WaterSense® Automatic Resetting Bath and Shower Diverter Minimum Leak Testing Research Proposal

I. Introduction

In EPA's *WaterSense® Notice of Intent (NOI) to Develop a Draft Specification for Bath and Shower Diverters*, WaterSense proposed to establish a pre- and post-life cycle leak limit of "0-0" for bath and shower diverters. Based on public comments received on the NOI, manufacturers have indicated that a small leak is required to ensure that automatic resetting diverters reset to the tub-filling position following the shower event. This function is intended as a safety feature to prevent shock, which can occur when water is unexpectedly released from the showerhead rather than the tub spout, catching the bather off guard. According to the manufacturers, a "0-0" leak limit would likely preclude bath and shower diverters with this automatic reset functionality from achieving the WaterSense label.

Based on WaterSense's market research, it has been suggested that most "lift-type" diverters, meaning the diverter is activated by lifting the control, are automatic resetting diverters. See Figure 1 below for an example of this product type.

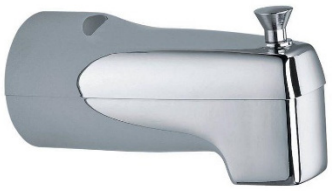

Figure 1. Example of a Lift-Type Diverter

According to the California Energy Commission's (CEC's) Appliance Efficiency Database (AED)[1], there are approximately 1,700 lift-type diverters for sale in California. Of these, approximately 44 percent have been reported to CEC as having a 0.00 gpm pre-life cycle leak rate. However, it is possible that many of these products have been characterized as having a 0.00 gpm leak rate based on rounding; essentially, the products have a leak rate below 0.005 gpm and are therefore reported as 0.00 gpm, but in fact may express nominal leakage. WaterSense also acknowledges that many of the products listed as lift-type diverters in the CEC AED may be roman tub faucets/fillers or other diverter products not intended for typical shower-bath combinations.

Before moving forward with developing a specification for bath and shower diverters, WaterSense seeks to

1) determine if a nominal leak rate is necessary for automatic reset diverters to function, and if so,
2) to quantify the minimum leak rate required.

WaterSense hopes to use the information generated from this research to establish a maximum leak rate for bath and shower diverters under a WaterSense specification. To inform its specification development efforts and support the two data gaps listed above, WaterSense is outlining a proposed research approach.

[1] See https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx.

II. General Test Setup and Methodology

A. Objectives and Methodology

1) Evaluate leak rates from a sample of automatic reset diverters in accordance with *ASME A112.18.1-2012/CSA B125.1-12* (ASME/CSA standard), as this will likely be the referenced standard in a WaterSense specification for bath and shower diverters.

   a. See 5.3.6.1 *Bath and Shower Diverters* for leak rate testing methodology
   b. See 5.6.1.5 *Diverters* for life cycle testing methodology

2) Record leakage volume as the amount accumulated throughout the duration of the 5-minute test window, in accordance with the ASME/CSA standard performance testing methodology.

   a. WaterSense requests recording total leak volume in milliliters (mL) to provide sufficient precision for this study.
   b. Repeat each leak test 3 times per diverter and average the recorded leak rates to ensure repeatable results.

3) Record the amount of time needed for the automatic reset diverter to properly reset itself.

   a. Repeat each leak test 3 times per diverter and average the recorded reset time to ensure repeatable results.

B. Product Sampling

1) Obtain one sample each of 15 to 20 models of lift-type or pull-type tub spout diverters equipped with automatic reset functionality and rated in the CEC Appliance Efficiency Database as having a 0.00 gpm flow rate. EPA's understanding is that most lift-type models and some pull-type models have automatic reset functionality, but it is recommended that products are verified to have this functionality prior to product selection.

2) The models should represent a variety of types of lift-type diverters (e.g., tub spout lift-type diverter, tub spout pull-type diverter, Roman tub faucets with an automatic resetting lift-type diverter). Record the type of diverter used during the test along with the average leak rate and reset time.

3) It is suggested that models be selected from multiple different manufacturers.

4) As requested, EPA can provide a list of models suggested for this test.