

Policy Position on State-and Province-Level Adoption of Plumbing Fixture Water Efficiency Standards for Residential and Commercial Properties

November 2022

Introduction

AWE is the nation's leading resource on water efficiency, which is often the fastest and least expensive way to save water. Water efficiency not only helps ensure access to clean, affordable water, it also:

- Protects our rivers, bays, and aquifers by limiting water withdrawals.
- Saves consumers money. Water efficient plumbing products can save an average family hundreds of dollars each year.
- Limits the need for expensive water infrastructure expansions.
- Helps tackle the root cause of climate change. Water-saving strategies reduce the amount of energy used to heat, pump, and treat water, which in turn reduces emissions of heat-trapping carbon dioxide.

It is also important to recognize potential unintended consequences of water efficiency in the context of plumbing fixture efficiency standards, including:

- (1) Reduced overall water flows may lead to stagnant water in municipal and premise plumbing designed for higher flows. This may promote pathogen growth in those supply lines, potential health risks and the need to purge supply lines and/or add disinfectants.

Research on the potential health risks from pathogen growth associated with low flows from showerheads and faucets has demonstrated some cause for concern, while such research on urinals and toilets has not. More research is needed to better understand the risks and how to mitigate them.

- (2) Reduced wastewater flows may be insufficient to move solid waste, leading to stoppages in building drain lines (in particular, commercial facilities with long drain lines and limited flows from other sources) and municipal sewers. This may result in blockages, odors, and corrosion in pipes.

Background

U.S. Federal Plumbing Efficiency Standards

The U.S. Energy Policy Act of 1992 includes federal water efficiency standards with maximum flow rates for toilets, showerheads, faucets, and urinals:

- Toilets (includes single- and dual-flush): 1.6 gallons per flush (gpf)
- Showerheads: 2.5 gallons per minute (gpm)
- Faucets: 2.2 gpm
- Urinals: 1.0 gpf

These federal standards went into effect January 1, 1994 (1992 in California), except for commercial toilets, which went into effect January 1, 1997, and they have not changed since. Such products sold in the U.S. must meet the federal standards.

As of July 1, 2022, thirteen states and the District of Columbia had adopted WaterSense specifications and/or California Standards* that require higher efficiencies than the federal standards.

U.S. Environmental Protection Agency (EPA) WaterSense Labeling Program

WaterSense is a national program that labels water-efficient products used in homes, other buildings, landscapes, and facilities to reduce water use and energy. To receive a WaterSense label, products must be performance tested by a third-party certifier and be at least 20% more efficient than the federal efficiency standard for that product. Specifications are based on field as well as laboratory analyses. Thus, WaterSense labeled products are intended to provide both water efficiency and quality performance.

According to U.S. EPA, since its inception in 2006, this voluntary public/private partnership has helped Americans save more than 5.3 trillion gallons of water – equivalent to the water used by all U.S. households in 200 days - and more than \$108 billion in water and energy bills. WaterSense works with thousands of businesses and organizational partners, with more than 38,500 water-efficient products carrying the WaterSense label.

Timeline for labeling of select WaterSense products:

- Tank-type toilets and faucets: 2007
- Flushing urinals: 2009
- Showerheads: 2010
- Flushometer toilets: 2015

As of November 15, 2022, 14 states and the District of Columbia had adopted WaterSense specifications for one or more plumbing fixtures.

California Appliance Efficiency Regulations

- California Appliance Efficiency Regulations for toilet, residential lavatory faucet, urinal and showerhead flow rates were established in 2016 (prior to this, CalGreen requirements existed).
- The California Appliance Efficiency Regulations for toilet flow rates, is consistent with the WaterSense toilet specification for tank-type toilets
- The California Appliance Efficiency Regulations for residential lavatory faucet, urinal, and showerhead flow rates go beyond WaterSense specifications.

As of November 15, 2022, four states had adopted California's Regulations for one or more plumbing fixtures.

Position and Recommendations on State- and Province-level Adoption of Plumbing Water Efficiency Standards for Residential and Commercial Properties

(See *Explanation of Recommendations*, below, for more detail)

For showerheads, toilets, flushing urinals, and residential lavatory faucets sold in a state

- WaterSense flow rate specifications are recommended for every state; flow rates within the California Appliance Efficiency Regulations may be a viable option for states with significant water supply stress.

For residential kitchen faucets (for which WaterSense specifications do not exist) sold in a state or province

- Flow rates within the California Appliance Efficiency Regulations are recommended.

For public lavatory faucets (for which WaterSense specifications do not exist) sold in a state or province

- Recommend water consumption levels as specified in the national product standard (ASME A112.18.1-2018/ CSA B125.1-18)

For tank-type dual-flush toilets sold in a state or province

The WaterSense Specifications and California Appliance Efficiency Regulations are consistent for tank-type dual flush toilet flow rates - AWE supports state- and province-level adoption of these standards. In addition, AWE recommends revising the WaterSense Specifications and the California Appliance Efficiency Regulations for tank-type dual-flush toilets to cap the maximum flush volume at 1.28 gallons per flush (gpf) identical to the maximum flush volume in the WaterSense Specification for flushometer dual-flush toilets, rather than the 1.6 gpf currently allowed. With a 1.6 maximum gpf, the average effective flush volume for many users can be above the 1.28 gpf that WaterSense and California require for single-flush toilets. We also recommend that the calculation of 'effective flush volume' be eliminated.

Adoption of standards other than the WaterSense and California Appliance Efficiency Regulations

AWE doesn't recommend adoption of flow rate specifications/regulations that vary from the WaterSense and California regulations at this time, other than for tank-type dual-flush toilets. Doing so would introduce additional uncertainties and undermine efforts to better understand the risks described above. It could also be difficult for plumbing manufacturers to produce and distribute products to states that adopt another set of standards, in addition the federal, WaterSense and California regulations that apply at the state-level today in the U.S.

Explanation of Recommendations

Currently, reports of pathogen outbreaks, e.g, legionella, related to plumbing fixtures are predominantly from commercial and institutional settings, and AWE supports policies and programs to prevent such outbreaks such as the ASHRAE Standard 188 which outlines a legionellosis risk management program for buildings.

There are few reports of illnesses linked to plumbing pathogen contamination in residential settings, but the risks appear to be small at this time for that category. (Hot tubs appear to be the main source of reported pathogen problems in residential settings.) However, the lack of reported cases may be because of under-reporting or misdiagnoses of illnesses. AWE will continue to advocate for additional research to better understand the extent of pathogen risks and options for mitigating the risks.

Some research indicates that decreased wastewater flows related to efficient plumbing fixtures may lead to an increase in pollutant and solids concentrations, which may increase blockages, odors, and corrosion in pipes. For example, 50 percent of California wastewater treatment plants responding to a survey indicated they had experienced increased solids deposition, odor problems, and O&M challenges due to lower flows. (2017, California Urban Water Agencies, et. al. *Adapting to Change: Utility Systems and Declining Flows*.) However, there is also evidence that the costs for managing lower flows are about the same as for managing higher flows.

Products that meet the WaterSense specifications have been widely available for more than 20 years with a history of quality performance. Some of the products meeting California Appliance Efficiency Regulations are also well-established, albeit with less time and breadth in the marketplace than WaterSense products.

The additional energy and water savings from adopting the California Appliance Efficiency Regulations vs WaterSense standards for showerheads, toilets and faucets are modest and should be evaluated in light of the pathogen and drain line carry risks described above. As a result, AWE recommends the WaterSense standards for these fixtures in all states. In states that face significant water supply stress, the California Appliance Efficiency Regulations may be a viable option. If the California regulations are adopted, AWE recommends developing ongoing protocols to evaluate performance and customer satisfaction, as well as monitor and mitigate pathogen and drain line carry risks.

Note that as of July 2022, WaterSense has not published specifications for residential kitchen faucets and public lavatory faucets. The California Appliance Efficiency Regulations for these fixtures are consistent with flow rates in a variety of national plumbing codes and standards and are recommended.

Table 1: Alliance for Water Efficiency’s Recommendations for State- or Province-Level Adoption of Plumbing Water Efficiency Standards Compared to the U.S. Federal Standards, USEPA WaterSense Specifications, and California Appliance Efficiency Regulations

Entity	Toilets	Dual Flush Toilets	Showerheads	Wall Mounted Urinals	Residential Lavatory Faucets	Residential Kitchen Faucets	Public Lavatory Faucet
U.S. Federal (Green)	1.6 gpf	1.6 gpf max flush	2.5 gpm	1.0 gpf	2.2 gpm	2.2 gpm	2.2 gpm
WaterSense (Blue)	1.28 gpf	1.28 gpf ⁽¹⁾ effective flush volume with a max. flush of 1.6 gpf ⁽²⁾	2.0 gpm	0.5 gpf	1.5 gpm ⁽³⁾	N/A	N/A
California (Yellow)	1.28 gpf	1.28 gpf ⁽¹⁾ effective flush volume with a max. flush of 1.6 gpf	1.8 gpm	0.125 gpf	1.2 gpm ⁽³⁾	1.8 gpm (2.2 boost)	0.5 gpm
AWE Recommendations <i>(Note: White signifies none of the above)</i>	1.28 gpf	1.28 max. flush volume	2.0 gpm	0.5 gpf	1.5 gpm	1.8 gpm (2.2 boost)	0.5 gpm

(1) Dual-flush effective flush volume is the average of 1.6 gpf Full flush and 1.10 Reduced flush (2:1 ratio).

(2) WaterSense standard for commercial dual flush toilets lists a minimum flush volume of 1.0 gpf

(3) WaterSense standard and California Appliance Efficiency Regulation for residential lavatory faucets list a minimum flow of 0.8 gpm gpf = gallons per flush; gpm = gallons per minute