new types and designs of bath and shower diverters have emerged in the marketplace that can eliminate leakage entirely. More than 1,150 of the models in MAEDBS (46 percent of the database listings) are “0-0” rated, indicating no measurable leakage during pre- and post-life cycle testing.<sup>10</sup>

WaterSense identified several studies that suggest that many bath and shower diverters in the field frequently leak at higher volumes. A first study, conducted in 2008 for Seattle City Light – an electric utility providing power to Seattle, sampled 94 diverters and found an average leak rate of 0.1 gpm, with the highest leak rate identified as 1.25 gpm.<sup>11</sup> In 2011, Taitem Engineering, an engineering consulting firm specializing in energy studies, found in an assessment of 130 homes that 34 percent of bath and shower diverters had leak rates greater than 0.1 gpm. Of these diverters, the average leak rate was 0.8 gpm, and the highest leak rate identified was 3.0 gpm.<sup>12</sup> In 2014 Gauley Associates Ltd. conducted another study to measure leakage rates of aging bath and shower diverters, which found that in an assessment of 453 diverters, 27 percent had a measurable leak rate. The average leak rate of diverters with measurable leakage was 0.34 gpm.<sup>13</sup> An assessment on bath and shower diverter leak rates, conducted at Fort Carson in Colorado, was completed in 2015 by Johnson Controls, Inc., under its energy savings performance contract. Johnson Controls’ assessment examined 82 bath and shower diverters estimated to be more than 10 years old and found an average leak rate of 0.7 gpm.<sup>14</sup> WaterSense averaged the leak rates within and across the studies to estimate an in-the-field leak rate, equal to 0.29 gpm. This value is used to evaluate water savings potential for old, leaky diverters and serves as a baseline for estimates of water waste discussed later in this NOI.

### III. Scope

For the purposes of this specification, WaterSense intends to define a bath and shower diverter as “any device used to direct the flow of water either toward a tub spout or toward a secondary outlet intended for showering purposes (e.g., showerhead, body spray).” This suggested definition, based on the definition of a bath and shower diverter included in the ASME/CSA standard, is meant to be inclusive of the multitude of spray devices included in tub-shower enclosures (e.g., fixed and handheld showerheads, body sprays). WaterSense also intends to retain the product family names and definitions established by the ASME/CSA standard: tub spout diverter and tub-to-shower diverter. As part of the specification development process, WaterSense is requesting input on these definitions for the overarching bath and shower diverter product category and the two product families.

Even though ASME/CSA separately characterizes the two families of bath and shower diverters, all bath and shower diverters are subject to the same requirements within the standard. The CEC regulations also do not differentiate efficiency requirements between different types of

<sup>10</sup> CEC MAEDBS. Advanced Search. Accessed April 26, 2016.

<https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx>.

<sup>11</sup> Schuldt and Tachibana, *op. cit.*

<sup>12</sup> Taitem Engineering, *op. cit.*

<sup>13</sup> Maximum Performance (MaP) Testing, *op. cit.*

<sup>14</sup> Johnson Controls, Inc. Bath and shower diverter leak rate data, collected in support of Fort Carson energy savings performance contract, W912DY-09-D-0017. 2015.

diverters. To this end, WaterSense does not intend to distinguish among the families or types in terms of the water efficiency or performance requirements. Rather, WaterSense is seeking to define the primary families of bath and shower diverters to assist consumers in making informed purchasing decisions for retrofits or replacements, depending on their bath and shower diverters currently installed. The two families of bath and shower diverters are not typically interchangeable. As stated, **WaterSense is seeking input on the proposed terminology to describe this product category and product families as well as the proposed definitions.**

A WaterSense specification for bath and shower diverters would define a product life span and establish pre- and post-life cycle leak rate limits in the same manner as the aforementioned standards and regulations. The goal of the specification is to reduce or eliminate water wasted through leakage during shower events and is not intended to limit the flow rate of the diverter.

WaterSense also does not intend for the specification to apply to companion products. These products include “twin ell” adaptors, which are designed to prevent water from flowing from the showerhead while users are filling the bathtub.<sup>15</sup> Manufacturers sometimes recommend these devices for tandem installation with bath and shower diverters to improve the overall shower system functionality and user experience. If a bath and shower diverter requires the use of a companion product to meet the water efficiency requirements of the specification, then WaterSense intends to require the companion product be tested, packaged, and sold along with the WaterSense labeled bath and shower diverter. However, WaterSense does not anticipate that these companion products contribute to water efficiency. **WaterSense is seeking input on whether twin ell adaptors or any other companion products impact bath and shower diverter water efficiency and performance.**

#### IV. Water Efficiency

WaterSense is seeking to establish maximum pre- and post-life cycle test leak rates for bath and shower diverters that meet or exceed the program’s water efficiency goal (i.e., products that are 20 percent more water efficient than their standard counterparts). As shown in Table 2, ASME/CSA requires pre-life cycle leak rates no greater than 0.1 gpm and post-life cycle leak rates no greater than 0.2 gpm. The CEC regulations require pre-life cycle leak rates no greater than 0.01 gpm and post-life cycle leak rates no greater than 0.05 gpm. WaterSense intends to build on these incremental improvements by establishing a “0-0” specification, meaning bath and shower diverters must have no measurable leakage pre- and post-life cycle.

The “0-0” specification would ensure a 100 percent increase in efficiency over the current national baseline set by ASME/CSA. The preceding discussion on these existing regulations reveals an overall nationwide trend toward increased water efficiency within this product category. As mentioned, 46 percent of the models in the CEC’s MAEDBS, spanning all different types of bath and shower diverters, have achieved a “0-0” rating, indicating that this level of water efficiency is achievable in practice.<sup>16</sup> Moreover, the International Association of Plumbing and Mechanical Officials (IAPMO) 2015 Green Plumbing and Mechanical Code Supplement adopted a zero-leakage specification, requiring no measurable leakage throughout the life cycle of the product.<sup>17</sup> Establishing “0-0” criteria would make the WaterSense specification consistent

<sup>15</sup> "MasterShower® Twin Ell." Kohler Bathroom and Kitchen. Kohler Co., <http://www.us.kohler.com/us/Twin-ell/productDetail/product:420454/420454.htm>.

<sup>16</sup> CEC MAEDBS, *op. cit.*

<sup>17</sup> IAPMO. 2015 *Green Plumbing and Mechanical Code Supplement*. page 14.

with the most efficient plumbing codes, recognize the growing market for increasingly more water efficient bath and shower diverters, and promote nationwide distribution and installation of the most efficient products on the market.

Leaks from bath and shower diverters are non-functional and thus are an inherent, unnecessary waste of water and energy. Bath and shower diverters achieving a “0-0” rating do not leak, helping homeowners and utilities save both water and energy throughout the product life cycle. Additionally, WaterSense is not aware of any health, safety, or plumbing system impacts that would result from eliminating bath and shower diverter leakage. For these reasons, WaterSense is considering adopting the most water-efficient “0-0” specification limits.

### ***Measurement Accuracy***

WaterSense intends to require bath and shower diverter leak rates to be tested in accordance with Section 5.3.6 of the ASME/CSA standard, which stipulates that measurements should be taken within a 5-minute window, initiated after the diverter has been actively engaged for one minute.<sup>18</sup>

Like all methods of measurement, the method WaterSense is proposing will have some degree of uncertainty, dictated by the precision of the measurement instrumentation. For example, a bath and shower diverter could have a leak rate of 0.004 gpm, but if the instrumentation is only capable of measuring to the hundredth of a gallon, then this reading might be reported as 0.00 gpm. WaterSense raises this issue because it is considering establishing a requirement for no measurable leakage pre- and post-life cycle. However, as the example above describes, a requirement of 0.00 gpm doesn’t necessarily mean no leakage in an absolute sense; it means 0.00 gpm within the measurement capabilities of the instrumentation. In another example, a bath and shower diverter might drip a few times (e.g., five drops) over the course of the 5-minute product testing period due to residual water at the tub spout outlet following the diverter being activated. While these few drops exceed “zero leakage” in absolute terms, does this truly indicate a persistently leaky diverter?

WaterSense intends to work with testing laboratories to determine the current threshold for measuring bath and shower diverter leaks. **WaterSense is also seeking input on whether the specification needs to include an acceptable tolerance level embedded within the water efficiency requirement. If so, WaterSense is requesting feedback about what that tolerance should be and how to structure the requirement such that it preserves the intent of a specification for bath and shower diverters with no measurable leakage.**

### ***Savings Factor***

A study conducted by Taitem Engineering found that actual bath and shower diverter water savings are potentially impacted by a savings factor in real-world applications. Typically, one might assume that the entire volume leaked from a diverter, once eliminated, would constitute realized savings. However, when a leaking diverter is fixed, a portion of the water that was being leaked could be properly diverted to the showerhead and used during the shower event. Therefore, even though no water is leaking from the tub spout, the entire volume of the eliminated leak may not be equivalent to water savings. This portion of the leak volume that does constitute realized water savings is often referred to as a savings factor.

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<sup>18</sup> ASME/CSA op. cit.

There are many components that can affect the magnitude of this savings factor, ranging from the magnitude of the initial diverter leak rate to the system pressure. This factor may also be eliminated if a bath and shower diverter is installed in tandem with a WaterSense labeled showerhead, which provides pressure compensation. **WaterSense is seeking input or data, and considering future research, on how to calculate this savings factor across a range of real-world scenarios, and how to appropriately apply a savings factor to its programmatic water savings calculations.**

### **Estimated Water Savings**

To illustrate the magnitude of water wasted by leaking bath and shower diverters and the potential incremental improvements produced through water efficiency regulations, WaterSense estimated the volume of water that is leaked from a bath and shower diverter over a typical shower event<sup>19</sup> across a variety of leak rates. WaterSense then used these data to estimate annual water waste per household and for a water utility that serves 200,000 households, as shown in Table 3.<sup>20</sup> These equivalencies represent a range of possibilities for specification improvement and signify water waste rather than potential water savings. As stated above, WaterSense is considering whether to incorporate a savings factor into future programmatic water savings calculations.

**Table 3. Bath and Shower Diverter Leak Volumes and Equivalencies**

Standard	Leak Rate Requirement	Leak Rate	Volume Wasted per Shower	Volume Wasted per Household per Year	Volume Wasted Annually for a Utility Servicing 200,000 Homes
In the field	Estimated leak rate from the four field studies discussed in Section II.	0.29 gpm	2.3 gal	1,543 gal	309 million gal
National	ASME/CSA pre-life cycle	0.1 gpm	0.8 gal	528 gal	106 million gal
National	ASME/CSA post-life cycle	0.2 gpm	1.6 gal	1,056 gal	211 million gal
State	CEC pre-life cycle	0.01 gpm	0.1 gal	53 gal	11 million gal
State	CEC post-life cycle	0.05 gpm	0.4 gal	264 gal	53 million gal
WaterSense	"0-0" pre- and post-life cycle requirement	No measurable leak	0 gal	0 gal	0 gal

As is evidenced by Table 3, based on the average leak rates identified in the four field studies described in Section II, the water wasted for a utility serving 200,000 homes amounts to nearly

<sup>19</sup> Based on an average shower length of 7.8 minutes. *Residential End Uses of Water, Version 2* (WRF 2016).

<sup>20</sup> Based on calculations involving data from the U.S. Census Bureau; *Residential End Uses of Water Version 2* (WRF 2016)

309 million gallons. This is equivalent to the amount of water needed to serve more than 3,600<sup>21</sup> additional homes every year.

## V. Performance and Product Testing

Establishing performance criteria for a draft WaterSense specification for bath and shower diverters is critical to ensuring user satisfaction, longevity of water savings, and program impact. The nationally agreed upon performance-testing protocol for bath and shower diverters is defined by ASME/CSA. WaterSense is considering incorporating the requirements from this standard by reference in its draft specification.

Currently, bath and shower diverters are tested in terms of pre- and post-life cycle leak rates. WaterSense intends to include these two aspects of bath and shower diverter performance in a draft specification. Based on product research and manufacturer interviews, a 20-year life cycle is appropriate for bath and shower diverters. ASME/CSA defines the product life cycle as 15,000 cycles. Using empirical data on typical characteristics of showering events,<sup>22</sup> this is roughly equivalent to 22.8 years of use, confirming the 20-year life cycle. **WaterSense is seeking input on this performance-testing protocol and the established life cycle definition of 15,000 cycles.**

WaterSense recognizes that there are potential factors (e.g., water hardness, water pH) that could impact bath and shower diverter performance in real-world applications, especially over time. While the ASME/CSA standard provides a testing methodology intended to be representative of real-world conditions, it is not technically feasible to test all potential conditions a diverter might be subject to once installed. WaterSense intends to ensure performance by providing reference to the ASME/CSA standard; however, **WaterSense is seeking input on whether there are additional factors that a draft specification should address to prevent bath and shower diverter failure or leaks over time.**

WaterSense is not aware of any health, safety, or plumbing system impacts that would result from eliminating bath and shower diverter leakage; however, **WaterSense is also seeking input on whether there are any potential unintended consequences from establishing a “0-0” specification.**

## VI. Product Marking, Documentation, and Marketing

WaterSense specifications typically include requirements for marking and product documentation to aid consumers in understanding the efficiency and performance of WaterSense labeled products. Currently, bath and shower diverters are not subject to specific packaging marking requirements, and WaterSense's research to date has not identified any specific examples of bath and shower diverter packaging that include water efficiency (i.e., leak rate) or performance information. As a result, consumers might lack the information needed at the point of purchase to make informed product choices concerning water efficiency.

WaterSense is considering including marking requirements on bath and shower diverter product documentation, regardless of the specification level selected. **Therefore, WaterSense is**

<sup>21</sup> Correction made to originally published value of 1,350 homes, which was a calculation error.

<sup>22</sup> Based on calculations involving data from the U.S. Census Bureau, *Residential End Uses of Water*, (AWWA 1999), and *Residential End Uses of Water, Version 2* (WRF 2016).

**seeking information on whether and how bath and shower diverter packaging is currently marked; the different options for product documentation; and possible language or terminology that could communicate improved water efficiency of this product.**

WaterSense is also aware that a specification for bath and shower diverters could complicate labeling of showerhead-tub spout diverter combination packages. Through research and discussions with product manufacturers, WaterSense identified that bath and shower diverters are sometimes packaged and sold with a matched showerhead and control valve. The CEC regulations define this scenario as a showerhead-tub spout diverter combination.<sup>23</sup> Some combination packages might also include trim kits, which include additional fittings that have coordinated aesthetic finishes. The CEC regulations address these combination packages by requiring “showerhead-tub spout diverter combinations [to] have both the showerhead and tub spout diverter tested individually.”<sup>24</sup> ASME/CSA does not discuss showerhead-tub spout diverter combinations. To maintain program and label integrity and avoid potential confusion in the marketplace, WaterSense is considering requiring both showerheads and bath and shower diverters contained within a showerhead-tub spout diverter combination package to be individually certified in order for the combination packaging to bear the WaterSense label.

**WaterSense is seeking input on any issues associated with these labeling requirements.**

Lastly, WaterSense intends to develop a specification in part to draw attention to leaky bath and shower diverters as significant water wasters and to promote efficient products to utilities, plumbing professionals, and consumers. **WaterSense is seeking ideas for how to engage utilities and plumbing professionals on the best approaches to raise consumer awareness of bath and shower diverter leaks and the availability of water-efficient products.**

## VII. Summary of Information Requests

WaterSense is requesting feedback on all aspects of this notice; summarized below are the specific outstanding issues, questions, and concerns about which WaterSense is seeking input on prior to drafting its specification for bath and shower diverters. All interested parties are encouraged to submit information and comments to [watersense-products@erg.com](mailto:watersense-products@erg.com).

### Scope

- Is the definition for bath and shower diverter (any device used to direct the flow of water either toward a tub spout or toward a secondary outlet intended for showering purposes [e.g., showerhead, body spray]) sufficient to encompass the product category in its entirety?
- Are the definitions for tub spout diverter (a diverter mechanism that is embedded in the tub spout itself) and tub-to-shower diverter (a diverter mechanism that is embedded as a valve in the plumbing hidden behind the wall) sufficient to encompass the possible configurations within this product category and educate consumers?

<sup>23</sup> CEC, *op. cit.*

<sup>24</sup> CEC, *op. cit.*

- Should these same terms and definitions (i.e., bath and shower diverter, tub spout diverter, and tub-to-shower diverter) be used for marketing purposes?
- Are there any accepted industry or regulatory definitions in addition to those discussed previously of which WaterSense should be aware?
- Are there any companion products that directly impact the water efficiency and performance of bath and shower diverters and that need to be considered within the requirements of a draft specification?

## Water Efficiency

- Given the inherent tolerance associated with the methods for measuring bath and shower diverter leak rates, how should WaterSense specify a “0-0” or no leak pre-and post-life cycle requirement? WaterSense is seeking information on laboratory testing equipment and inherent limitations on measuring ability and accuracy.
- Should WaterSense apply a savings factor to its programmatic water savings calculations for bath and shower diverters? If so, is there additional information available that WaterSense should consider when determining an appropriate value for this savings factor?

## Performance and Product Testing

- Are there potential factors (e.g., water hardness, water pH) that can cause a bath and shower diverter to leak in real-world applications that should be addressed in performance testing?
- Are there any system impacts or impacts to user health and safety from fixing a leaking bath and shower diverter that WaterSense has not considered?

## Marking and Product Documentation

- How are bath and shower diverters and associated product packaging and documentation currently marked to communicate information about tested leak rates?
- What phrasing or terminology can WaterSense use to convey a concept of no measurable leakage during product operation and throughout the lifetime of the product?
- Are there any unforeseen impacts of requiring both showerheads and bath and shower diverters sold in the same package to be WaterSense labeled in order for the entire package to bear the label?
- WaterSense is requesting feedback from water utilities on the best approaches to raise consumer awareness of bath and shower diverter leaks and the availability of water-efficient product versions, as well as to engage the water-efficient plumbing community.

## VIII. Schedule and Next Steps

WaterSense is requesting input, supporting information, and data from all interested parties on topics discussed in this NOI and otherwise related to bath and shower diverters. Interested parties can provide input to WaterSense regarding any of the issues presented in this notice by submitting written comments to [watersense-products@erg.com](mailto:watersense-products@erg.com). Comments and information on the issues presented in this NOI are welcome and will be taken into consideration as WaterSense develops a draft specification for bath and shower diverters.

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

WaterSense tentatively plans to publish a draft specification for bath and shower diverters in spring 2017; however, the release will be contingent upon adequate resolution of the questions and issues presented in this NOI.

## IX. References

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