Comments on WaterSense® Notice of Intent (NOI) to Revise the *High-Efficiency Lavatory Faucet Specification*

June 2024

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Commenter: James Chagetas
Affiliation: Ferguson
Comment Date: April 4, 2024

Hello,

I attended the lavatory faucet NOI presentation and while reviewing the presentation slides, I noticed that New York does not have an * indicating a 1.2gpm flow rate for lavatory faucets.

New York's Appliance Standards 2023 Compliance Policies and Procedures Manual updates to the following:

> (b) Standard requirements for faucets.
>
> (1) The flow rate of private lavatory faucets and lavatory replacement aerators shall be not greater than 1.2 gpm at 60 psi.

Please let me know if I'm wrong on this one.

Take Care,

James Chagetas
Product Assurance Analyst
Ferguson – Corporate HQ
(757) 969-4506
james.chagetas@ferguson.com
ferguson.com

Commenter: Larry Himmelblau
Affiliation: The Chicago Faucet Company
Comment Date: May 6, 2024

Email Text:

Please accept our comments regarding the EPA **WaterSense Notice of Intent (NOI) to Revise the *High-Efficiency Lavatory Faucet Specification.***

Regards,

Larry Himmelblau
Sr. Product Compliance Engineer

The Chicago Faucet Company
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Email Attachment:
See pages 3 through 5.

Template for Public Comment Submission on WaterSense Documents

Commenter Name: Larry Himmelblau

Commenter Affiliation: The Chicago Faucet Company

Date of Comment Submission: May 6, 2024

Topic: II & V. Definitions & Procedures

Comment:
The Chicago Faucet Company (CFC) strongly supports the use of definitions obtained from the consensus standards including ASME A112.18.1/CSA B125.1
ASME A112.18.1/CSA B125.1 flow rate testing procedures are required for measuring the flow rate of all Plumbing Supply Fittings including faucets.

Rationale:
The consensus standards are created and debated by industry technical experts along with the representatives for regulatory and government agencies. These are the definitions and procedures used for performance testing and 3rd party certification.

Suggested Change (or Language):

Topic: Scope

Comment:
- CFC supports the explicit inclusion of bar sink faucets in the scope of the revised specification.
- We support the addition of public lavatory faucets at 0.5 gpm maximum.
- We are opposed to the inclusion of commercial kitchen faucets to the scope.
- We are opposed to the inclusion of residential kitchen faucets to the scope.
- We are opposed to the inclusion of metering faucets to the scope.

Rationale:
Many users of WaterSense faucets do not understand why a faucet that uses less than 0.8 gpm is not WaterSense compliant. We welcome the opportunity to add 0.5 gpm public lavatory faucets to the EPA listings.
The firm and clear definitions of “commercial kitchen faucet” and “residential kitchen faucet” do not exist in the ANSI accredited standards and should be written by the established SDO using the ANSI consensus process.

Kitchen faucets require a larger flow rate because they are used for a large variety of tasks.
- Filling Pots – User will use the same volume of water.
- Filling Sink to wash dishes - User will use the same volume of water.

- Rinsing Food from cookware before loading dishwasher– User will need to use more water to remove food from cookware if the flowrate is lowered.
- There is no established data proving that reduced flowrate in the kitchen faucet will result in reduced volume of water used.
- Lower flow rates will result in more clogged drains blocked by food not washed down the drainage system.

Suggested Change (or Language):

Topic: *Public Lavatory Faucets – Flow Rate*

Comment: CFC strongly opposes establishing a maximum flow rate below the current national standard of 0.5 gpm

Rationale:
1. We receive constant complaints from customers regarding the user experience when they install 0.35 gpm faucet outlets.
2. Many public lavatory faucets may never receive hot water if the flow is reduced.
3. Lowering the flow rates will have a negative effect on plumbing supply and drainage systems.
4. Setting a WS standard lower than 0.5 GPM maximum does not consider public plumbing design where the larger pipes are already having issues with bacteria buildup due to stagnant water in the system.
5. EPA must maintain focus on the health and safety of the public and promote improved personal hygiene.

Suggested Change (or Language):

Topic: *Public Lavatory Faucets – Converting gpc to gpm*

Comment:
CFC opposes the proposed conversion of Gallons/Cycle to Gallons/Minute

Rationale:
The conversion calculation is confusing and not necessary. The Gallons/Cycle measurement has been the industry standard for decades. Metering faucets are designed to prevent users from wasting water when they allow the water to remain flowing while completing other tasks. Metering faucets save water by shutting off if the user walks away while the water is running. The calculation makes false assumptions.
The ADA states “Hand-operated metering faucets shall remain open for 10 seconds minimum.” If a faucet has a 10 second cycle time the EPA assumes a user will activate the faucet 6 times per visit. This does not happen in a public bathroom.
A 0.25 gpc metering faucet will use less water than a 1.5 gpm faucet.

$$60\ \frac{\cancel{SEC}}{MIN} = \mathbf{6}\ \frac{CYCLE}{MIN}$$

$$10\ \frac{\cancel{SEC}}{CYCLE}$$

$$\mathbf{0.25}\ \frac{GAL}{\cancel{CYCLE}}\ X\ \mathbf{6}\ \frac{\cancel{CYCLE}}{MIN} = \mathbf{1.5}\ \frac{GAL}{MIN}$$

Suggested Change (or Language): Delete proposed text.

Commenter: Eugene DeJoannis
Affiliation: General Public
Comment Date: May 17, 2024

After we got an energy audit from our electric utility, I quickly noticed they had changed the aerators on our lavatory faucets to reduce the maximum water flow. I suddenly realized that I would never get hot water from those faucets again, simply because I didn't have the patience to wait a minute of more for the hot water to reach the tap. It also made me aware of how much water we waste in the process of getting hot water to our remote lavatory faucets.

That's when I installed a Watts temperature controlled crossover valve [https://www.homedepot.com/p/Watts-Hot-Water-Recirculating-System-Sensor-Valve-Kit-Sensor-Valve-Kit/100493462] below my furthest lavatory faucet so that both upstairs bathrooms would have "instant" hot water. This valve is intended to work with a timer-activated pump at the water heater, but when the valve is located above the water heater, recirculation occurs by buoyancy forces alone. That is, the valve allows hot water to bypass to the cold water line and return to the water heater to be reheated. When the temperature is in the comfort range of about 95-105 the valve closes to stop recirculation.

There is a cost to this feature: The cost of replacing the heat lost along the hot water supply line due to increased flow in the line. That heat is lost to the interior walls of the home where it probably does not have value. To limit that, I use a clock thermostat to turn off my (indirect fired) hot water heater at night and at several times during the day when it is not needed. *You will also give up instant cold water*; the cold supply is now tepid with the water returning to the water heater. But we discovered that we don't really want much cold water for bathing. *It's just there to temper the hot water!* **The pleasure of having virtually instant hot water is huge**, and I would warn that ANY LAVATORY SOLUTION THAT EXTENDS THE TIME TO GET HOT WATER AT THE BATHROOM FAUCET WILL BE VERY UNPOPULAR AND AVOIDED BY CONSUMERS.

Unless lavatory faucets can include a recirculating valve that delivers hot water to the user in a reasonable time, lower flow faucets will not improve the lives of users, and they will certainly do nothing to conserve water. What users need is a way to get the hot water they want in their bathrooms quickly so that they don't have to waste the cooled-down hot water in the lines to get it. Any attempt to reduce flow without solving the wait for hot water will do nothing to conserve water, but will frustrate and anger users. If you can solve the "time to hot water" issue, I have noticed that in some public washrooms a faucet with a spray discharge uses less water but distributes it more widely for more effective washing. But they have built-in recirculation systems to rapidly deliver hot water. I don't see how you can reduce lavatory flow without addressing the problem of hot water delivery time. Building it into the faucet would be one solution, but forcing anyone buying a new faucet to also buy a 3rd party bypass valve that may cost more than the faucet seems a poor solution. Another solution is using a 3/8" diameter supply line instead of the code-required 1/2". But that will not work for existing homes (except for 1 story homes) and faces opposition from building code enforcers.

Gene DeJoannis
gdejo@sbcglobal.net
The cause of problems is solutions.
Eric Sevareid

Commenters: Jeremy Brown
Affiliation: NSF
Comment Date: May 20, 2024

Email Text:

EPA WaterSense Staff,

Thank you for the opportunity to provide comments on the NOI. Please find attached our comments. In addition, since I referenced NSF/ANSI/CAN 61, I have included a copy for your reference. If you have any questions, feel free to contact me.

Regards,

Jeremy Brown
Regulatory Affairs Manager, Water Program
NSF | 789 N. Dixboro Road | Ann Arbor, MI 48105 USA
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Email Attachment:
See page 8.

Template for Public Comment Submission on WaterSense Documents

Commenter Name: Jeremy Brown

Commenter Affiliation: NSF

Date of Comment Submission: 5-17-24

Topic: Should EPA require all labeled faucets to conform to applicable requirements in ASME A112.18.1/CSA B25.1 and NSF/ANSI Standard 61, Section 9?

Comment: Yes, NSF encourages the reference to the NSF Standard to encourage focus on health and safety.

1) The standard name should be updated to NSF/ANSI/CAN Standard 61, Section 9. The CAN indicates its designation as a Canadian National Standard.
2) Although self-closing and metering faucets are exempted from NSF/ANSI/CAN 61 (Section 9.1.2), the WaterSense Specification creates no conflict because it clearly references "applicable requirements" in Section 2.1. In other words, self-closing and metering faucets would not be required to comply with NSF/ANSI/CAN 61 because those products are exempted and therefore not applicable.

Rationale: Use of the standard's proper updated nomenclature is required for legal enforceability.

Suggested Change (or Language):

Topic: Definitions

Comment: Where possible, we encourage EPA to work with standards committees such as ASME A112.18.1/CSA B125.1 to develop definitions for faucets, private lavatory faucet, bar sink faucet, multi-modal, public lavatory faucet, self-closing faucet, metering faucet, cold start faucet, etc.

Rationale: Using consistent definitions across standards, codes, specification, and regulations yields more consistent compliance.

Suggested Change (or Language):

Commenter: Maribel Campos
Affiliation: International Code Council Evaluation Service (ICC-ES)
Comment Date: May 20, 2024

Email Text:

To Whom It May Concern,

Please see the attached comments regarding the NOI for revisions to the Lavatory Faucet Specification.

Please let me know if you have any questions.

Sincerely,

Maribel Campos
Vice President of ES-PMG Standards

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Western Regional Office
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mcampos@icc-es.org

Email Attachment:
See pages 10 and 11.

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May 20, 2024

Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Re: EPA WaterSense® Notice of Intent (NOI) to Revise the High-Efficiency Lavatory Faucet Specification

To Whom It May Concern,

The International Code Council's Evaluation Service (ICC-ES), an accredited third-party certification agency recognized by the U.S. Environmental Protection Agency's (EPA) WaterSense® Program as an approved Certification Body (CB), appreciates this opportunity to provide the following comments regarding the NOI to revise the WaterSense® High-Efficiency Lavatory Faucet Specification.

We have concerns with developing new definitions and performance criteria outside of the work of the product standard committees (ASME A112 and CSA B125) that oversee the development of the industry standard for faucets, ASME A112.18.1/CSA B125.1 (Plumbing Supply Fittings). This includes requiring NSF/ANSI/CAN 61 compliance for toxicity as this standard is already required within ASME A112.18.1/CSA B125.1, which is referenced in the WaterSense® High-Efficiency Lavatory Faucet Specification, for applicable product types and has nothing to do with water efficiency which is the purpose for the EPA WaterSense® Program.

ICC-ES supports the manufacturing industry who are against lowering the maximum flow rate of private lavatory faucets below 1.5 gallons per minute (gpm) that has been proven to ensure both water savings and performance, which unlike the California Energy Commission's 1.2 gpm maximum flow rate that is highly questionable to whether it truly saves water based on the state's current code requirements for pipe layouts and sizing, and was developed without any consideration made regarding product performance. Additionally, reducing the maximum flow rate requirement from 1.5 to 1.2 gpm would eliminate approximately 35 percent of the current portfolio of WaterSense certified lavatory faucets.

ICC-ES also supports the manufacturing industry who are against EPA's development of a specification for public lavatory faucets as the 0.5 gpm flow rate was established by the product standard committees as the maximum flow rate needed to address both water savings and performance. Furthermore, manufacturers have been notified of potential issues (e.g., sink clogging) where lower flow rates have been adopted.

In addition, ICC-ES supports the manufacturing industry who are against EPA's efforts to translate the metering faucet maximum flow rate from gallons per cycle (gpc) to gpm as both ASME A112.18.1/CSA B125.1 and Federal Regulations 10 CFR 430 already dictate that such faucets be measured by gpc. Developing a different method would create market confusion and additional issues related to conformity assessment of metering faucets.

ICC-ES encourages EPA to work with the product standards committees to develop performance and testing requirements for kitchen faucets, including multi-modal kitchen faucets, in ASME A112.18.1/CSA B125.1 prior to considering a WaterSense specification for kitchen faucets that should be separate from the current lavatory faucet specification.

Lastly, regarding the incorporation of new technologies such as cold-start faucets into the lavatory faucet specification, ICC-ES believes it is critical for EPA to work through the product standard committees to define, along with developing performance and testing criteria, before considering its inclusion or any other type of faucet in the specification. Furthermore, the purpose for cold-start faucets is to save energy and not water, which is outside the scope of EPA WaterSense® Program.

In conclusion, ICC-ES strongly agrees with the manufacturing industry that EPA works with the applicable product standard committees to incorporate definitions and criteria before making any additional changes to the lavatory faucet specification or adding new categories of products.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Maribel Campos
Vice President of ES-PMG Standards

ICC Evaluation Service, LLC
Western Regional Office
3060 Saturn Street, Suite 100
Brea, CA 92821
Tel: 562-699-0543 x3578
mcampos@icc-es.org

Commenters: Joanna Mauer, Edward Osann
Affiliation: Appliance Standards Awareness Project (ASAP), Natural Resources Defense Council (NRDC)
Comment Date: May 22, 2024

Email Text:

Please find attached comments from the Appliance Standards Awareness Project and the Natural Resources Defense Council on the Notice of Intent (NOI) to Revise the WaterSense High-Efficiency Lavatory Faucet Specification,

Thank you,
Joanna

--
Joanna Mauer
Appliance Standards Awareness Project
www.appliance-standards.org
(202) 672-1407

Email Attachment:
See pages 13 through 16.

Appliance Standards Awareness Project
Natural Resources Defense Council

May 24, 2024

Stephanie Tanner
U.S. Environmental Protection Agency
Office of Water
WaterSense Program
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

RE: WaterSense® Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification

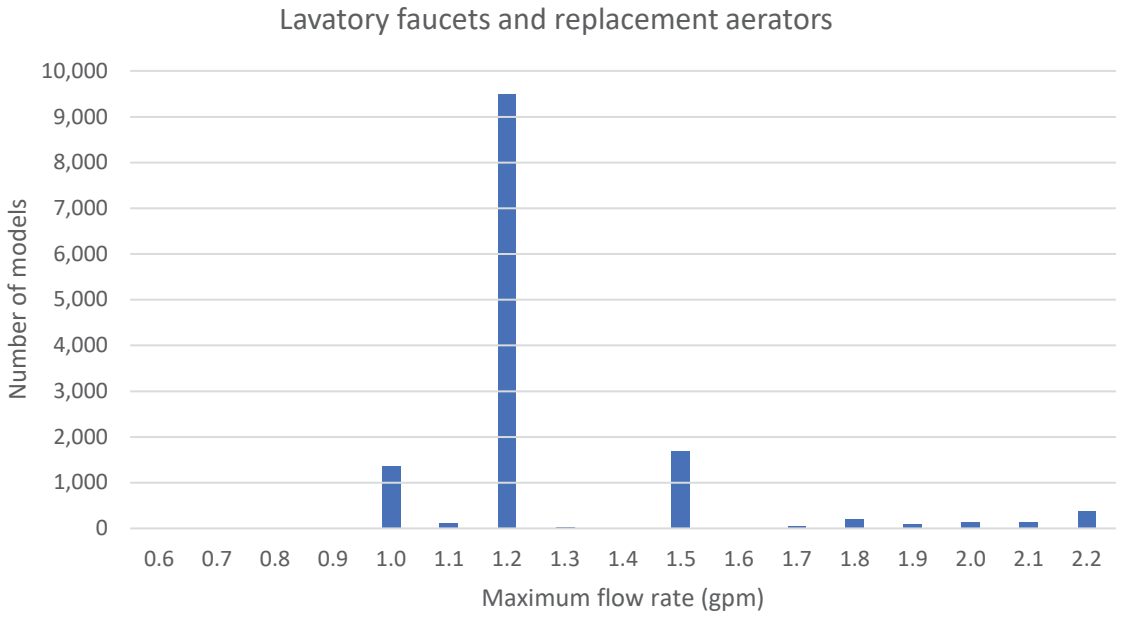
Dear Ms. Tanner:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP) and the Natural Resources Defense Council (NRDC) on the Notice of Intent (NOI) released on March 7, 2024 to revise the High-Efficiency Lavatory Faucet Specification. We appreciate the opportunity to comment.

We strongly support updating the WaterSense specification for faucets. The current WaterSense specification for lavatory faucets was released in 2007; since then, more than a dozen states have adopted standards for lavatory faucets that either match the WaterSense criteria of 1.5 gallons per minute (gpm) or are more stringent (at 1.2 gpm). Thus, updated criteria for lavatory faucets will be critical to ensuring market differentiation for WaterSense certified products. Furthermore, states have also adopted standards for kitchen faucets and public lavatory faucets. We believe that there is large potential for water and energy savings from adopting a WaterSense specification for kitchen faucets, and we encourage EPA to consider specifying a maximum flow rate of 1.5 gpm for kitchen faucets. Furthermore, there could be significant benefit to including performance requirements for public lavatory faucets as part of a WaterSense specification to help ensure user satisfaction; for the same reason we also support including minimum flow rates for all WaterSense certified faucets. Finally, we encourage EPA to publish shipment data for WaterSense products, which would help inform the specification development process.

For lavatory faucets, we encourage EPA at a minimum to lower the maximum flow rate to 1.2 gpm and to consider whether 1.1 or 1.0 gpm would be appropriate. As shown in Figure 1, most lavatory faucet models (and replacement aerators) on the market today have maximum flow rates that are at or below 1.2 gpm. Therefore, we support EPA's intent to lower the maximum flow rate for lavatory faucets from the current specification of 1.5 gpm. In addition, in order to provide greater market differentiation, we encourage EPA to investigate whether specifying a maximum flow rate of 1.1 or 1.0 gpm could achieve greater water savings than a 1.2 gpm specification while maintaining consumer satisfaction.

Figure 1. Maximum flow rate of lavatory faucet models in the DOE Compliance Certification Database[1]



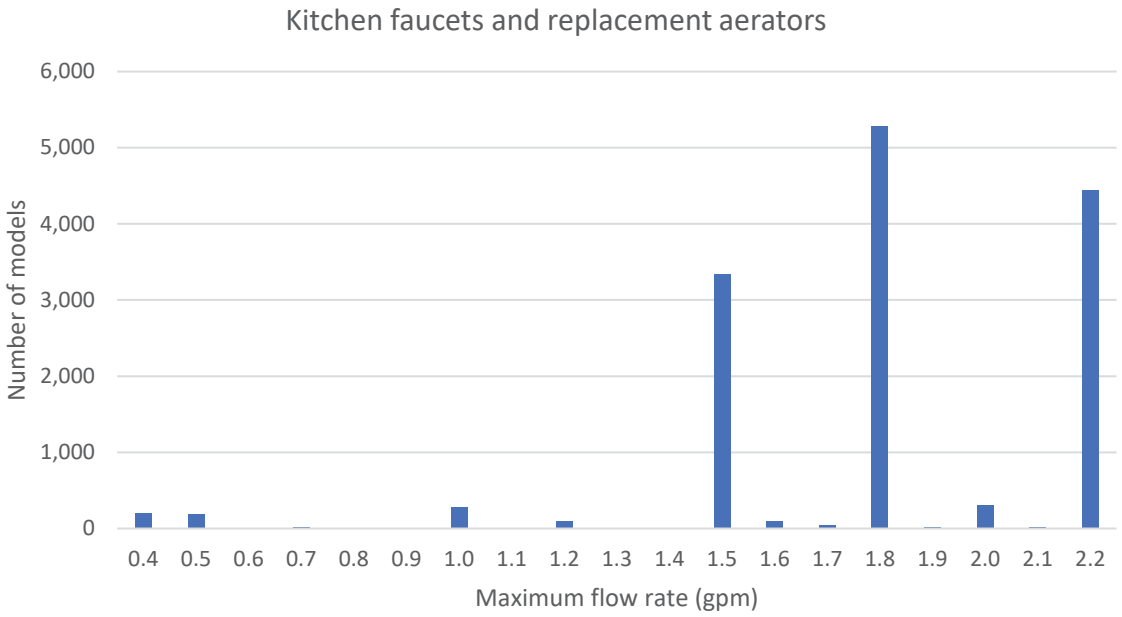
We support adopting a WaterSense specification for kitchen faucets and encourage EPA to consider specifying a maximum flow rate of 1.5 gpm. Kitchen faucets consume a significant amount of water, and kitchen faucet hot water use translates into significant water heating energy consumption.[2] Furthermore, as shown in Figure 2 below, about two-thirds of all kitchen faucets (and replacement aerators) on the market are rated at or below 1.8 gpm (compared to the federal standard of 2.2 gpm). Therefore, there appears to be a significant opportunity for a new WaterSense kitchen faucet specification to drive large water and energy savings.

Furthermore, it appears that the market for kitchen faucets has largely transitioned to products with rated maximum flow rates of 1.8 gpm and below. For example, HomeDepot's October 2021 "Responsible Product Standards" specify that all kitchen faucets sold in their U.S. stores will have a rated maximum flow rate no greater than 1.8 gpm.[3] Of all the kitchen faucets advertised on lowes.com, there are 2,700 models rated at 1.8 gpm and 795 models rated at 1.5 gpm, while just 84 models are rated at 2.2 gpm;[4] the cheapest kitchen faucet advertised on lowes.com is rated at 1.8 gpm.[5] And all Moen kitchen faucets have a rated maximum flow rate no greater than 1.5 gpm.[6] Therefore, we would be concerned that a WaterSense specification of 1.8 gpm for kitchen faucets would not provide meaningful

[1] https://www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A*. Accessed May 14, 2024. Excluding models with maximum flow rates of 0.5 gpm or below since these are likely to be public lavatory faucets.
[2] For example, the 2017 ASAP & ACEEE report "States Go First" estimated that a 1.8 gpm kitchen faucet saves 2,214 gallons of water, 75 kWh of electricity, and 0.55 MMBtu of natural gas annually on average relative to a 2.2 gpm faucet. https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf. p. 57.
[3] https://ecoactions.homedepot.com/wp-content/uploads/Responsible-Product-Standard-October-2021.pdf.
[4] https://www.lowes.com/search?searchTerm=kitchen%20faucet. Accessed May 21, 2024.
[5] https://www.lowes.com/pd/Keeney-Polished-Chrome-2-Handle-Deck-Mount-Low-Arc-Handle-Lever-Residential-Kitchen-Faucet/1002859368.
[6] https://www.moen.com/c/Kitchen?query=:launchDate-desc:allCategories:Kitchen:category:Kitchen%20Faucets.

differentiation in the market, and we instead encourage EPA to consider establishing a maximum flow rate of 1.5 gpm.

Figure 2. Maximum flow rate of kitchen faucet models in the DOE Compliance Certification Database[7]



We support adopting a WaterSense specification for public lavatory faucets and encourage EPA to include performance requirements. As EPA notes in the NOI, none of the existing standards (e.g., ASME A112.18.1/CSA B125.1) for public lavatory faucets include performance requirements. EPA further notes that adequacy of water flow and spray force and comfort may be important performance considerations, while sensor sensitivity and responsiveness may also be important for sensor faucets. We understand that each of these performance attributes can impact user satisfaction, and we therefore encourage EPA to develop performance requirements for public lavatory faucets to address minimum flow rate, spray force, and, for sensor faucets, sensor sensitivity and responsiveness. We also encourage EPA to evaluate resistance to tampering with any component that would influence the water use of a public lavatory faucet as a potential design requirement.

We support including minimum flow rates for all WaterSense certified faucets. The current WaterSense specification includes a minimum flow rate of 0.8 gpm at a pressure of 20 psi at the inlet for private lavatory faucets. The NOI notes that EPA intends to maintain the current minimum flow rate requirement and is also considering setting minimum flow rates for kitchen faucets and public lavatory faucets. We support including minimum flow rate requirements for all WaterSense certified faucets in order to ensure user satisfaction at locations with lower operating pressures. As EPA notes in the NOI, including minimum flow rate requirements would effectively ensure that manufacturers are providing pressure compensation to provide a fairly steady flow rate across a range of operating pressures.

[7] https://www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A*. Accessed May 14, 2024.

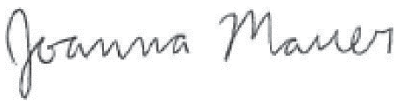
We question the efficacy of requiring metering and self-closing faucets to convert flow quantities into flow rates (gpm) for labeling eligibility. While a conversion of the water usage of metering and self-closing faucets from maximum volumes to maximum flow rates might appear to offer an opportunity for comparison within the same product category as manually closed faucets, metering faucets by design do not run continuously, and the comparison may not be apt. Metering and self-closing faucets could comprise their own product category, or could be presented as a subgroup within a faucet category with their performance metric expressed as a maximum volume. WaterSense informational materials could be developed to illustrate and compare the water use of manual and metering faucets in different occupancies and use levels.

We encourage EPA to publish shipment data for WaterSense products. Unlike with the ENERGY STAR program, EPA does not currently publish shipment data for WaterSense certified products. For the ENERGY STAR program, EPA annually publishes a unit shipment and market penetration report,[8] which allows stakeholders to understand the market penetration of ENERGY STAR certified products. We encourage EPA to publish similar data for WaterSense certified products, which would help inform the specification development process.

We encourage EPA to consider publishing separate specifications for different faucet types. We understand that it may be possible for EPA to move forward relatively quickly for certain faucet types, while others may require more research and analysis. Each one of the major faucet types (e.g., residential lavatory, kitchen, public lavatory) are distinct and significant enough to warrant its own specification. We therefore encourage EPA to consider publishing separate specifications for different faucet types if such a process would allow for moving forward more quickly with certain products.

Thank you for considering these comments.

Sincerely,



Joanna Mauer
Deputy Director
Appliance Standards Awareness Project

Edward R. Osann
Senior Policy Analyst
Natural Resources Defense Council

[8] See, for example, for 2022: https://www.energystar.gov/sites/default/files/2022%20Unit%20Shipment%20Data%20Summary%20Report.pdf.

Commenters: Andrew Morris, Ron Burke
Affiliation: Alliance for Water Efficiency (AWE)
Comment Date: May 23, 2024

Email Text:

Dear WaterSense,

Please find AWE'c comments attached.

Best Regards,

Andrew D. Morris | Senior Manager of Policy & Programs
ALLIANCE FOR WATER EFFICIENCY
e: andrew@a4we.org | t: (770)906-1888 | w: www.allianceforwaterefficiency.org

Email Attachment:
See pages 18 through 27.

Submitted via email to watersense-products@erg.com

May 23, 2024

WaterSense
U.S. Environmental Protection Agency
Office of Wastewater Management (4204M)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: WaterSense® Notice of Intent (NOI) to Revise the High-Efficiency Lavatory Faucet Specification

Dear WaterSense Staff:

The Alliance for Water Efficiency ("AWE") is a stakeholder-based 501(c)(3) organization with more than 500 member organizations dedicated to the efficient and sustainable use of water. AWE provides a forum for collaboration around policy, information sharing, education, and stakeholder engagement. AWE is providing these comments on the Notice of Intent (NOI) to Revise the High-Efficiency Lavatory Faucet Specification ("Faucet NOI"). These comments are based on discussion and feedback among AWE's WaterSense-Water Efficient Products Advisory Committee, which met once to discuss this topic and shared their perspectives by email.

AWE is focusing primarily on those aspects of the Faucet NOI with the largest potential impact on water efficiency – reducing the maximum flow rates for private lavatory faucets and kitchen faucets. AWE recognizes that there are many important technical aspects of this Faucet NOI, and we urge WaterSense to carefully consider the many detailed comments submitted by those with experience in plumbing codes and standards, premise plumbing design and engineering, plumbing manufacturing, plumbing services, and other relevant professional backgrounds.

In submitting these comments, AWE's goal is to convey perspectives of its members and highlight both available data and gaps in the data. At this time, AWE is not taking a position on the efficiency levels of private lavatory faucets and kitchen faucets, but AWE does anticipate doing so later in part based on the additional data and information submitted by others in commenting on the Faucet NOI.

A. Faucets and End Use Data. Many sources of end use data do not breakdown private lavatory and kitchen faucet use separately. For example, residential faucet use is combined and analyzed as a single category in the Residential End Uses of Water, Version 2 (Water Research Foundation Report #4309b). AWE is not aware of similarly large national studies that break down the use of private lavatory and kitchen faucets separately. At a state level, some data has been compiled, estimated, and assumed for the breakdown of faucet end use data for California-related rulemaking. The most recent report was for Codes and Standards

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Enhancement (CASE) Initiative for PY 2013: Title 20 Standards Development titled *Analysis of Standards Proposal for Residential Faucets and Faucet Accessories* (July 29, 2013). Table 5.4 from this report breaks down per unit water use separately for lavatory and kitchen faucets. This table is included as Attachment A to this letter.

B. Faucets and Anticipating Water Savings. While the general perspective remains that reducing the max flow rate for faucets will save water, there are at least three factors that may offset anticipated water savings to some extent. First, most faucet valves can be opened incrementally to adjust the flow of water. This means that users may be opening the valve until the flow is satisfactory to them. As a result, the savings anticipated from decreasing the max flow rate could be offset in part by users opening the valves further than they previously did under higher max flow rates. Second, given that hot water is desired for many faucet uses, lowering the max flow can, depending on the type of water heater, result in longer wait times for hot water and, therefore, at least partially offset the anticipated water savings. Third, with kitchen faucets especially, some uses are fixed-volume tasks like pot filling while others are less volume- and flow-dependent like handwashing and dish rinsing. AWE is not aware of national data addressing user behavior and use patterns related to these three topics. Nonetheless, common sense and behaviors everyone has observed, like letting the water unnecessarily run while using a faucet, support the concept that there will be at least some water savings from lowering the maximum flow rate.

C. Private Lavatory Faucet Max Flow Rates. Most of AWE's committee members did not express concerns related to lowering the max flow rate to 1.2 gpm for WaterSense given the sense that the market appears to have already substantially shifted to this flow rate. However, some of our manufacturing members are of the opinion that EPA should maintain the current requirement of 1.5 gpm for private lavatory faucets because of the lack of underlying studies and evidence related to water savings. Members have even more mixed views on whether the max should be lowered to 1.0 gpm. Some expressed concerns about the limited number of models on the market and potential impacts to performance, user satisfaction, and manufacturers. Others observed that users could compensate for lower flows by opening private lavatory faucets control valves all the way and, therefore, offsetting potential water savings. Other members recognized the potential for a lower max flow rate to save water and the potential energy benefits given that private lavatory faucets are a major user of hot water. It was also noted that hot water use is a very important topic for zero energy homes.

Members agreed that there was a general lack of national, representative data on the market share of the flow rates of new faucets being sold today that use 1.0 gpm, 1.2 gpm or higher. WaterSense has data on the number of new models being certified by flow rate that shows that most new models use 1.2 gpm or less, but this leaves some uncertainty about their relative market share of new products sold especially related to faucets using 1.0 gpm or less. Having market share and shipment data would provide more information to confirm the general sense that the market has already transitioned to 1.2 gpm and insights as to the feasibility and water savings if WaterSense specified a 1.0 gpm flow rate. There are several limited sources of retail product availability data that also support the fact that most private lavatory faucets offered for sale use 1.2 gpm or less even in places beyond states like California where they are required.

An article from the *Georgia Operator Magazine* reports that only 1 of 63 private lavatory faucets available on the shelves in metro Atlanta used more than 1.2 gpm even though 1.5 gpm private lavatory faucets were allowed under Georgia's code. See Attachment B to this letter. This data from Georgia was

published in the summer of 2020, almost four years ago, suggesting that at least at a retail level the market transformation was well advanced. A simple search on Lowe's retail website in April 2024 from an AWE staff member located in Ohio shows a wider of range of products are available to be shipped to stores, but the private lavatory faucets still overwhelmingly have a max flow rate of 1.2 gpm or less. See screenshots of these flow rates in Attachment C to this letter.

D. Kitchen Faucet Max Flow Rates. Many members expressed their support for WaterSense labeling for kitchen faucets. There were no concerns expressed related to establishing a flow rate of 1.8 gpm for WaterSense given the sense that the market appears to have already substantially shifted to this flow rate. Some of our manufacturing members take the position that since this would constitute a brand-new EPA specification for kitchen faucets, EPA WS should work with the product standards committee ASME A112/CSA B125 to determine a standard kitchen faucet flow rate (e.g. 2.2 gpm Federal EPAct) prior to developing a specification for efficient kitchen faucets at 1.8 gpm which would be in line with a 20% reduction from the current EPAct federal requirements.

Members have mixed views on whether the max should be lowered to 1.5 gpm. Some expressed concerns about potential impacts to performance, user satisfaction, and manufacturers. Others observed that the lower the flows get, the longer fixed volume tasks like pot filling would take without a temporary override. Other members recognized the potential for water savings of going lower and the potential energy benefits given that kitchen faucets are a major user of hot water.

Members agreed that there was a general lack of national, representative data on the market share of the flow rates of new faucets being sold today that use 1.5 gpm, 1.8 gpm or 2.2 gpm. Because WaterSense has not previously labeled kitchen faucets, it does not have certification data like it does for private lavatory faucets. Having market share data would provide information to evaluate the general sense that the market has already transitioned to 1.8 gpm and insights as to the feasibility of moving to 1.5 gpm. There are several limited sources of retail product availability data that support the fact that most kitchen faucets offered for sale use 1.8 gpm or less even in places beyond states like California where this flow rate is required.

AWE has obtained some kitchen faucet data from the Residential Energy Services Network or RESNET (www.resnet.us/about/us/), which is a non-profit, national standards-making body for building energy efficiency rating and certification systems in the United States. The data they provided is from their HERS H20 water efficiency rating system, which is an approved certification method used for WaterSense Homes certification. RESNET provided the following data on kitchen faucets being installed in HERS H20 rated homes in 2023, which are generally located in Southwestern states:

Kitchen Faucet Flow Rate (gpm)	Number of Homes (2023)
1-1.25	226
1.26-1.5	3433
1.51-1.75	69
1.76-2	177
>2	13

These data show that kitchen faucets using 1.5 gpm or less are the most popular choice in water efficient homes seeking the WaterSense homes certification. RESNET did not collect detailed data on private lavatory faucets.

An article from the *Georgia Operator Magazine* reported that only 2 of 133 kitchen faucets available on the shelves in metro Atlanta used more than 1.8 gpm even though 2.0 gpm were allowed under Georgia's code. See Attachment B to this letter. A simple search on Lowe's retail website from an AWE staff member located in Ohio shows a wider of range of products are available to be shipped to stores, but the kitchen faucets still overwhelmingly have a max flow rate of 1.8 gpm or less. See screenshots of these flow rates in Attachment D to this letter.

E. Kitchen Faucet Temporary Override Valves. AWE members were generally supportive of maintaining and allowing the temporary override to allow for higher flow rates up to 2.2 gpm for things like pot filling and other fixed-volume tasks. Members were also encouraged by the efforts to define further how this override feature should work and to ensure it does not remain permanently in the override setting.

F. WaterSense's Purpose – Identifying and Promoting Water-Efficient Products. Recognizing that it is part of WaterSense's statutory purpose to identify and promote water-efficient products, some members questioned whether labeling a private lavatory faucet using 1.2 gpm or a kitchen faucet using 1.8 gpm would fulfill this purpose given their apparent dominance in the marketplace. If nearly all private lavatory faucets already use 1.2 gpm and many kitchen faucets use 1.8 gpm, then would the WaterSense label convey meaningful information to consumers about the product's water efficiency? Others noted that water savings calculations for any revised specification should take into account the fact that many new faucets being sold already have flow rates far lower than the federal or prior WaterSense maximum.

AWE and its members appreciate this opportunity to comment and provide information for the Faucet NOI. We will continue working with stakeholders to learn more about the questions raised with this NOI and to be prepared to submit comments on any future draft specification.

Sincerely,

Ron Burke
President and CEO
Alliance for Water Efficiency

Attachment A

Table Showing Kitchen and Lavatory Use Separately; Source: Codes and Standards Enhancement (CASE) Initiative for PY 2013: Title 20 Standards Development titled *Analysis of Standards Proposal for Residential Faucets and Faucet Accessories* (July 29, 2013)

Table 5.4 Assumptions Used to Calculate Annual per Unit Water Use

Metric	Value	Source
Number of Kitchen Faucet Events per Household per Day [a]	41.6	CASE Team analysis
Faucet Events per Household per Day	57.4	Aquacraft 2011
Lavatory Faucet Events per Household per Day	13.8	See Section 5.2.1
Number of Kitchen Faucets per House [b]	1.04	CASE Team analysis
Installed Kitchen Faucets (2010)	13,357,895	See Section 6.1.1
Number of Homes (2010)	12,885,684	See Section 6.1.1
Average Duration of Faucet Event	37 seconds	Aquacraft 2011
Daily water used to fill pots and basins	3 gal/day-faucet	assumption
Flow rate derating factor for non-qualifying products	0.67	Aquacraft 2000
Market share of non-qualifying products		
2.2 gpm	77%	See Section 6.1.2
1.81 – 2.19 gpm	23%	See Section 6.1.2
Average flow rate (actual) of non-qualifying product	1.4 gpm	CASE Team analysis

a. 57.4 events total – 13.8 lavatory faucet events

b. Installed faucets ÷ total houses

MARKET RESEARCH SHOWS CURRENT GEORGIA PLUMBING FIXTURE EFFICIENCY REQUIREMENTS ARE OFTEN EXCEEDED

By Andrew D. Morris, Celine Mollet Saint Benoit, and Jacob Whitacre, Metropolitan North Georgia Water Planning District

The Metropolitan North Georgia Water Planning District (the 'Metro Water District') is frequently presented with the following question from utilities and other stakeholders: *"With Georgia already a national leader on water efficiency, how much more efficient can residential customers become?"*

Georgia's national leadership over the past two decades is unquestionable. For example, Georgia is ranked as the forth best state for water efficiency and conservation in the Alliance for Water Efficiency's 2017 report titled, 'The Water Efficiency and Conservation State Scorecard: An Assessment of Laws.' Only Arizona, California, and Texas scored better than Georgia on this scorecard. Exemplifying this success, the Metro Water District withdraws 10% less water today than in 2000, despite a 1.3 million increase in population.

Efforts by the State of Georgia, the Metro Water District, and utilities have all helped drive down total water withdrawals and per person water demands. The use of high-efficiency plumbing fixtures has played a key role in this progress. In the 2000s, the Metro Water District and its local government partners promoted high-efficiency fixtures through rebates, education, and a variety of other programs. The State of Georgia built on these efforts in 2010 when the Georgia General Assembly passed the Georgia Water Stewardship Act. This act requires, among other things, the use of high-efficiency plumbing fixtures through plumbing code standards for toilets, urinals, and faucets in new and renovated buildings.

Since it's been 10 years since the *Georgia Water Stewardship Act* was passed, a review of current trends in water efficient plumbing fixtures is needed to answer the question of what additional efficiency is feasible today. Therefore, the Metro Water District has taken a data-driven approach to survey today's technology trends and to see how plumbing fixtures in retail stores meet or exceed the State of Georgia's minimum plumbing fixture efficiency requirements.

For the Metro Water District's market research, plumbing fixtures available in stores at The Home Depot, Lowe's, and Walmart retail stores in the Metro Water District were reviewed. Five of each store, for a total of 15 retail stores, were selected at random.

The market research was performed electronically by selecting a specific store location on each retailer's website and then choosing the option to only show products available on the day of the review at the selected store. Fixture data was gathered from retail stores because they provided the most robust and readily accessible data set on plumbing fixture availability, pricing, and customer satisfaction. While many fixtures are sold through other channels to builders and contractors, these sources do not readily provide the same amount and quality of data.

Table 1 shows the current fixture efficiency requirements in the State of Georgia. In the figures below, fixtures listed as meeting current efficiency requirements are those that match exactly the current Georgia efficiency requirements. The retail market data shown in these figures strongly support the conclusion that exceeding current efficiency requirements remains feasible for three reasons.

First, fixtures that exceed the current efficiency requirements are readily available. In fact, the results provided in **Figure 1** show that, except for toilets, there are many more fixtures available in retail stores that exceed the standards than those that meet it.

FIXTURE	GA STATE CODE
Toilet	1.28 gpf
Showerhead	2.5 gpm
Kitchen Faucet	2.0 gpm
Lavatory Faucet	1.5 gpm

Table 1. *Current Georgia Efficiency Requirements*

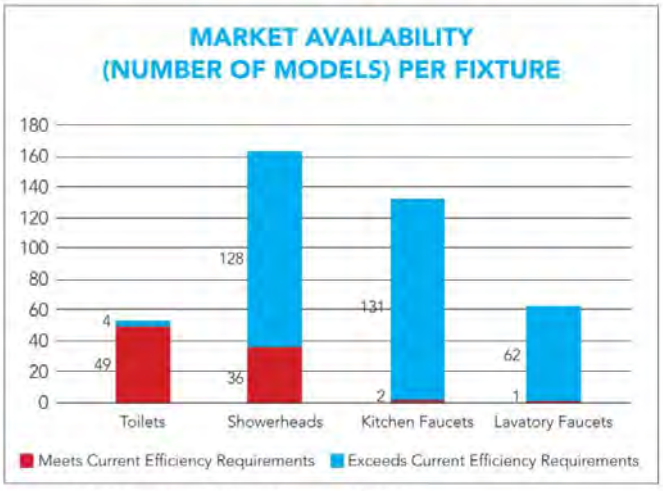

Figure 1. *Market Availability of Fixture Models*

Showerheads and faucets that exceed current requirements are widely available. It's worth noting that while only four toilet models that exceed current efficiency requirements were available in stores, nearly every store carried at least one of these four very popular models that exceed current efficiency requirements. The Metro Water District is exploring additional research avenues to understand what models are available beyond retail store shelves that exceed current efficiency requirements. For example, the MaP voluntary toilet performance testing program has tested more than 100 models that exceed current efficiency requirements (see *www.map-testing.com/map-premium.html*). More research is needed to understand why more models are not available at retail.

Second, customers appear to be very satisfied, and sometimes more satisfied, with fixtures that exceed current efficiency requirements as seen in **Figure 2**. We've excluded faucets from the chart below given how few faucets are available that merely meet the current efficient requirements (two kitchen faucets and one lavatory faucet).

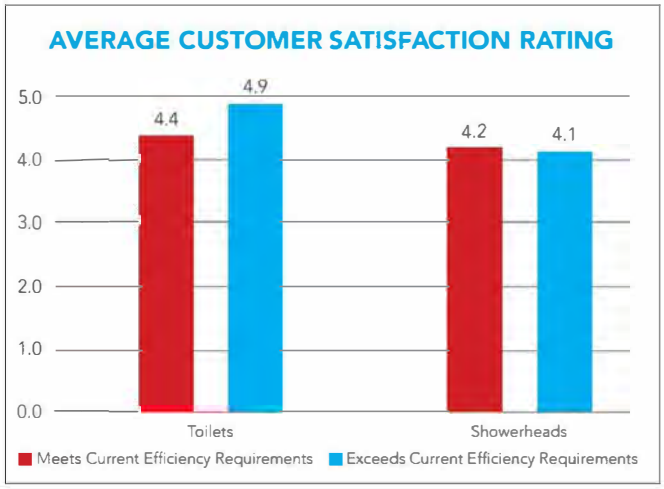

Figure 2. *Customer Satisfaction Ratings of Toilet and Showerhead Fixtures*

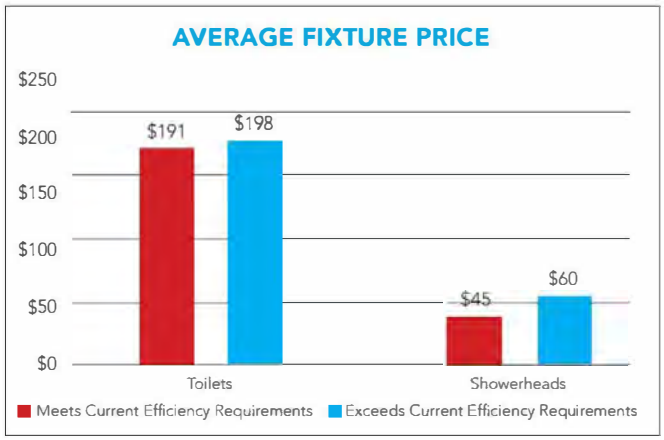

Figure 3. *Average Price of Toilet and Showerhead Fixtures*

Third, fixtures that exceed current efficiency requirements fall within a similar price range as demonstrated in **Figure 3**. Again, faucets have been excluded given the limited number available that merely meet current requirements.

While the average price for showerheads that exceed current efficiency requirements is somewhat higher, the difference in price would be recouped in utility bill savings in less than a year. Compared to showerheads that merely meet Georgia's current efficiency requirements, EPA's WaterSense program estimated the utility bill savings in its March 4, 2010, *Supporting Statement for the WaterSense Specification for Showerheads*, with the WaterSense showerheads exceeding Georgia's current efficiency requirements. The relevant part reads:

> *"The average homeowner retrofitting his or her showerheads with WaterSense labeled showerheads will realize an accompanying $14 savings on water and wastewater costs annually due to lower water consumption. Factoring in the accompanying energy savings, the average household with electric water heating may save an additional $36, for a combined annual savings of $50. The average household with natural gas water heating may save an additional $18 for a combined annual savings of $32."*

Accounting for inflation and average water, sewer, and energy rate increases since 2010, when WaterSense did this analysis, the savings would be even larger today.

Also, if one is looking for the least expensive showerhead options, our data show that five of the 10 least expensive models were models that exceed current efficiency requirements. Clearly, many low-cost showerhead models are available.

In conclusion, the data from the Metro Water District show that plumbing fixture technology and markets continue to advance, and so the question, *"How much more efficient can our residential customers become?"* is one that must be reevaluated from time to time. Based on this evaluation of current technologies available at retail stores in the Metro Water District, exceeding current efficiency requirements remains feasible.

The data also show that, even without code changes, some new and renovated homes will use fixtures that exceed current efficiency requirements based simply on what is already widely available on retail store shelves.

The Metro Water District expects to continue our work to take advantage of new efficiency opportunities through a data driven approach. We would love to hear from you if you have experience or insights on plumbing fixture efficiency that will help us in our research, analysis, and action through the Metro Water District's technical assistance programming and next regional plan update.

Note: copies of the retail data are available by emailing *amorris@northgeorgiawater.com*.

AWE COMMENTS - ATTACHMENT C

Max Flow Rate

- 0.35 GPM(1.3 LPM) (7)
- 0.5 GPM (1.9 LPM) (166)
- 1.0 GPM (3.8 LPM) (201)
- 1.2 GPM (4.5 LPM) (4350)
- 1.5 GPM (5.7 LPM) (641)
- 1.6 GPM (6.1 LPM) (8)
- 1.75 GPM (6.6 LPM) (3)
- 1.8 GPM (6.8 LPM) (27)
- 2.0 GPM (7.6 LPM) (37)
- 2.1 GPM (8.0 LPM) (2)
- 2.2 GPM (8.3 LPM) (159)
- 2.4 GPM (9.1 LPM) (64)
- 2.5 GPM (9.5 LPM) (23)
- 3.7 GPM (14.0 LPM) (1)
- 0 GPM (0 LPM) (3)

— See Less

Handle Type

Spout Type

Style

allen + roth

Harlow Matte Black Widespread 2-Handle WaterSense Handle Bathroom Sink Faucet with Drain

Shop the Collection

$119.00 ★★★★☆ 439

10% OFF WITH BULK SAVINGS

Installation Available

Pickup
Ready by Wed, Apr 10 at Steubenville Lowe's

Free Delivery to 43952
Get it by Sat, Apr 6

Add to Cart

Compare

$159.00 ★★★★½ 1641

~~$179.00~~ Save $20.00 Ends Apr 5

Installation Available

Pickup
Ready within 3 hrs | 3 in Stock at Steubenville Lowe's

Free Delivery to 43952
As soon as Tomorrow

Add to Cart

Compare

Max Flow Rate

- [ ] 0.5 GPM (1.9 LPM) (19)
- [ ] 1.0 GPM (3.8 LPM) (14)
- [ ] 1.2 GPM (4.5 LPM) (41)
- [ ] 1.5 GPM (5.7 LPM) (547)
- [ ] 1.6 GPM (6.1 LPM) (1)
- [ ] 1.7 GPM (6.4 LPM) (17)
- [ ] 1.75 GPM (6.6 LPM) (161)
- [ ] 1.8 GPM (6.8 LPM) (1686)
- [ ] 2.0 GPM (7.6 LPM) (43)
- [ ] 2.2 GPM (8.3 LPM) (66)
- [ ] 2.5 GPM (9.5 LPM) (4)
- [ ] 2.6 GPM (9.8 LPM) (3)
- [ ] 3.0 GPM (11.36 LPM) (5)
- [ ] 4 GPM (15.2 LPM) (128)
- [ ] 5.5 GPM (20.8 LPM) (1)

— See Less

Valve Type

Commercial/Residential

Maximum Kitchen Faucet Height (Inches)

Commenter: Mark Malatesta
Affiliation: LIXIL
Comment Date: May 23, 2024

Email Text:

Please accept these comments from Lixil with regards to the 2024 Lavatory Faucet NOI.

Email Attachment:
See pages 29 through 31.

Question Topic	Response	Comments
Scope and Definitions		
Are there other accepted industry definitions relevant to faucets that EPA should consider?	Yes	EPA should continue to work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop industry definitions for relevant faucets.
Are the proposed definitions for “private lavatory faucet” and “bar sink faucet” acceptable?	No	The proposed definition is in contrast with the current definitions within the UPC and WE-Stand, as these documents link the definition of bar sink faucet to the kitchen sink faucet.
Is the proposed definition for “kitchen faucet” acceptable?	No	The EPA should work with the product standards committees to revise the definition
Should EPA include kitchen faucets and kitchen faucet accessories in the scope of its revised faucet specification?	Yes	We will support this effort, but will note that we do not perceive a large benefit to consumers. There needs to be a clear definition for "Temporary Override" feature.
Should EPA include multi-modal kitchen faucets in the scope of its revised faucet specification?	Yes	
Is the proposed definition for “public lavatory faucet” acceptable?	Yes	
Should EPA include public lavatory faucets and public lavatory faucet accessories in the scope of its revised faucet specification?	No	Performance criteria is what sets WS program apart and it is not clear what performance criteria would be for public lavy faucets. We are not comfortable with minimum flow rate requirement on a faucet with maximum flow of 0.5 gpm
Are the proposed definitions for “metering faucet” and “self-closing faucet” acceptable?	Yes	The EPA should work with the product standards committees to revise the definition
Is the proposed definition for “cold-start faucet” acceptable, and should EPA use the specification as a mechanism to encourage these more energy-efficient faucet types?	Yes	The EPA should work with the product standards committees to revise the definition
Are there any other faucet types EPA should consider explicitly excluding from the scope of a revised specification?	No	
General Requirements		
Should EPA require all labeled faucets to conform to applicable requirements in ASME A112.18.1/CSA B25.1 and NSF/ANSI Standard 61, Section 9?	No	Currently some public lavatory faucets are excempt from meeting NSF 61 (i.e. "electronically operated nonkitchen faucets")
WaterEfficiency		
Private Lavatory and Bar Sink Faucets		
Should EPA lower the maximum flow rate for private lavatory and bar sink faucets to 1.2 gpm or 1.0 gpm?	1.2 GPM	If EPA reduces to 1.0 gpm, EPA will further perpetuate the "race to the bottom" and we still don't know the long term effects on drain lines and water stagnation. Also, the 0.8 gpm minimum should be maintained. The 1.0 gpm max creates an extremely tight window and this will restrain product design and availability.
Are the flow rate testing procedures in ASME A112.18.1/CSA B125.1 and referenced in the current specification sufficient for measuring private lavatory and bar sink faucet flow rates?	Yes	
Are there any potential concerns with requiring private lavatory metering faucets to meet the maximum flow rate requirement when converted from gpc to gpm?	Yes	Metering faucets should be measured in gpc with no conversion to gpm. Cycle times for mechanical metering faucets can be inconsistant, so the proposed calculation would be inconsistant. If the faucet spec intends to have subset categories (i.e. Cold Start to Private Lavatory) then why not have Metering as an additional subset of Private Lavatory Faucets
Kitchen Faucets		

Should EPA establish a maximum flow rate for kitchen faucets of 1.8 gpm or 1.5 gpm?	1.8 gpm	1.8 gpm, if EPA reduces to 1.5 gpm, EPA will further perpetuate the "race to the bottom" and we still don't know the long term effects on drain lines and water stagnation.
Should EPA allow for a temporary override feature that allows kitchen faucets to operate at up to 2.2 gpm for pot filling?	Yes	The term "temporary override" has yet to be defined by the industry
Are the ASME A112.18.1/CSA B125.1 flow rate testing procedures sufficient for measuring kitchen faucet flow rate?	Yes	
For multi-modal kitchen faucets and side sprays packaged with a kitchen faucet, should EPA require all modes to meet the maximum flow rate criteria (excluding the temporary override function)?	Yes	With the caveat that the side spray could be temporay override function.
Public Lavatory Faucets		
Should EPA establish a maximum flow rate for public lavatory faucets of 0.5 gpm, 0.4 gpm, or 0.35 gpm?	No	Performance criteria is what sets WS program apart and it is not clear what performance criteria would be for public lavy faucets. We are not comfortable with minimum flow rate requirement on a faucet with maximum flow of 0.5 gpm
Are the ASME A112.18.1/CSA B125.1 flow rate testing procedures sufficient for measuring public lavatory faucet flow rate?	yes	
Are there any potential concerns with requiring public lavatory metering faucets to meet the maximum flow rate requirement when converted from gpc to gpm?	Yes	Metering faucets should be measured in gpc with no conversion to gpm. Cycle times for mechanical metering faucets can be inconsistant, so the proposed calculation would be inconsistant. If the faucet spec intends to have subset categories (i.e. Cold Start to Private Lavatory) then why not have Metering as a subset of Public Lavatory Faucets
Are there any market data or studies related to public lavatory faucet use that EPA should consider when determining a maximum flow rate requirement or potential water savings?	No	Not aware of anything
Preliminary Water Savings Calculations		
Are there any faucet market data, usage data, or studies that could help inform EPA's specification revision and help EPA estimate water savings from different faucet categories?	No	Not aware of anything
Performance		
Private Lavatory and Bar Sink Faucets		
Should EPA maintain its minimum flow rate requirement of 0.8 gpm at 20 psi for private lavatory faucets (even if it lowers the maximum flow rate criteria)?	Yes	
What strategies should EPA implement to further discourage the installation of public lavatory faucets and faucet aerators in private restrooms?		No action suggested. Allow Consumer choice
Should EPA incorporate any other performance requirements in addition to minimum flow rate to ensure sufficient private lavatory faucet and bar sink faucet performance?	No	Not aware of anything
Kitchen Faucets		
Should EPA prescribe a minimum flow rate for kitchen faucets at 1.0 gpm or 1.2 gpm at 20 psi?	No	EPA should work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop both minimum and maximum flow rates for standard kitchen faucets prior to establishing a specification for evaluating kitchen faucet efficiency.

Should EPA allow "multi-modal" faucets to receive the WaterSense label provided that all modes meet the maximum flow rate requirement and at least one mode meets all performance requirements?	Yes	
Should EPA incorporate any other performance requirements in addition to minimum flow rate to ensure sufficient kitchen faucet performance?	No	Not aware of anything
Public Lavatory Faucets		
Should EPA prescribe a minimum flow rate for public lavatory faucets?	No	
ensure sufficient public lavatory faucet performance?	No	
Marking and Product Documentation		
Private Lavatory and Bar Sink Faucets		
Should EPA maintain its current packaging, marking, and documentation requirements for private lavatory faucets?	Yes	
Kitchen Faucets		
Should EPA require kitchen faucets to adhere to the maximum flow rate marking requirements prescribed in the current specification?	Yes	
Would the temporary override feature for kitchen faucets impact product marking and packaging requirements, especially as they pertain to DOE's marking requirements?	No	
Public Lavatory Faucets		
Should EPA require public lavatory faucets to adhere to the maximum flow rate marking requirements prescribed in the current specification and additionally require product packaging and documentation be marked with "Not for private lavatory use."?	No	Current maximum flow rate marking requirements are sufficient.
System Impacts and Other considerations		
EPA is seeking any data or studies related to low-flow faucets and increased water stagnation or water quality issues.	No	

Commenter: Kyle Thompson
Affiliation: Plumbing Manufacturers International (PMI)
Comment Date: May 24, 2024

Email Text:

Dear WaterSense Products,

PMI's comments and suggestions on the Notice of Intent (NOI) to Revise the WaterSense® High-Efficiency Lavatory Faucet Specification are attached.

Please let me know if you have any questions.

All the best,
- Kyle

Kyle Thompson
Technical Director
Plumbing Manufacturers International
Cell: 847-217-7212

Email Attachment:
See pages 33 through 48.

Template for Public Comment Submission on WaterSense Documents

Notice of Intent (NOI) to Revise the High-Efficiency Lavatory Faucet Specification issued March 7, 2024. Comments Due May 24, 2024

Commenter Name: Kyle Thompson

Commenter Affiliation: Plumbing Manufacturers International (PMI)

Date of Comment Submission: May 24, 2024

PMI appreciates the opportunity to provide comments on the NOI to revise the WaterSense high-efficiency lavatory faucet specification. Overall, our comments below highlight PMI member concerns with developing new definitions and performance criteria outside of the product standards committees. We strongly encourage the EPA WaterSense team to first work with the applicable product standards committees to develop appropriate definitions and performance criteria before making any additional changes to the WaterSense specification or adding new categories of products to the WaterSense specification.

In addition, PMI does not support development of a WaterSense specification for public lavatory faucets, nor do we support translating the metering faucet maximum flow rate from gpc to gpm.

Regarding adding a new WaterSense specification for kitchen faucets, PMI encourages EPA to work with the ASME A112/CSA B125 product standards committee to develop performance requirements for kitchen faucets in the applicable product standard ASME A112.18.1/CSA B125.1 prior to considering a new WaterSense specification for evaluation of efficient kitchen faucets.

PMI supports efforts to work with the product standards committees on the appropriate definitions and performance criteria so that any changes to current WaterSense specifications are based on that performance criteria, which leads to customer satisfaction with water efficient products. PMI looks forward to meeting with EPA WaterSense staff to discuss our comments and determine a path forward.

Following are PMI's comments/responses to the specific issues raised in the NOI.

---

1)
Topic: EPA is seeking input on other accepted industry definitions.
Question: Are there other accepted industry definitions relevant to faucets that EPA should consider?

Comment:
EPA should continue to work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop and/or revise industry definitions for relevant faucets.

Rationale:
Any definitions included directly in an EPA WaterSense specification(s) for faucets should originate from and align with definitions in the applicable product standard(s) for faucets (e.g. ASME A112.18.1/CSA B125.1). In the event a faucet-related definition does not exist, it

should be developed in conjunction with the appropriate standards committees (e.g. ASME A112/CSA B125) and PMI would gladly support that work at the committees. Having all product-related definitions originating from the product standard allows for a single source that all in the industry can work from and lessens the likelihood of potential confusion in the field. EPA has had success in the past in partnering with product standards committees to develop definitions such as was done for the recent definition for rain showers.

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2)
Topic: EPA is seeking input on its proposed definitions for **private lavatory faucet** and **bar sink faucet**.
Question: Are the proposed definitions for "**private lavatory faucet**" and "**bar sink faucet**" acceptable?

Comment:
EPA should continue to work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop industry definitions related to faucets. WaterSense should not develop definitions outside of that process.

Rationale:
There is no definition for private lavatory faucet or bar sink faucet in the applicable product standard ASME A112.18.1/CSA B125.1. While it may be necessary to distinguish between private lavatory faucets and public lavatory faucets in the product standard, a full committee discussion should occur to determine the appropriate definitions and to determine definitions for kitchen faucets and bar sink faucets. It is important to note that market data and customer feedback indicates that bar sink faucets are more aligned with kitchen faucets than lavatory faucets. Consumer use of bar sink faucets can be broader than what is typical for a private lavatory faucet and include tasks more commonly associated with kitchen faucets such as, but not limited to, container filling, dish rinsing, and washing.

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3)
Topic: EPA is seeking input on its proposed adoption of the **kitchen faucet definition** from the California Title 20 *Appliance Efficiency Regulations*. EPA is also seeking input on its intent to include **kitchen faucets** and **kitchen faucet accessories** in the scope of its revised faucet specification.
Questions:
- Is the proposed definition for "**kitchen faucet**" acceptable?
- Should EPA include **kitchen faucets** and **kitchen faucet accessories** in the scope of its revised faucet specification?

Comment:
EPA should continue to work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop and/or revise industry definitions for relevant faucets. California Title 20 regulations do not take into account performance criteria the way WaterSense is supposed to do. PMI urges EPA to remain consistent in using current definitions in the appropriate product standards and work with the committees to develop new definitions when needed.

If the EPA intends to define kitchen faucet accessories different than the definition of accessories in the high-efficiency lavatory specification Version 1.0 and by reference to ASME A112.18.1/CSA B125.1, the EPA should work with the product standards committees to revise the definition.

Rationale:

- There is currently no definition for kitchen faucet in the applicable product standard ASME A112.18.1/CSA B125.1, and that must be determined prior to development of a WaterSense specification.
- The WaterSense program is based on water efficiency as compared to federal minimum standards, not on one state's regulations
- The specification for private lavatory faucets should remain as it is until updated performance criteria can be considered by the product standards committees, and a new separate specification should be developed for kitchen faucets and kitchen faucet accessories once definitions are finalized by the product standards committees.

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4)
Topic: EPA is seeking feedback on its intent to include **multi-modal kitchen faucets** in the scope of the WaterSense specification.
Question: Should EPA include **multi-modal kitchen faucets** in the scope of its revised faucet specification?

Comment:
See response to Topic 13.
Multi-modal kitchen faucets need to be taken into consideration for any specification covering kitchen faucets; however, PMI does not support developing a kitchen faucet specification unless a definition is developed by the appropriate product standards committees, and the appropriate product standards committees develop technical criteria for multi-model kitchen faucets. EPA should work with the product standards committees (e.g. ASME A112/CSA B125) to develop all the definitions required for kitchen faucets prior to developing a WaterSense specification based on these definitions.

Rationale:
Kitchen faucet technology has progressed significantly in the last 20 years. Historically some kitchen faucets included a separate sprayer on the side used for accomplishing tasks such as removing food from pans and dishware prior to washing. In many modern models, the sprayer function has been incorporated directly into the kitchen faucet main spout and typically includes multiple spray patterns or modes in one faucet. The EPA should work through the product standards committees to carefully consider how to address the primary mode(s) and multiple spray patterns as well as the allowable override mode(s) with multiple spray patterns.

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5)
Topic: EPA is seeking input on its proposed adoption of the **public lavatory faucet** definition from ASME A112.18.1/CSA B125.1. EPA is also seeking input on its intent to

include **public lavatory faucets** and **public lavatory faucet accessories** in the scope of its revised faucet specification.

Questions:

- Is the proposed definition for "**public lavatory faucet**" acceptable?
- Should EPA include **public lavatory faucets** and **public lavatory faucet accessories** in the scope of its revised faucet specification?

Comment:

EPA should use the existing terms defined in the applicable product standard or work with the product standards committees (e.g. ASME A112/CSA B125) to develop a new or updated definition for public lavatory faucet. PMI also believes that EPA should not develop a specification for public lavatories faucets without performance criteria (e.g. ability of a model or product to perform a specific task). EPA should work with the ASME A112/CSA B125 product standards committees to develop performance test procedures in the applicable product standard for public lavatories if a public lavatory faucet standard is pursued.

Rationale:

- The definition proposed by EPA is slightly different from the definition in the product standard ASME A112.18.1/CSA B125.1.

EPA Proposed Definition:

Public lavatory faucet: A faucet intended to be installed in non-residential bathrooms that are exposed to walk-in traffic.

ASME A112.18.1/CSA B125.1 Definition:

Fitting — a device that controls and guides the flow of water.
***Note:** Fittings include faucets and valves.*
Public lavatory fitting — a fitting intended to be installed in non-residential bathrooms that are exposed to walk-in traffic.

Note: A public lavatory faucet is a public lavatory fitting but not all public lavatory fittings are faucets.

- **See responses to Topics 1), 17) and 18) for further discussion on the importance of performance criteria for public lavatory faucets.**

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6)

Topic: EPA is seeking input on its proposed adoption of the ASME A112.18.1/CSA B125.1 definitions for **metering faucet** and **self-closing faucet**.

Question: Are the proposed definitions for "**metering faucet**" and "**self-closing faucet**" acceptable?

Comment:

EPA should use the existing terms defined in the product standard for "self-closing faucet" and work with the product standards committees to develop a definition for "metering faucet".

Rationale:
The definition proposed by EPA for "self-closing faucet" is different from the definition in the product standard ASME A112.18.1/CSA B125.1 and the product standard does not currently define "metering faucet".

Metering faucet:

EPA Proposed Definition:

Metering faucet: A self-closing faucet that discharges water for a predetermined period of time (i.e., cycle) or discharges a predetermined quantity of water before shutting off.

ASME A112.18.1/CSA B125.1 Existing Definition:

Metering faucet - No definition.

Self-closing faucet:

EPA Proposed Definition:

Self-closing faucet: A terminal fitting (faucet) that, once the valve is opened, automatically shuts off the flow of water by either mechanical or electronic means.

ASME A112.18.1/CSA B125.1 Existing Definition:

Self-closing faucet — a faucet that closes itself after the actuation or control mechanism is deactivated.
***Note:** The actuation or control mechanism can be mechanical or electronic.*

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7)
Topic: EPA is seeking input on whether to adopt a definition and testing criteria for **cold-start faucets** and its intent to promote them through the WaterSense Product Search Tool.
Question: Is the proposed definition for "**cold-start faucet**" acceptable, and should EPA use the specification as a mechanism to encourage these more energy-efficient faucet types?

Comment:
No. EPA should engage with the product standards committees to explore development of a definition that is inclusive of all technologies. In addition, the efficiency of cold start faucets is in energy savings not water savings. This type of efficiency is outside the scope of EPA WaterSense Specifications.

Rationale:
Industry has developed a variety of technologies that can contribute to the same concept as a cold-start faucet. Examples of innovative products in the market include technologies with LED indicators to show the water temperature to voice or motion activation. Pursuing the incorporation of one such definition without the inclusion of other, innovative technologies that can accomplish similar water or energy savings should be developed through industry standards such that the definition is technology neutral.

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8)
Topic: EPA is seeking input on its intended scope exclusions and whether there are other faucet types that should be explicitly excluded from the scope of the revised faucet specification.
Question: Are there any other faucet types EPA should consider explicitly excluding from the scope of a revised specification?

Comment:
See all other comments regarding the importance of only updating WaterSense specifications or developing new specifications when appropriate definitions have already been established by product standards committees and when additional water efficiency can be demonstrated.

Rationale:

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9)
Topic: EPA is seeking feedback on its intent to require all labeled faucets to conform to applicable requirements in ASME A112.18.1/CSA B125.1 and NSF/ANSI Standard 61, Section 9.
Question: Should EPA require all labeled faucets to conform to applicable requirements in ASME A112.18.1/CSA B25.1 and NSF/ANSI Standard 61, Section 9?

Comment:
Compliance with the appropriate product standard is sufficient. Not all faucets are required to comply with NSF/ANSI Standard 61, and the referenced product standard ASME A112.18.1/CSA B125.1 requires conformity to NSF/ANSI 61 for the applicable faucet types.

Rationale:
Compliance with NSF 61 does not impact the water efficiency of products. EPA should continue to require product compliance with its associated product standard (e.g. ASME A112.18.2/CSA B125.1) as a steppingstone prior to applying additional requirements that demonstrate improved efficiency over standard models. Compliance with NSF/ANSI 61 is embedded in the product standard for the applicable faucet types.

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10)
Topic: EPA is seeking feedback on its intent to lower the maximum flow rate requirement for **private lavatory faucets** and **bar sink faucets** and on which maximum flow rate it should require.
Question: Should EPA lower the maximum flow rate for **private lavatory** and **bar sink faucets** to 1.2 gpm or 1.0 gpm?

Comment:
EPA should maintain the current requirement of 1.5 gpm for private lavatory faucets until and unless there is data showing increased water savings AND appropriate performance. Further, EPA should seek feedback specifically on the usage of the term “bar sink faucets”. As discussed throughout these comments, these types of faucets are likely better aligned to

a future proposed kitchen faucet maximum flow rate rather than the private lavatory faucet maximum flow rate.

Rationale:
A 1.2 gpm for private lavatory faucets was established by the California Energy Commission (CEC) in 2016 to address local drought conditions without any studies or evidence to suggest that a lower flow rate was truly more efficient at completing the tasks required of private lavatories. WaterSense should only lower its current private faucet specification from 1.5 gpm if there is evidence of improved water efficiency AND the necessary performance. As of April 29, 2024, EPA's WaterSense product search lists 21,291 Bathroom Sink Faucet/Accessory products at 1.5 gpm or below. Reducing the requirement to 1.2 gpm or less would eliminate 7,550 (about 35%) with no evidence of water savings.

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11)
Topic: EPA is seeking input on whether there are any issues or concerns with the current flow rate testing procedures.
Question: Are the flow rate testing procedures in ASME A112.18.1/CSA B125.1 and referenced in the current specification sufficient for measuring **private lavatory** and **bar sink faucet** flow rates?

Comment:
PMI supports EPA maintaining the current EPA High-Efficiency Lavatory Faucet Specification as it is currently written but has concerns with the inclusion of the term "bar sink faucet" which is not defined in the current standard.

Rationale:
The existing specification for faucets has proven itself to be a robust and respected method of evaluating private lavatory faucets for EPA WaterSense labeling. Any additions to the specifications for different types of faucets should be evaluated at the product standard committee level first for appropriate definitions and then related flow rate testing.

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12)
Topic: EPA is seeking feedback on its intent to allow **metering faucets** to meet the established water efficiency criteria for private lavatory faucets by translating the maximum flow rate from gpc to gpm.
Question: Are there any potential concerns with requiring **private lavatory metering faucets** to meet the maximum flow rate requirement when converted from gpc to gpm?

Comment:
Yes. PMI has significant concerns with this approach. The product standard ASME A112.18.1/CSA B125.1 and the Energy Policy Act (EPAct) (10 CFR 430) both address metering faucets through gpc and any WaterSense specification references should be consistent..

Rationale:
Development of a method different from the accepted standard and federal law would create confusion and additional activities related to conformity assessment of metering faucets. In addition, the whole approach to a metering faucet is different from traditional faucets. Consumers intentionally select metering faucets because traditional faucets do not address their needs. Manufactures calibrate the water delivery time based on current cycle allowances and users recognize and have become accustomed to metering faucets for delivering water in a set amount of time and modify washing behavior accordingly.

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13)
Topic: EPA is seeking feedback on its intent to establish a maximum flow rate requirement of 1.8 gpm or 1.5 gpm for **kitchen faucets**.
Question: Should EPA establish a maximum flow rate for **kitchen faucets** of 1.8 gpm or 1.5 gpm?

Comment:
PMI supports and is willing to assist with developing a definition for kitchen faucets at the appropriate product standards committees (e.g. ASME A112/CSA B125). Considering the same questions posed by the NOI, elements such as multi-modal flow rates, side spray flow rate, definition of a kitchen faucet and criteria for the override feature would be best for the product standards committees to evaluate. PMI does not support developing a specification outside of the product standards committees given these complex variables and the variety of products in the market.

Rationale:
Since this would constitute a brand-new EPA WaterSense specification for kitchen faucets, EPA should work with the ASME A112/CSA B125 product standards committee to determine a standard kitchen faucet flow rate (e.g. 2.2 gpm federal EPAct level) prior to developing a specification for efficient kitchen faucets at 1.8 gpm, which would be in line with a 20% reduction from the current federal requirements.

In addition, there are thousands of kitchen faucet models that include bar faucets on the side and these types of faucets (kitchen and bar sink faucets) should be included in the same specification. The new specification for kitchen faucets and bar sinks should be established separately from the lavatory faucet specification.

The current test procedure and requirements in ASME A112.18.1/CSA B125.1, Section 5.4.2.3.1 allow for flow rate verification and Section 6.1.3 requires the product to be marked with maximum flow rate only. While the standard does not specify a minimum or maximum required flow rate for “kitchen faucets”, they are generally considered as “sink” fittings under Table 1 in the standard with a maximum flow rate of 2.2 gpm. The typical flow rate and flow rate test procedure should be confirmed for standard kitchen faucets prior to developing a new specification for efficient kitchen faucets through EPA.

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14)
Topic: EPA is seeking input on its intent to allow a temporary override feature to allow **kitchen faucets** to operate at up to 2.2 gpm for pot filling.
Question: Should EPA allow for a temporary override feature that allows **kitchen faucets** to operate at up to 2.2 gpm for pot filling?

Comment:
EPA should include a 2.2 gpm override for pot filling and other necessary kitchen tasks provided that performance criteria is developed for the override feature by the appropriate product standards committees.

Rationale:
The 2.2 gpm override feature provides consumers the option of intentionally accessing higher flows and different spray modes as and when needed to perform essential kitchen tasks. The override feature functionality and performance expectations should be well defined in the industry standard, ASME A112.18.1/CSA B125.1.

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15)
Topic: EPA is seeking input on whether there are any issues or concerns with using the ASME A112.18.1/CSA B125.1 testing procedures to measure **kitchen faucet** flow rate.
Question: Are the ASME A112.18.1/CSA B125.1 flow rate testing procedures sufficient for measuring **kitchen faucet** flow rate?

Comment:
PMI agrees that the flow rate of kitchen faucets should be addressed through the ASME A112.18.1/CSA B125.1 testing procedures.

Rationale:
EPA should work with the product standards committee to confirm that the application of the minimum flow rate test procedure for kitchen faucets is appropriate.

Also see response to Topic 13.

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16)
Topic: EPA is seeking feedback on its intended efficiency criteria for multi-modal kitchen faucets and side sprays packaged with a **kitchen faucet**.
Question: For **multi-modal kitchen faucets** and side sprays packaged with a kitchen faucet, should EPA require all modes to meet the maximum flow rate criteria (excluding the temporary override function)?

Comment:
See response to Topic 13.

Rationale:
Traditional kitchen faucets have a side sprayer that lends itself easily to evaluation for the override function allowance. However, modern kitchen faucets have incorporated what used

to be the separate side sprayer directly into the faucet spout. In many cases these are all in one faucet outlet. The discharge mode, and by extension, its corresponding flow rate depends on the mechanism design as well as the activation of a toggle or switch to engage an alternate mode(s) or an override function(s). It is important that we establish a clear understanding within the ASME A112/CSA B125.1 product standard committee and with WaterSense staff regarding how these multimodal functions operate and where the primary functions versus override functions apply. Definitions for this differentiation do not yet exist in the standard and the industry needs to develop them.

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17)
Topic: EPA is seeking feedback on its intent to establish a maximum flow rate requirement of 0.5 gpm, 0.4 gpm, or 0.35 gpm for **public lavatory faucets**.
Question: Should EPA establish a maximum flow rate for **public lavatory faucets** of 0.5 gpm, 0.4 gpm, or 0.35 gpm?

Comment:
No. EPA should not develop a specification for public lavatory faucets at this time.

Rationale:
The product standard ASME A112.18.1/CSA B125.1 establishes the maximum flow rate for public lavatory faucets at 0.5 gpm. In addition, the model Plumbing Codes in the U.S. have universally adopted 0.5 gpm public lavatory flow rates. In many cases 0.5 gpm should also be specified as the minimum flow rate necessary for public lavatory faucets.

The 0.5 gpm flow rate was intentionally developed by the ASME A112/CSA B125 product standards committee as the minimum and maximum flow rate needed to address the most common tasks required of public lavatories. Manufactures are hearing from commercial customers that they are experiencing clogging issues in public lavatories due to soap and debris collection in the P-trap of lavatories installed with flow rates less than 0.5 gpm.

If EPA develops a specification for 0.5, 0.4, or 0.35 gpm public lavatory faucets, the lower flow rates should demonstrate both water efficiency (above simply delivering less water over the same amount of time), and equivalent or improved performance with respect to current faucets through test procedures or defined performance metrics.

Since there are no existing performance criteria (e.g., ability of a model or product to perform a specific task) for public lavatory faucets at this time, EPA should work with the ASME A112/CSA B125 product standards committee to develop performance test procedures in the applicable product standard for public lavatories, if a public lavatory faucet standard is pursued.

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18)
Topic: EPA is seeking input on whether there are any issues or concerns with using the ASME A112.18.1/CSA B125.1 testing procedures to measure **public lavatory faucet** flow rate.

Question: Are the ASME A112.18.1/CSA B125.1 flow rate testing procedures sufficient for measuring **public lavatory faucet** flow rate?

Comment:
Yes. The standard is currently used for compliance of public lavatory faucets at 0.5 gpm.

Rationale:
The product standard covers the test procedure for the 0.5 gpm flow rate of public lavatory faucets. However, it does not currently address performance metrics for faucets to complete specific tasks under various conditions. Based on this, EPA should work with the ASME A112/CSA B125 product standards committee to develop such performance test procedures.

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19)
Topic: EPA is seeking feedback on its intent to allow **metering faucets** to meet the established water efficiency criteria for **public lavatory faucets** by translating the maximum flow rate from gpc to gpm.
Question: Are there any potential concerns with requiring **public lavatory metering faucets** to meet the maximum flow rate requirement when converted from gpc to gpm?

Comment:
Yes. There are significant concerns. The approach of converting gpc to gpm for like comparison with other faucets is not appropriate in the EPA WaterSense specification.

Also see Response to Topic 12.

Rationale:
Metering faucets fill a need in the market where typical public lavatory faucets are not as capable of completing the tasks that the users need. There is no equivalency in comparing the gpm flow rate of metering faucets with the gpm flow rate of public lavatory faucets.

It may be a better measure of efficiency to determine the current average gpc that is delivered by “efficient” public lavatory faucets in use today. Then the efficiency requirements for public lavatory faucets could be recognize in gpc (average public user), gpt (gallon per task), or gpf (gallon per function). The most efficient faucets would be those with fluctuating flow rates capable of delivering the precise amount of water needed to accomplish a given task.

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20)
Topic: EPA is seeking data or studies relevant to **public lavatory faucet** water use to examine the viability of various maximum flow rate requirements and help estimate projected water savings.
Question: Are there any market data or studies related to **public lavatory faucet** use that EPA should consider when determining a maximum flow rate requirement or potential water savings?

Comment:
No Comment.

Rationale:

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21)
Topic: EPA is seeking any faucet market data, usage data, and studies to inform its faucet specification revisions and potential water savings of more efficient **private lavatory faucets**, **public lavatory faucets**, and **kitchen faucets** within both residential and non-residential applications.
Question: Are there any faucet market data, usage data, or studies that could help inform EPA's specification revision and help EPA estimate water savings from different faucet categories?

Comment:
No Comment

Rationale:

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22)
Topic: EPA is seeking feedback on its minimum flow rate requirement (for **private lavatory** and **bar sink faucets**). Are there any concerns with maintaining the same minimum flow rate of 0.8 gpm at 20 psi while lowering the maximum flow rate to 1.2 gpm or 1.0 gpm at 60 psi? EPA is seeking feedback on whether it should incorporate any other performance requirements in addition to minimum flow rate.
Questions:
- Should EPA maintain its minimum flow rate requirement of 0.8 gpm at 20 psi for **private lavatory faucets** (even if it lowers the maximum flow rate criteria)?
- Should EPA incorporate any other performance requirements in addition to minimum flow rate to ensure sufficient **private lavatory faucet** and **bar sink faucet** performance?

Comment:
- EPA should remove the minimum flow rate requirement of 0.8 gpm at 20 psi from the faucet specification or work with the product standards committees to evaluate the expected minimum flow rate performance for private lavatory faucets at maximum flow rates lower than 1.5 gpm.

Rationale:
- The EPA WaterSense specification for lavatory faucets requires compliance with the appropriate product standard. The product standard ASME A112.18.1/CSA B125.1 currently includes the requirement for a minimum flow rate of 0.8 gpm at 20 psi for private lavatory faucets. Therefore, the inclusion of this requirement in the EPA specification is duplicative and could potentially lead to inconsistencies in the future if this provision is changed for any reason in either the product standard or EPA specification.
- Private lavatory Faucets in homes should among other tasks be able to:

Wash hands
Wash/rinse hair
Remove make-up
Clean a razor
Brush teeth and remove residual toothpaste from a toothbrush.
Flush hair and other debris down the drain with sufficient force to clear a P-Trap.

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23)
Topic: EPA is seeking feedback on additional strategies to further discourage the installation of **public lavatory faucets** in private restrooms.
Question: What strategies should EPA implement to further discourage the installation of **public lavatory faucets** and faucet aerators in private restrooms?

Comment:
This is a plumbing code enforcement issue.

Rationale:

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24)
Topic: EPA is seeking feedback on its intent to include a minimum flow rate requirement (for **kitchen faucets**). Are there any concerns with prescribing a minimum flow rate of 1.0 gpm or 1.2 gpm at 20 psi?
Question: Should EPA prescribe a minimum flow rate for **kitchen faucets** at 1.0 gpm or 1.2 gpm at 20 psi?

Comment:
As noted earlier in these comments, PMI believes that EPA should work with the appropriate product standards committees (e.g. ASME A112/CSA B125) to develop the appropriate definitions and both minimum and maximum flow rates for standard kitchen faucets prior to establishing a specification for evaluating kitchen faucet water efficiency.

Rationale:
See previous responses.

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25)
Topic: EPA is seeking feedback on its planned approach for labeling **multi-modal kitchen faucets**.
Question: Should EPA allow **"multi-modal" faucets** to receive the WaterSense label provided that all modes meet the maximum flow rate requirement and at least one mode meets all performance requirements?

Comment:
See previous responses.

Rationale:

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26)
Topic: EPA is seeking feedback on whether a minimum flow rate is sufficient to ensure **kitchen faucet performance**. Should EPA consider including additional requirements to address any other performance metrics (e.g., spray force, rinsability)?
Question: Should EPA incorporate any other performance requirements in addition to minimum flow rate to ensure sufficient **kitchen faucet** performance?

Comment:
EPA should work with the ASME A112/CAS B125 product standards committees to develop a definition for kitchen faucets and then develop consensus criteria for performance expectations for standard kitchen faucets for comparison with and in a new specification for efficient kitchen faucets.

Rationale:
See several previous responses regarding requirements for establishing a new kitchen faucet specification.

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27)
Topic: EPA is seeking feedback on minimum flow rate recommendations and other performance requirements that it could include to address spray force, sensor responsiveness, and any other performance considerations applicable to **public lavatory faucets**.
Questions: Should EPA prescribe a minimum flow rate for public lavatory faucets? Should EPA incorporate any other performance requirements in addition to minimum flow rate to ensure sufficient **public lavatory faucet** performance?

Comment:
See all previous responses regarding public lavatory faucets.

Rationale:

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28)
Topic: EPA is seeking feedback on its intent to maintain the current packaging, marking, and documentation requirements for **private lavatory** and **bar sink faucets**.
Question: Should EPA maintain its current packaging, marking, and documentation requirements for **private lavatory faucets**?

Comment:
Yes.

Rationale:

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29)
Topic: EPA is seeking feedback on its intent to require **kitchen faucets** to adhere to marking requirements similar to the **lavatory faucet** marking requirements included in the current specification.
Questions: Should EPA require **kitchen faucets** to adhere to the maximum flow rate marking requirements prescribed in the current specification?

Comment:
Yes.

Rationale:
The current EPA specification for lavatory faucets only requires product and packaging to be marked with the maximum flow rate, which aligns with the marking requirements in ASME A112.18.1/ CSA B125.1.

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30)
Topic: EPA is seeking feedback on whether specific product or product packaging markings or information should be included for **kitchen faucets** equipped with a temporary override feature.
Question: Would the temporary override feature for **kitchen faucets** impact product marking and packaging requirements, especially as they pertain to DOE's marking requirements?

Comment:
It is premature to answer this question when the appropriate definitions and performance requirements have not been established for a kitchen faucet WaterSense specification.

Rationale:

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31)
Topic: EPA is seeking feedback on its intent to require **public lavatory faucets** to adhere to similar marking requirements included in the current specification and for packaging and product documentation to be marked with "Not for private lavatory use."
Question: Should EPA require **public lavatory faucets** to adhere to the maximum flow rate marking requirements prescribed in the current specification and additionally require product packaging and documentation be marked with "Not for private lavatory use."?

Comment:
No.

Rationale:
See previous responses regarding public lavatory faucets.

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32)
Topic: EPA is seeking any data or studies related to lower flow faucets and increased water stagnation, water quality issues, increased hot water wait times, or other unintended consequences.

Comment:
No Comment.

Rationale:

Commenter: Misty Guard
Affiliation: Regulosity, LLC on behalf of Neoperl, Inc.
Comment Date: May 24, 2024

Email Text:

Dear Ms. Tanner:
Regulosity LLC, on behalf of Neoperl, Inc. ("Neoperl"), appreciates the opportunity to provide comments on the US Environmental Protection Agency (EPA), Office of Wastewater Management, WaterSense, known as "WaterSense®," notice of intent document titled "Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification" referred to as the NOI.

Neoperl is a leading technology company offering innovative solutions for drinking water. Neoperl's products shape the water stream, regulate the flow rate, and protect water from contamination. Founded in 1959, Neoperl is a worldwide company with over 6500 customers from multiple industries and retail. Annually, Neoperl sells hundreds of millions of faucet aerators, flow regulators, check valves, and hoses.

Neoperl sincerely appreciates WaterSense®'s consideration of our comments to inform WaterSense®'s intent to modify voluntary program requirements discussed in the NOI for products in the US to obtain the WaterSense® label for products covered by the scope of the specification. If there are any questions regarding the comments and information provided, please contact Mrs. Misty Guard, Regulosity LLC, at +1 (414) 988-8613.

Sincerely,
Misty Guard, MSPP
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New Clients, book here.
Existing Clients, book here.
Regulosity's friends & general inquiries, book here.
Vendors of Regulosity, book here.

Check out my PM Engineer column: Guard on Compliance.

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Email Attachment:
See pages 50 through 70.

May 24, 2024

WaterSense®
US Environmental Protection Agency
Attn: Ms. Stephanie Tanner
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Email: watersense-products@erg.com

RE: Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification

Dear Ms. Tanner:

Regulosity LLC, on behalf of Neoperl, Inc. ("Neoperl"), appreciates the opportunity to provide comments on the US Environmental Protection Agency (EPA), Office of Wastewater Management, WaterSense, known as "WaterSense®," notice of intent document titled "Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification" referred to as the NOI.

Neoperl is a leading technology company offering innovative solutions for drinking water. Neoperl's products shape the water stream, regulate the flow rate, and protect water from contamination. Founded in 1959, Neoperl is a worldwide company with over 6500 customers from multiple industries and retail. Annually, Neoperl sells hundreds of millions of faucet aerators, flow regulators, check valves, and hoses.

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Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification
Neoperl, Inc.
May 24, 2024

The United States plumbing industry utilizes various documents in product development and design. ASME A112.181.1 is a product performance standard used by original equipment manufacturers (OEMs) for design options, performance metrics, and safety considerations. Base model building and safety codes, such as the Uniform Plumbing Code (UPC) and International Plumbing Code (IPC), establish the minimum safety requirements for the built environment for building occupancies, building room installations, and product use exposures. Neoperl respectfully provides clarification on industry terminology.

1. CLARIFICATION OF BUILDING OCCUPANCIES

Neoperl respectfully provides clarification on building occupancy terminology. Plumbing product design requirements differ based on building occupancies, room installation locations, and product use exposure.

1.1 Residential Building Occupancies

The generic term "residential" correlates to multiple building occupancy classifications with sleeping units or dwelling units separated by the permanence of the occupants. For example, building occupancies are primarily transient (e.g., hotels, motels) or permanent (e.g., single-family dwellings, dormitories). The building occupancies with sleeping units or dwelling units associated with permanent occupancy are:

- Detached one- and two-family dwellings
- Townhouses not more than three stories above grade, such as low-rise residential
- Residential Groups R-2, R-3, and R-4

The building occupancy with sleeping units or dwelling units associated with transient occupancy is:

- Residential Group R-1

From an industry perspective, the use of the generic term "residential" without clarifying building occupancy classifications generally covers the following occupancies:

- Detached one- and two-family dwellings
- Townhouses not more than three stories above grade, such as low-rise residential

From an industry perspective, the correct generic term for these building occupancies is "building occupancies with sleeping or dwelling units."

1.2 Institutional Building Occupancies

The generic term "institutional" correlates to Institutional Groups I-1 to I-4 for buildings "in which care or supervision is provided to persons who are incapable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted.[1]" Plumbing products for Institutional Groups I-1 to I-4 are specifically designed for the health and safety of users and the workers supervising the users. For instance, faucets designed for psychiatric hospital rooms for private use (Institutional Group I-2) are ligature-resistant to prevent the user from using clothing or linen in the private use room to strangle themselves. Another example is that faucets designed for prison

[1] International Code Council. (2024). *International Building Code*.

cells for private use (Institutional Group I-3) are ligature-resistant and vandalism-resistant to prevent strangulation and the removal of the faucet for use as a weapon with the intention of causing self-harm or harm to others.

Institutional Groups I-1 to I-4 do not cover hotels, dormitories, barracks, or campsites. Therefore, from an industry perspective, dormitories, barracks, or campsites are not institutional building occupancies.

1.3 Commercial Building Occupancies

The terms "commercial" and "non-residential" do not directly correlate with building occupancy classifications. The remaining building occupancies not discussed in previous sections are:

- Assembly Groups A-1, A-2, A-3, A-4, and A-5
- Business Group B
- Educational Group E
- Factory and Industrial Groups F-1 and F-2
- High Hazard Groups H-1, H-2, H-3, H-4, and H-5
- Mercantile Group M
- Storage Groups S-1 and S-2
- Utility and Miscellaneous Group U

From an industry perspective, the use of the term "commercial" without clarifying building occupancy classifications generally covers the following occupancy:

- Business Group B

From an industry perspective, no generic term, such as "non-residential," is used to refer to all the building occupancies listed above, collectively.

2. CLARIFICATION OF BUILDING ROOM INSTALLATION AND PRODUCT USE EXPOSURE TERMINOLOGY

Neoperl respectfully provides clarification on building room terminology. Plumbing product design requirements differ based on building occupancy, room installation locations, and product use exposure.

Many different types of building rooms contain plumbing fixtures. The plumbing fixtures required vary based on room type and building occupancy.

At a minimum, bathrooms contain a water closet, a lavatory, and a bathtub or shower but can contain additional plumbing fixtures. Bathrooms are exposed to 1) walk-in traffic and 2) may be restricted from walk-in traffic. Bathrooms not exposed to walk-in traffic may be generically referred to as "private use." Specific types of bathrooms are:

- Bathing rooms
- Family or assisted-use bathing rooms
- Bathroom, half
- Bathroom group

- Bathing facilities

Toilet facilities contain at least one water closet and one lavatory but can contain additional plumbing fixtures, excluding a bathtub or a shower. Toilet facilities are exposed to 1) transient walk-in traffic, 2) walk-in traffic, and 3) may be restricted from walk-in traffic. Specific types of toilet facilities are:

- Single-user toilet facility
- Multiple-user toilet facility
- Family or assisted-use toilet facility
- Toilet room
- Employee toilet facilities
- Restrooms

From an industry perspective, the generic term "restrooms" is not used to reference toilet facilities exposed to walk-in traffic in the following building occupancies:

- Assembly Groups A-1, A-2, A-3, A-4, and A-5
- Business Group B
- Educational Group E
- Factory and Industrial Groups F-1 and F-2
- High Hazard Groups H-1, H-2, H-3, H-4, and H-5
- Mercantile Group M
- Residential Groups R-1, R-2, R-3, and R-4
- Storage Groups S-1 and S-2
- Utility and Miscellaneous Group U

3. BUILDING ROOM TYPES AND BUILDING OCCUPANCIES RELATIONSHIPS

Neoperl respectfully provides clarification on the relationship between building room types and building occupancies. Plumbing product design requirements differ based on building occupancy, room installation locations, and product use exposure.

The following building occupancies have bathrooms and rarely have toilet facilities:

- Detached one- and two-family dwellings
- Townhouses not more than three stories above grade, such as low-rise residential

The following building occupancies have toilet facilities and may also have bathrooms:

- Assembly Groups A-1, A-2, A-3, A-4, and A-5
- Business Group B
- Educational Group E
- Factory and Industrial Groups F-1 and F-2
- High Hazard Groups H-1, H-2, H-3, H-4, and H-5
- Mercantile Group M
- Residential Groups R-1, R-2, R-3, and R-4
- Storage Groups S-1 and S-2
- Utility and Miscellaneous Group U

The following building occupancies may have bathrooms and toilet facilities:

- Residential Groups R-1, R-2, R-3, R-4

Neoperl respectfully provides comments on the following items to inform WaterSense®'s intent to modify voluntary program requirements discussed in the Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification for products in the US to obtain the WaterSense® label for products covered by the scope of the specification. Legislative markup is used to show the addition of text and ~~removal of text~~.

4. CLARIFICATION OF PRODUCT AND PACKAGE MARKINGS AND MARKETING MATERIALS

4.1 Clarification of On-Product Markings

ASME A112.18.1/CSA B125.1[2] requires OEM kitchen, lavatory, and metering faucets to be marked with the manufacturer's recognized name, trademark, or other mark, including private-labeled products, by placing a permanent label or mark on the product. Additionally, kitchen, lavatory, and metering faucets must be marked with the manufacturer's specified maximum flow rate, in gallons per minute (gpm) and liters per minute (L/min) or gallons per cycle (gpc) and liters per cycle (L/cycle) by placing a permanent label or mark on the faucets. ASME A112.18.1/CSA B125.1 requires maximum and minimum (where applicable) flow rates using the following metrics for the following product categories:

- Lavatory (other than public lavatory or metering): gpm and L/min
- High-efficiency lavatory faucet: gpm and L/min
- Public lavatory (other than metering): gpm and L/min
- Sink: gpm and L/min
- Metering: gpc and L/cycle

The 1992 revisions to the Energy Policy and Conservation Act, known as "EPAct '92," granted labeling authority for plumbing products to the US Federal Trade Commission (FTC). FTC aligns with the ASME A112.18.1/CSA B125.1 manufacturer's recognized name marking requirements above. FTC deviates from the labeling requirements of the ASME A112.18.1/CSA B125.1 standard and does not require flow rate markings in L/min or L/cycle. 42 USC 6295(j) requires maximum water use in the following metrics for the following product categories:

- Lavatory faucets: gpm
- Lavatory replacement aerators: gpm
- Kitchen faucets: gpm
- Kitchen replacement aerators: gpm
- Metering faucets: gpc

4.2 Clarification of Package Markings

FTC and ASME A112.18.1/CSA B125.1 align on package markings requiring the manufacturer's recognized name, trademark, or other mark, including private-labeled products and the actual flow rate or the maximum flow rate expressed in gpm and L/min or gpc and

[2] ASME. (2024 Draft). *Plumbing Supply Fittings* (ASME A112.18.1/CSA B125.1) Section 6.1.3 Kitchen, lavatory, and metering faucets marking.

L/cycle. FTC deviates from the labeling requirements of the ASME A112.18.1/CSA B125.1 standard requiring that the package markings include the manufacturer's model number.

4.3 Clarification of Marketing Materials Requirements

FTC requires promotional materials and websites to provide the actual flow rate or the maximum flow rate expressed in gpm and L/min or gpc and L/cycle. ASME A112.18.1/CSA B125.1 does not require installation and marketing materials for faucets and accessories.

5. FEEDBACK ON FAUCET ACCESSORIES

It is Neoperl's understanding that WaterSense®'s intent is to have the WaterSense® label brand be representative of water-efficient products that are high-performing and effective at ensuring user satisfaction in all installation locations. It is Neoperl's understanding that WaterSense®'s current specification allows aerators and replacement aerators, but not flow restrictors or flow regulators, to be eligible for the WaterSense® label. It is Neoperl's understanding that WaterSense® generically references the "accessory" definition from ASME A112.18.1/CSA B125.1 with additional clarification, which states:

> *"... a component that can, at the discretion of the user, be readily added, removed, or replaced and that when removed, will not prevent the fitting from fulfilling its primary function. For the WaterSense® specification, an accessory can include, but is not limited to, lavatory faucet flow restrictors, flow regulators, aerators, and laminar devices.* [3]"

However, a WaterSense® definition for faucet accessories has not been officially adopted. The ASME A112.18.1/CSA B125.1 definition is intended to be used by manufacturers and would be confusing for the WaterSense® consumer and green building marketplace. While the ASME A112.18.1/CSA B125.1 definition is useful for product development and design of an OEM faucet, it lacks the necessary clarity regarding the type of faucet accessories available for the WaterSense® label.

Neoperl respectfully recommends that WaterSense® consider adding the following definitions to the text to clarify the different types of aerators and that WaterSense® use terminology familiar to consumers and the green building marketplace.

> Aerator. A component designed to control the flow of water by delivering a water stream containing a mixture of air and water or a water stream without the introduction of air.
>
> Replacement Aerator. An aerator that is added, removed, or replaced at the discretion of the user.
>
> Faucet Accessories. See Aerator, Replacement Aerator, Pressure Compensating Aerator, and Replacement Pressure Compensating Aerator.

[3] NOI (March 2024), page 1.

> Pressure Compensating Aerator. An aerator that incorporates a flow-restricting orifice or fixed geometrical construction such that flow through the restrictor varies approximately in direct proportion with the square root of the pressure drop across the restriction.
>
> Replacement Pressure Compensating Aerator. A pressure compensating aerator that is added, removed, or replaced at the discretion of the user.

Neoperl respectfully recommends that WaterSense® consider the following changes to the text to clarify the type of faucet accessories available for the WaterSense® label.

> *"... For the WaterSense® specification, an accessory is a type of ~~can include, but is not limited to, lavatory faucet flow restrictors, flow regulators,~~ aerator~~, and laminar devices~~."*

Neoperl supports WaterSense®, water conservation, and water efficiency efforts to address global water scarcity and incorporates water conservation in many of our aerator technologies. Faucet design and technology have advanced since the existing WaterSense® specification was released in 2007. Three (3) product design considerations affect faucet and aerator flow rates: 1) the volume of water, 2) the flow of water, and 3) the pressure of the plumbing system. Historically, these three factors were equally considered in faucet and aerator design to ensure product performance, such as flow rates, while ensuring customer satisfaction.

With increasing awareness of global water scarcity and the importance of water efficiency efforts, conservation efforts have focused on the volume of water dispensed by faucets and aerators. With any physics equation, changing one variable results in changes in the other variables to achieve a balanced equation. With increasing focus only on reducing the volume of water, OEM faucet design and resultant actual faucet flow rate performance may rely on more than end component aerator technologies to achieve flow rate performance and ensure user satisfaction. As the volume of water in OEM products continues to be reduced, aerator technology alone may not be able to balance the physics equation.

To ensure user satisfaction with low-flow OEM products, performance criteria, such as flow rates, spray coverage, spray force, and sensor activation, are product-specific and not aerator-generic. Aerators are important in ensuring user satisfaction, but aerators alone do not ensure user satisfaction. For example, multi-modal kitchen faucets have a single faucet sprayhead that allows the user to switch among different modes to change the spray pattern and flow rate of the faucet for specific functions (e.g., plate rinsing, reduction of splashing, pot filling). If the product's maximum flow rate is 2.2 gpm for all modes, the aerator must permit a maximum flow rate of 2.2 gpm, and reductions in flow rates for different faucet functions rely on product design to achieve reduced flow rates.

Since faucet design and resultant faucet flow rate performance rely on product design and aerator technologies, user satisfaction can be negatively impacted by installing water-conserving aerator technologies that conflict with faucet design. For instance, if the faucet design incorporates upstream pressure-compensating techniques, replacing the OEM-installed aerator

with a pressure-compensating aerator will result in insufficient low-pressure, affecting product performance and user satisfaction.

Efforts to reduce flow rates, market trends for streamlined faucet designs, incorporation of smart faucet features, and the addition of multiple flow rates have resulted in actual flow rate performance relying on product design and aerator technologies. Additionally, it is Neoperl's understanding that WaterSense® is adding additional faucet product categories to the specification. Neoperl respectfully recommends WaterSense® clarify the following statement from the specification: "*A ~~lavatory~~ faucet and kitchen side spray are ~~is~~ also considered to meet ~~this~~ the specification's maximum and minimum flow rate requirements, as applicable, if equipped with ~~a lavatory~~ ~~faucet~~ an aerator ~~accessory~~ and the maximum "rated"[4] flow rate of the faucet or kitchen side spray is the same as the registered flow rate of the aerator ~~that meets this requirement~~.*"

6. FEEDBACK ON WATERSENSE® SPECIFICATION MARKING REQUIREMENTS

It is Neoperl's understanding that WaterSense®'s current specification includes the following product marking and documentation requirements[5]:

> *Products shall not be packaged, marked, or provided with instructions directing the user to an alternative water-use setting that would override the WaterSense® specification maximum flow rate.*
>
> *Any instruction related to the maintenance of the product, including changing or cleaning faucet accessories, shall direct the user on how to return the product to its WaterSense® specification maximum flow rate.*
>
> *The product and/or packaging shall be marked in accordance with 16 CFR 305.24(a)[6] with the maximum "rated"[7] flow rate in gallons per minute (gpm) and liters per minute (L/min) as determined through testing and compliance with the WaterSense® specification. Marking shall be in two- or three-digit[8] resolutions (e.g., 1.5 gpm, 5.7 L/min).*
>
> *The specification also requires all labeled products to adhere to ASME A112.18.1/CSA B125.1, which requires all kitchen, lavatory, and metering faucet products and packaging to be marked with the manufacturer's specified maximum*

[4] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-0113-1.
[5] NOI (March 2024), pages 17 and 18.
[6] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-1221-1.
[7] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-0113-1.
[8] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-1219-1.

flow rate in L/min and gpm or liters per cycle (L/cycle) and gallons per cycle (gpc), as verified through the standard.

Neoperl respectfully recommends that WaterSense® consider the following clarifications.

Products shall not be packaged, marked, or provided with instructions directing the user to an alternative water-use setting that would override the WaterSense® specification ~~maximum~~ flow rates.

Any instruction related to the maintenance of the product, including changing replacement aerators or cleaning aerators~~faucet accessories~~, shall direct the user on how to return the product to its WaterSense® specification maximum and minimum flow rates, as applicable.

The product, replacement aerators, and~~/or~~ packaging shall be marked in accordance with 16 CFR 305.24(a)[9] with the maximum "rated"[10] flow rate in gallons per minute (gpm) ~~and liters per minute (L/min)~~ or gallons per cycle (gpc) as determined through testing and compliance with the WaterSense® specification. ~~Marking shall be in two- or three-digit[11] resolutions (e.g., 1.5 gpm, 5.7 L/min).~~

~~The specification also requires all labeled products to adhere to ASME A112.18.1/CSA B125.1, which requires all kitchen, lavatory, and metering f~~Faucets, kitchen side sprays, ~~products~~ and packaging shall ~~to~~ be marked in accordance with ASME A112.18.1/CSA B125.1 Sections 6.1.1 Marking Requirements and 6.1.3 Kitchen, Lavatory, and Metering Faucets Marking with the manufacturer's maximum "rated"[12] ~~specified maximum~~ flow rate in liters per minute (L/min) and gpm or liters per cycle (L/cycle) and ~~gallons per cycle (~~gpc~~)~~, as determined through testing and compliance with the WaterSense® specification ~~as verified through the standard~~. Marking shall be in two- or three-digit[13] resolutions (e.g., 1.5 gpm, 5.7 L/min).

Neoperl respectfully states that compliance with the on-product marking requirements of ASME A112.18.1/CSA B125.1 does not provide compliance with FTC regulations. Neoperl respectfully recommends that WaterSense® consider the removal of conflicting requirements

[9] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-1221-1.
[10] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-0113-1.
[11] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-1219-1.
[12] US EPA WaterSense Specification, Certification, and Labeling Clarifications. Active Clarification Detail Tab ID No. LF-0113-1.
[13] Ibid.

and collaborate with FTC to align WaterSense® marking requirements with federal marking requirements.

Neoperl respectfully provides the following information for WaterSense® to consider about metering faucets and respectfully disagrees with WaterSense®'s intent to convert metering faucet flow rate performance from gpc to gpm. Metering faucets run for a predetermined period, known as a cycle, while discharging a predetermined quantity of water before shutting off. Metering faucets have a federal maximum flow rate of 0.25 gpc and are required to provide flow rates in gpc:

1. 16 CFR 305.42(a) requires products, packaging, and marketing materials to be marked in gpc; therefore, the product must comply with FTC regulations.
2. ASME A112.18.1/CSA B125.1 requires metering faucet flow rates on the product, packaging, and marketing materials to be marked in gpc; therefore, the product's third-party certification listing requires the product to comply with ASME A112.18.1/CSA B125.1.

7. FEEDBACK ON APPLICATION OF ASME A112.18.1/CSA B125.1

Neoperl respectfully disagrees with WaterSense®'s stated intent that the specification generically requires conformance to the applicable requirements in ASME A112.18.1/CSA B125.1. Neoperl respectfully recommends WaterSense® specify the sections of the ASME A112.18.1/CSA B125.1 standard applicable to the WaterSense® specification similar to FTC and US Department of Energy (DOE) references to the ASME A112.18.1/CSA B125.1 standard, such as ASME A112.18.1/CSA B125.1 Sections 5 Performance Requirements and Test Procedures and 6.1.3 Kitchen, Lavatory, and Metering Faucets Marking.

8. FEEDBACK ON PRIVATE LAVATORY FAUCETS

8.1 Private Lavatory Faucet Definition

It is Neoperl's understanding that WaterSense®'s stated intent is that the definition of "private lavatory faucet" includes:

> *"...lavatory faucets in private use, including in residences and private restrooms in commercial and institutional buildings such as hotels and dormitories.[14]"*

> *"... EPA anticipates that most metering faucets and self-closing faucets ... However, it is possible for these devices to be installed in shared, residential lavatories ... where their expected uses and performance requirements ... align more with those of a private lavatory faucet. EPA intends to incorporate these faucet types into the scope of its revised specification, provided that they adhere to the criteria for private lavatory faucets...[15]"*

> *"... In addition, EPA is considering allowing private and public lavatory faucets that use a metering or other self-closing function to earn the label.[16]"*

[14] NOI (March 2024), page 1.
[15] NOI (March 2024), page 6.
[16] NOI (March 2024), page 5.

Neoperl respectfully disagrees with WaterSense®'s stated intent that the specification allow lavatory faucets in private restrooms in institutional buildings to obtain the WaterSense® mark. Ligature-resistant and vandalism-resistant plumbing products are designed to prevent user and worker harm, which is more critical in these building occupancy installations than user satisfaction. Neoperl respectfully recommends that plumbing products installed in Institutional Groups I-1 to I-4 be excluded from the revised WaterSense® specification. Neoperl respectfully recommends WaterSense® consider the following changes to the text in the context of the clarification information provided on industry terminology in Sections 1 to 3:

1. The generic term "residential" correlates to multiple building occupancy classifications with sleeping units or dwelling units, which excludes building occupancies:
    a. Business Group B
    b. Utility and Miscellaneous Group U
2. Toilet facilities and bathrooms are in the building occupancies WaterSense® references in the NOI.
3. From an industry perspective, dormitories, barracks, or campsites are not institutional building occupancies.
4. Ligature-resistant and vandalism-resistant plumbing products installed in Institutional Groups I-1 to I-4 are designed to prevent user and worker harm.

"Private lavatory faucet: A faucet intended to be installed in ~~residential~~ bathrooms and toilet facilities restricted from walk-in traffic that discharges into a lavatory, excluding private lavatory faucets installed in Institutional Groups I-1 to I-4."

8.2 Private Lavatory Faucet Performance

It is Neoperl's understanding that WaterSense®'s stated position is to reduce the WaterSense® specification maximum flow rate requirement for private lavatory faucets from 1.5 gpm to 1.2 gpm or 1.0 gpm. The proposed change to 1.2 gpm is a twenty percent (20%) reduction of the existing WaterSense® maximum flow rate and a forty-five percent (45%) reduction of the EPAct '92 maximum flow rates. The proposed change to 1.0 gpm is a thirty-three percent (33%) reduction of the existing WaterSense® maximum flow rate and a fifty-five percent (55%) reduction of the EPAct '92 maximum flow rates. Existing aerator technology complies with the proposed WaterSense® maximum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

Neoperl respectfully supports WaterSense®'s stated position to maintain the existing WaterSense® specification minimum flow rate requirement for private lavatory faucets at 0.8 gpm at 20 psi. Existing aerator technology complies with the proposed WaterSense® minimum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

Neoperl respectfully provides the following information for WaterSense® to consider regarding the relationship between maximum and minimum flow rate performance for aerator technology, building on the information in Section 5. Aerators function based on the relationship between the flow of water and the size of the restriction in the device. Relying on Bernoulli's principle, as the water flow reaches the aerator restriction, the water speeds up to maintain a constant volume flow rate. The acceleration of the constant volume flow rate is a function of the surrounding fluid pressure performing external work on the water, which causes the aerator to have a lower pressure. As aerator flow rates decrease, the drop in pressure results in wider tolerance bands to achieve predictable flow rate outcomes. As the tolerance bands increase for predictable flow rate outcomes, maximum and minimum flow rate tolerances start to overlap, which makes minimum flow rates not a predictor of aerator performance and user satisfaction. For aerator technology, the point at which this convergence will occur is a maximum flow rate of less than 1.0 gpm, which would necessitate the removal of the minimum flow rate for aerators.

It is Neoperl's understanding that WaterSense®'s stated intent is to include metering and self-closing faucets in the private lavatory product category by converting gpc to gpm per WaterSense®'s following statements:

> *"... Metering faucets and other self-closing faucets that fall within the "private lavatory and bar sink faucets" or "public lavatory faucets" categories would be eligible to receive the WaterSense® label if they meet the category-specific requirements in the specification.*[17]*"*
>
> *"... EPA anticipates that most metering faucets and self-closing faucets ... However, it is possible for these devices to be installed in shared, residential lavatories ... where their expected uses and performance requirements ... align more with those of a private lavatory faucet. EPA intends to incorporate these faucet types into the scope of its revised specification, provided that they adhere to the criteria for private lavatory faucets...*[18]*"*
>
> *"...Rather, EPA intends to translate the currently defined water consumption of metering faucets (in gallons per cycle) into a flow rate in gallons per minute, similar to how non-metering faucets are tested.*[19]*"*
>
> *"For metering faucets intended for residential lavatories ..., EPA intends to allow metering faucets to earn the WaterSense® label provided that their flow rate, when converted from gpc to gpm, remains below the maximum flow rate prescribed in the specification. For example, a metering faucet operating at 0.2 gpc (0.8 L/cycle) that has an operating cycle of 10 seconds would have a resulting flow rate of 1.2 gpm.*[20]*"*

[17] NOI (March 2024), pages 5 and 6.
[18] NOI (March 2024), page 6.
[19] NOI (March 2024), page 8.
[20] NOI (March 2024), page 12.

Neoperl respectfully states that metering faucets have a federal maximum flow rate of 0.25 gpc. To prevent violation of federal law and non-conformance with ASME A112.18.1/CSA B125.1 requirements, metering faucets flowing at 1.2 gpm would be restricted to a maximum run time of 12 seconds and flowing at 1.0 gpm would be restricted to a maximum run time of 15 seconds. Faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies. Neoperl respectfully disagrees with WaterSense®'s intent to convert metering faucet flow rate performance from gpc to gpm, as discussed in Section 6.

8.3 Private Lavatory Faucets Packaging, Marking, and Documentation

Neoperl respectfully disagrees with WaterSense®'s intent to maintain current packaging, marking, and documentation requirements for the expanded private lavatory faucet product category, including metering faucets, based on the information in Sections 4 and 6.

9. FEEDBACK ON PUBLIC LAVATORY FAUCETS

9.1 Public Lavatory Faucet Definition

While the ASME A112.18.1/CSA B125.1 definition is useful for product development and design of faucets, the definition lacks the necessary clarity of the industry terminology about building occupancies and building room installation used in the building and safety codes. Neoperl respectfully recommends WaterSense® consider the following changes to the text in the context of the clarification information provided on industry terminology in Sections 1 to 3:

1. Building occupancies with bathrooms rarely have lavatory faucets exposed to walk-in traffic.
2. From an industry perspective, the generic term "non-residential" does not collectively refer to all building occupancies with toilet facilities.
3. Toilet facilities and bathrooms are in the building occupancies WaterSense® references in the NOI.

"Public lavatory faucet: A faucet intended to be installed in ~~non-residential~~ bathrooms and toilet facilities that are exposed to walk-in traffic."

9.2 Public Lavatory Faucets Performance

It is Neoperl's understanding that WaterSense®'s stated position is to establish a new WaterSense® specification maximum flow rate requirement for public lavatory faucets at 0.5 gpm, 0.4 gpm, or 0.35 gpm. The new maximum flow rate for non-metering public lavatory faucets at 0.5 gpm is a seventy-seven percent (77%) reduction, 0.4 gpm is an eighty-two percent (82%) reduction, and 0.35 gpm is an eighty-four percent (84%) reduction of the existing EPAct '92 maximum flow rates. Existing aerator technology complies with the proposed WaterSense® maximum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

Neoperl respectfully supports WaterSense®'s stated position to not require minimum flow rates for public lavatory faucets. Neoperl respectfully provides the following information for WaterSense® to consider regarding minimum flow rates for public lavatory faucet aerator technology, building on the information in Sections 5 and 8.2. The proposed public lavatory

faucet maximum flow rates are lower than the aerator technology flow rate tolerance convergence point maximum flow rate of 1.0 gpm for aerators. Minimum flow rates would not be a reliable predictor of aerator performance and user satisfaction.

Neoperl respectfully provides the following information about public lavatory faucets for WaterSense® to consider. The majority of metering public lavatory faucets are located in toilet facilities, rarely bathrooms. They are intended to serve large numbers of people quickly by reducing the user's interaction with the product to turn the faucet on manually, wait for a comfortable handwashing temperature, and turn off the faucet. Manual public lavatory faucets are available but not as common as metering public lavatory faucets. Generally, public lavatory faucets are angled towards the front rim of the sink, bowl, or lavatory and dispense water at an angle to provide maximum water for handwashing, whereas private lavatory faucets are generally installed parallel to the bottom of the sink and dispense water in a downward flow to permit filling of the sink, face washing, teeth brushing, etc. The building occupancy, user expectations, regulations, product performance standards, and building and safety code requirements drive public lavatory faucet design.

9.3 Public Lavatory Faucets Packaging, Marking, and Documentation

Neoperl respectfully disagrees with WaterSense®'s intent to require current packaging, marking, and documentation requirements for the new public lavatory faucet product category based on the information in Sections 4 and 6.

Neoperl respectfully suggests that the phrase, "*Not for private lavatory use,"* utilizes terminology intended for manufacturers and building and safety code officials. The terminology may be confusing to the WaterSense® consumer and green building marketplace. Neoperl respectfully recommends WaterSense® conduct Voice of the Customer (VOC) assessments to identify resonating terminology for the consumer and terminology that does not conflict with the expanded private lavatory faucet definition.

10. FEEDBACK ON METERING AND SELF-CLOSING FAUCETS

10.1 Metering and Self-Closing Faucet Definitions

While the ASME A112.18.1/CSA B125.1 definitions are useful for faucet product development and design functions, they lack the necessary clarity of the industry terminology about building occupancies, building room installation, and product use exposure. The ASME A112.18.1/CSA B125.1 definitions are intended to be used by manufacturers and would confuse the WaterSense® consumer and green building marketplace. Additionally, the UPC requires public lavatories exposed to transient walk-in traffic to have self-closing or metering functionality.[21]

It is Neoperl's understanding that WaterSense®'s stated position is to allow metering and self-closing faucets in both private and public lavatory installations. Neoperl respectfully recommends WaterSense® consider the following changes to the text to align with the private and public lavatory faucet definitions modifications in the context of the information provided on

[21] International Association of Plumbing and Mechanical Officials. (2024). *Uniform Plumbing Code*.

industry terminology in Sections 1 to 3 and to ensure installed WaterSense® labeled products do not violate the UPC's[22] public lavatory faucet function requirements for transient walk-in traffic:

> *Private Lavatory Metering Ffaucet: A private lavatory self-closing faucet that discharges water for a predetermined period of time (i.e., cycle) or discharges a predetermined quantity of water before shutting off.*
>
> *Private Lavatory Self-closing Ffaucet. A ~~terminal fitting (~~private lavatory faucet~~)~~ that, once the valve is opened, automatically shuts off the flow of water by either mechanical or electronic means.*
>
> *Public Lavatory Metering Ffaucet: A public lavatory self-closing faucet that discharges water for a predetermined period of time (i.e., cycle) or discharges a predetermined quantity of water before shutting off.*
>
> *Public Lavatory Self-closing Ffaucet. A ~~terminal fitting (~~public lavatory faucet~~)~~ that, once the valve is opened, automatically shuts off the flow of water by either mechanical or electronic means.*

10.2 Metering and Self-Closing Faucet Packaging, Marking, and Documentation

Neoperl respectfully disagrees with WaterSense®'s intent to require current packaging, marking, and documentation requirements for the new metering and self-closing faucet product cateogories based on the information in Sections 4 and 6.

11. FEEDBACK ON BAR SINK FAUCETS

11.1 Bar Sink Faucet Definition

It is Neoperl's understanding that WaterSense®'s stated position is that bar sink faucets are currently eligible for the WaterSense® label. WaterSense®'s current specification covers building occupancies with sleeping or dwelling units. Neoperl respectfully recommends WaterSense® consider the following changes to the text in the context of the clarification information provided on industry terminology in Sections 1 to 3:

1. From an industry perspective, the correct generic term for the building occupancies listed above is "building occupancies with sleeping or dwelling units."

> *"Bar sink faucet: A faucet designed for discharge into a bar sink intended to be installed in building occupancies with sleeping or dwelling units."*

11.2 Bar Sink Faucet Performance

It is Neoperl's understanding that WaterSense®'s stated position is to reduce the WaterSense® specification maximum flow rate requirement for bar sink faucets from 1.5 gpm to 1.2 gpm or 1.0 gpm. The proposed change to 1.2 gpm is a twenty percent (20%) reduction of the existing WaterSense® maximum flow rate and a forty-five percent (45%) reduction of the EPAct

[22] Ibid.

'92 maximum flow rates. The proposed change to 1.0 gpm is a thirty-three percent (33%) reduction of the existing WaterSense® maximum flow rate and a fifty-five percent (55%) reduction of the EPAct '92 maximum flow rates. Existing aerator technology complies with the proposed WaterSense® maximum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

Neoperl respectfully supports WaterSense®'s stated position to maintain the existing WaterSense® specification minimum flow rate requirement for bar sink faucets at 0.8 gpm at 20 psi. Existing aerator technology complies with the existing WaterSense® minimum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

11.3 Bar Sink Faucets Packaging, Marking, and Documentation

Neoperl respectfully disagrees with WaterSense®'s intent to maintain current packaging, marking, and documentation requirements for the new bar sink product category because bar sinks are not a federally regulated faucet type, and ASME A112.18.1/CSA B125.1 does not cover bar sinks. Please see the information provided in Sections 4 and 6.

12. FEEDBACK ON KITCHEN FAUCETS

12.1 Kitchen Faucet Definition

Neoperl has no recommendations on the proposed definition of "kitchen faucet."

12.2 Kitchen Faucet Performance

It is Neoperl's understanding that WaterSense®'s stated position is to establish a new WaterSense® specification maximum flow rate requirement for kitchen faucets to 1.8 gpm or 1.5 gpm. The new maximum flow rate at 1.8 gpm is an eighteen percent (18%) reduction, and 1.5 gpm is a thirty-two percent (32%) reduction of the existing EPAct '92 maximum flow rates. Existing aerator technology complies with the proposed WaterSense® maximum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

Neoperl respectfully understands WaterSense®'s stated position is to establish a new minimum flow rate requirement for kitchen sink faucets at 1.2 gpm or 1.0 gpm at 20 psi. Neoperl respectfully provides the following information for WaterSense® to consider regarding the minimum flow rates for kitchen faucet aerator technology, building on the information in Sections 5, 8.2, and 9.2. The following maximum and minimum flow rate combinations work with the limitations of Bernoulli's principle and are available today:

1. Maximum flow rate: 1.8 gpm; Minimum flow rate: 1.2 gpm
2. Maximum flow rate: 1.8 gpm; Minimum flow rate: 1.0 gpm
3. Maximum flow rate: 1.5 gpm; Minimum flow rate: 1.0 gpm

Existing aerator technology complies with the proposed WaterSense® new minimum flow rate requirements and the flow rate testing procedures of ASME A112.18.1/CSA B125.1.

However, as discussed in Section 5, faucet design and resultant faucet flow rate performance may rely on more than just replacement aerator technologies.

12.3 Kitchen Faucets Packaging, Marking, and Documentation

Neoperl respectfully disagrees with WaterSense®'s intent to maintain current packaging, marking, and documentation requirements for the new kitchen faucet product category based on the information in Sections 4 and 6.

13. Feedback on Kitchen Faucets with Temporary Override Feature

13.1 Kitchen Faucets with Temporary Override Feature Performance

It is Neoperl's understanding that WaterSense®'s stated position is to develop a new product category for kitchen faucets with a temporary override feature (e.g., a user-activated actuator that allows the faucet to flow up to 2.2 gpm for pot filling) that will automatically return to the reduced WaterSense® maximum flow rate after the user releases the override feature. Additionally, the maximum flow rate marking will be the flow rate when the temporary override is activated to align with FTC marking requirements. Neoperl respectfully recommends that WaterSense® develop a product category definition, as there are no existing industry or federal regulatory product category definitions. Existing aerator technology complies with the proposed WaterSense® temporary override feature maximum flow rate requirements. However, faucet design and resultant faucet flow rate performance may rely on more than just aerator technologies, as discussed in Section 5.

13.2 Kitchen Faucets with Temporary Override Feature Packaging, Marking, and Documentation

It is Neoperl's understanding that WaterSense®'s stated position is to develop a new product category for kitchen faucets with a temporary override feature and the maximum flow rate marking for an aerator will be the flow rate when the temporary override is activated to align with FTC marking requirements.

Neoperl respectfully recommends that WaterSense® develop a product category definition, as there are no existing industry or federal regulatory product category definitions. Neoperl respectfully disagrees with WaterSense®'s intent to require current packaging, marking, and documentation requirements for the new kitchen faucet with override feature product category based on the information in Sections 4 and 6.

14. Feedback on Multi-Modal Kitchen Faucets

14.1 Multi-Modal Kitchen Faucets Performance

It is Neoperl's understanding that WaterSense®'s stated position is to develop a new product category for multi-modal kitchen faucets that have a single faucet sprayhead that allows the user to switch among different modes to change the spray pattern and flow rate of the faucet for different functions (e.g., plate rinsing, reduction of splashing, pot filling). For multi-modal kitchen faucets, WaterSense® intends to require all modes to meet the maximum WaterSense® flow rate criteria, excluding a temporary override function. However, WaterSense® wants to require only one "primary" mode that is not a temporary override to meet all performance requirements. If the multi-modal kitchen faucet's maximum flow rate is 2.2 gpm for all modes, the aerator must permit a maximum flow rate of 2.2 gpm and reductions in flow rates for

different faucet functions must utilize product design to achieve a reduced flow rate. Multi-modal kitchen faucet design and resultant faucet flow rate performance rely on product design and aerator technologies. Neoperl respectfully recommends that WaterSense® develop a product category definition, as there are no existing industry or federal regulatory product category definitions.

14.2 Multi-Modal Kitchen Faucets Packaging, Marking, and Documentation

It is Neoperl's understanding that WaterSense®'s stated position is to develop a new product category for multi-modal kitchen. Neoperl respectfully disagrees with WaterSense®'s intent to require current packaging, marking, and documentation requirements for the new multi-modal kitchen faucet product category based on the information in Sections 4 and 6.

15. FEEDBACK ON KITCHEN SIDE SPRAY

15.1 Kitchen Side Spray Performance

It is Neoperl's understanding that WaterSense®'s stated position is to develop a new product category for kitchen side sprays packaged with kitchen faucets. WaterSense® intends to require the kitchen side spray to meet the kitchen faucet's maximum flow rate criteria.

The kitchen faucet's aerator does not control the side spray flow. Therefore, the kitchen side spray design and the resultant side spray flow rate performance rely on product design instead of aerator technologies. Product-specific performance criteria should be established to ensure user satisfaction and flow rate performance.

Neoperl respectfully recommends that WaterSense® develop a product category definition, as there are no existing industry or federal regulatory product category definitions. Neoperl respectfully disagrees with WaterSense®'s intent to require current packaging, marking, and documentation requirements for the new kitchen side spray product category based on the information in Sections 4 and 6.

16. FEEDBACK ON COLD-START FAUCETS

16.1 Cold-Start Faucet Definition

It is Neoperl's understanding that WaterSense®'s stated purpose of "cold-start faucets" is:

> *"...Cold-start faucets are designed to save energy by reducing hot water demand. They are single-handled faucets designed to discharge only cold water as a default, and if the WaterSense® user desires hot water, they need to turn the handle away from its neutral position. These faucets prevent users from unintentionally using hot water or creating a hot water draw in circumstances where it is not needed, thereby reducing energy use. ... Therefore, this designation would only be used to further differentiate between the primary faucet types that EPA intends for the scope of the specification to include (i.e., private lavatory and bar sink, kitchen faucets, and public lavatory). .... EPA does not intend to require all faucets to demonstrate cold-start functionality[23]."*

[23] NOI (March 2024), pages 8 and 9.

Neoperl respectfully provides clarification on the IPC's[24] water temperature requirement for toilet facilities exposed to walk-in traffic, specifically customers, patrons, and visitors, in the following building occupancies:

- Assembly Groups A-1, A-2, A-3, A-4, and A-5
- Business Group B
- Educational Group E
- Factory and Industrial Groups F-1 and F-2
- High Hazard Groups H-1, H-2, H-3, H-4, and H-5
- Mercantile Group M
- Residential Groups R-1, R-2, R-3, and R-4
- Storage Groups S-1 and S-2
- Utility and Miscellaneous Group U

The IPC requires "tempered water be delivered from lavatories and group wash fixtures located in public toilet facilities provided for customers, patrons, and visitors.[25]"

Neoperl respectfully recommends WaterSense® consider the following changes to the text in the context of the information in Sections 1 to 3 and to ensure installed WaterSense® labeled products do not violate the IPC's[26] water temperature requirements.

> *"Cold-start faucet: A faucet intended to be installed in bathrooms and toilet facilities restricted from walk-in traffic discharging into a lavatory and installed in kitchens discharging into a kitchen sink with a single-control mixing valve that turns on only in the cold position and provides hot or tempered water by turning the handle away from the on-position."*

Neoperl respectfully recommends that WaterSense® add the following definitions for water temperatures to clarify the modified cold-start faucet definition.

> Cold Water. Water at a temperature less than 85°F (29°C).
> Hot Water. Water at a temperature greater than or equal to 110°F (43°C).[27]
> Tempered Water. Water having a temperature range between 85°F (29°C) and 110°F (43°C).[28]

17. Feedback on Scope Exclusions

It is Neoperl's understanding that WaterSense®'s stated intent is that the scope of the revised faucet specification excludes the following product types:

[24] International Code Council. (2024). *International Plumbing Code*.
[25] Ibid.
[26] Ibid.
[27] Ibid.
[28] Ibid.

"...

- *Laundry tub/tray and service sink faucets, which are used for filling a laundry tub, mop buckets, or other basins;*
- *Lawn or sediment faucets (i.e., hose bibbs);*
- *Deck-mounted tub faucets, including roman tub faucets, which are used for filling a bathtub;*
- *Pot fillers, which are typically installed over a stovetop or range or in a commercial kitchen for filling pots with water; and*
- *Water dispensers, which typically are connected to an under-sink or whole-house water treatment, cooling, or heating system and are used for glass or pot filling.*[29]

..."

Neoperl respectfully recommends WaterSense® consider the following changes to the text to clarify the types of excluded product types.

"...

- *Laundry tub/tray and service sink faucets, which are used for filling a laundry tub, mop buckets, or other basins;*
- *Lawn or sediment faucets (i.e., hose bibbs);*
- ~~*Deck-mounted*~~ *T~~t~~ub faucets, including roman tub faucets, which are used for filling a bathtub;*
- *Pot fillers, which are typically installed over a stovetop or range or in a commercial kitchen for filling pots with water; and*
- *Drinking w~~W~~ater dispensers, which typically are connected to an under-sink or whole-house water treatment, cooling, or heating system and are used for glass or pot filling.*[30]

Neoperl respectfully recommends that WaterSense® consider also excluding the following product types due to their unique requirements for product design, building occupancies, and building room installations:

- Private lavatory faucets installed in Institutional Groups I-1 to I-4
- Bar sink faucets installed in building occupancies without sleeping or dwelling units
- Head shampoo sink faucets
- Lavatory faucets with sprayheads
- Metering faucets with sprayheads
- Movable lavatory system faucets
- Laboratory faucets
- Clinical sink faucets

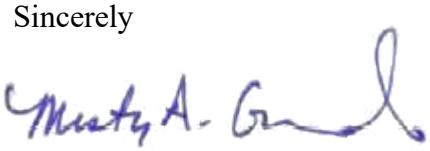
[29] NOI (March 2024), page 9.
[30] Ibid.

18. FEEDBACK ON THE TRANSITIONAL PERIOD

It is Neoperl's understanding that WaterSense®'s stated position is to provide a transition period of six (6) to twelve (12) months for the revised specification to become effective. Neoperl respectfully recommends a transition period of eighteen (18) to twenty-four (24) months to accommodate manufacturer product development cycles, third-party laboratory testing, and third-party certification listing updates.

Neoperl sincerely appreciates WaterSense®'s consideration of our comments to inform WaterSense®'s intent to modify voluntary program requirements discussed in the notice of intent document titled "Notice of Intent to Revise the High-Efficiency Lavatory Faucet Specification" for products in the US to obtain the WaterSense® label for products covered by the scope of the specification. If there are any questions regarding the comments and information provided, please contact Mrs. Misty Guard, Regulosity LLC, at +1 (414) 988-8613.

Sincerely



Misty Guard
President

cc: Mr. Jörg Rudolph, Neoperl GmbH
Mrs. J'aime Salvatore, Neoperl, Inc.
Mrs. Angela Jimenez, Neoperl, Inc.
Ms. Stephanie Tanner, WaterSense®
Mr. Robbie Pickering, ERG

Commenter: Kyle Meehan
Affiliation: Delta Faucet Company
Comment Date: May 24, 2024

COMMENTER NAME: Kyle Meehan
COMMENTER AFFLIATION: Delta Faucet Company
DATE OF COMMENT SUBMISSION: 5/24/24

Topic: Overall Support of PMI Comments and Support for Working with Product Standards Committees

Comment:
Delta Faucet Company (DFC) has been a long-time supporter and partner of EPA WaterSense. We stand ready to continue to work with EPA WaterSense staff on the necessary steps to determine if lowering the current WaterSense specification for private lavatory faucets is warranted, and how best to develop a new WaterSense specification for kitchen faucets and their accessories. We do not believe the needed information is available to make such changes at this time.

DFC endorses the detailed technical comments submitted by our trade association, PMI.

Rationale:
The WaterSense program is successful because of its public-private partnership in ensuring water efficient products that continue to perform to customer satisfaction are available in the marketplace. DFC firmly believes that for this to continue to be true for the faucet category, new definitions and performance criteria must be developed by the appropriate product standards committees before making any changes to the WaterSense faucet specification.

Regarding adding kitchen faucets to the existing specification, DFC recommends a new specification be created to take into account the many different modes a kitchen faucet can operate under. Prior to the creation of that new specification, several new definitions and testing data must be created at the ASME A112/CSA B125 product standards committee. To establish WaterSense criteria for kitchen faucets without this important work risks continued customer satisfaction in WaterSense-labeled products and long-term credibility in the program.

Suggested Change (or Language):
DFC encourages EPA WaterSense staff to work with PMI and its manufacturing members to move the needed projects at the ASME A112/CSA B125 product standards committee as soon as possible.

Thanks,

Kyle Meehan
Director of Product Engineering
Delta Faucet Co.
Office-(317) 848-0745
Cell-(317) 847-4033

Commenter: Shareef Khoga, Rob Bohn, Christopher Malotte, Kate Zeng
Affiliation: Energy Solutions on behalf of California Investor-Owned Utilities (CA IOUs)
Comment Date: May 24, 2024

Email Text:

Hello,

Please see attached for the California Investor-Owned Utility comments on EPA's Water Sense Specification NOI for Lavatory Faucets. We look forward to continued collaboration and please let us know if you have any questions about our comments.

We would greatly appreciate if you could confirm receipt of this email.

Shareef Khoga
Senior Project Manager
Energy Solutions
510.482.4420 x667
energy-solution.com

Email Attachment:
See pages 73 through 107.

May 24, 2024

Ms. Stephanie Tanner
EPA WaterSense
U.S. Environmental Protection Agency
Office of Wastewater Management (4204M)
1200 Pennsylvania Ave., NW
Washington, DC 20460

Topic: WaterSense Notice of Intent (NOI) to Revise the *High-Efficiency Lavatory Faucet Specification*

Dear Ms. Tanner:

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE), collectively referred to herein as the California Investor-Owned Utilities (CA IOUs), in response to the United States (U.S.) Environmental Protection Agency (EPA) Notice of Intent (NOI) to Revise the *High-Efficiency Lavatory Faucet Specification.*

The CA IOUs comprise some of the largest utility companies in the nation, serving over 32 million customers in the Western U.S. We are committed to helping customers reduce energy costs and consumption while striving to meet their evolving needs and expectations. Therefore, we advocate for product specifications that accurately reflect the climate and conditions of our respective service areas.

We respectfully submit the following comments to EPA:

1. **The CA IOUs support EPA's proposed scope for a revised faucet specification.**

The EPA's proposed expansion of the WaterSense faucet specification to include kitchen, public lavatory, metering and self-closing faucets, and related accessories aims to enhance the program's water-saving potential. This initiative will enable customers to select products with lower flow rates without compromising performance. The updated specification offers considerable technical potential for water savings, energy savings associated with water heating, and embedded energy savings. Appendix C presents an analysis of potential household and national savings from the proposed changes. As noted further in these comments, additional real-world data is required to better estimate savings. WaterSense specifications often become the starting point for state appliance standards and building codes, so expanding the specification to include additional products could result in significant water savings.

The CA IOUs also support the EPA's proposed exclusions from the revised faucet specification. The products excluded are laundry tub faucets, lawn and sediment faucets, deck-mounted tub faucets, pot fillers, drinking water dispensers, and service sink faucets. These products, designed specifically for filling a receptacle or serving a similar purpose, would not significantly reduce overall water use with a

low flow rate but would increase the time it takes to fill the receptacle without substantial water conservation benefits. These faucet types are appropriate to exclude from the scope as a specification is unlikely to save water.

2. The CA IOUs recommend EPA update its definitions to avoid confusion and overlap.

As EPA expands its scope, establishing clear definitions will ensure that products meet the appropriate maximum flow rate to receive the WaterSense label and provide manufacturers with a clear understanding of the specifications for testing and certification. Moreover, WaterSense terms often form the basis for definitions of state and federal appliance standards. Specific and unambiguous definitions uphold regulatory compliance, prevent potential loopholes that could lead to the exclusion of products intended to be covered, and avoid accidental inclusion of products that should not be covered, thereby avoiding the misapplication of standards.

In California proceedings, the broad definition of a kitchen faucet[1] has led to confusion among manufacturers concerning the types of covered faucets. Many of these manufacturers have certified products, such as water dispensers or side sprayers, that are unlikely to save water by setting maximum flow rates, adding unintended testing burden and regulatory cost.

The term "lavatory" varies in meaning depending on context. For example, California's Title 20 defines a lavatory as "a basin or bowl designed for washing the face and hands."[2] In contrast, Merriam-Webster refers to it as "a room with conveniences for washing and usually with one or more toilets." Since the WaterSense specification aims to conserve water by optimizing flow rates for washing hands, adopting the California definition is more appropriate for the revised WaterSense specification.

Applying the WaterSense label at the point of sale creates an additional challenge for strong definitions. Faucets are often identified based on the actual or intended installation location—public or private—rather than characteristics specific to the faucet. The CA IOUs recommend adopting definitions focusing on the product's design features and including additional differentiating information based on the intended installation, as indicated in its marketing or labeling. This approach would aid implementers and consumers in differentiating among faucet types.

As described below, we recommend distinguishing between commercial and residential kitchen faucets. States with implemented faucet efficiency standards have focused only on residential kitchen faucets. Commercial kitchen faucets may differ from residential ones due to their distinct uses, which include rapidly filling vessels and containers for food preparation and cooking and filling large multi-compartment commercial sinks with hot water for sanitation.[3] We recommend adopting definitions and marking requirements to distinguish between commercial and residential kitchen faucets to avoid confusion between these state standards and the WaterSense label, which can apply to commercial kitchen faucets.

[1] Cal. Code Regs., tit. 20, § 1602(h) ("'Kitchen faucet' means a faucet designed for discharge into a kitchen sink.")
[2] Cal. Code Regs., tit. 20, § 1602(h).
[3] See California Energy Commission, Appliance Efficiency Rulemaking for kitchen faucets, tub spout diverters and showerheads, Docket,15-AAER-07, https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-AAER-07.

For metering and self-closing faucets, in addition to the sources EPA reviewed for the NOI, the EPA should consider the approach used by MaP to distinguish between these faucet types and between private and public lavatory faucets.[4]

Aligning faucet types with existing state or federal definitions will reduce confusion for manufacturers and the market. We advise using these definitions as a basis for the WaterSense specification while emphasizing the need to clearly delineate what is included in and excluded from its scope. We further recommend that WaterSense avoid using language such as "intended," which creates ambiguity about the source of the intent and the methods of verification.

We specifically recommend the following definitions for the revised WaterSense specification:

- Faucet: A device that controls and guides the flow of water in a supply system. A faucet includes, but is not limited to, a lavatory faucet, kitchen faucet, and metering faucet.
- Private lavatory faucet: A faucet for private use designed for discharge into a basin or bowl designed for washing the face and hands and is not a metering faucet. Private use refers to faucets marketed for private use or installation in residences and apartments, hotel or motel guestrooms, and private rooms in hotels, hospitals, and healthcare facilities. A private lavatory faucet does not include faucets designed for public restrooms, medical uses, or laboratory uses.
- Bar sink faucet: A faucet designed for discharge into a residential bar sink.
- Private use kitchen faucet: A faucet designed for discharge into a kitchen sink and marketed for private use. A private use kitchen faucet does not include a drinking water dispenser or a side sprayer when sold separately from the faucet.
- Drinking water dispenser: A faucet designed for use at a kitchen sink that discharges drinking water into a receptacle such as a cup, glass, or bottle. A drinking water dispenser is typically connected to a filtration or purification system.
- Side sprayer: A handheld device designed for use in a residential kitchen sink that has a release-to-close valve to divert water flow from the primary faucet nozzle to a secondary nozzle and is suitable for removing residue from food, dishes, or utensils.
- Commercial kitchen faucet: A faucet designed for discharge into a commercial or restaurant kitchen sink that is marked as "for commercial use only." A commercial kitchen faucet does not include a faucet that does not discharge into a sink.
- Public lavatory faucet: A faucet for public use designed for discharge into a basin or bowl and designed for washing the face and hands. Public use refers to faucets installed in places with unrestricted exposure to walk-in traffic, such as in a business or public restroom.
- Metering faucet: A self-closing faucet that discharges a predetermined quantity of water before automatically shutting off. A metering faucet is also a self-closing faucet.
- Cold-start faucet: A faucet with a single-control mixing valve that provides only cold water from the initial start position and supplies hot water when the user turns the handle toward the hot position.
- Faucet accessory: A component of a faucet that can, at the discretion of the user, be readily added, removed, or replaced and, when removed, will not prevent the faucet from fulfilling its primary function. An accessory includes, but is not limited to, lavatory faucet flow restrictors, flow regulators, aerators, and laminar devices.

[4] MaP, Faucets-Residential & Commercial, https://map-testing.com/faucets/ (last visited April 9, 2024).

3. EPA should lower the maximum flow rate for private lavatory and bar sink faucets to no more than 1.2 gpm and investigate performance, consumer acceptance, and the potential for water savings at levels at 1.0 gpm.

According to a 2019 report from the Plumbing Manufacturers Institute, WaterSense-certified private lavatory and bar faucets have more than 40% nationwide market penetration.[5] California, Colorado, New York, Oregon, Washington, Hawaii, and Maine have adopted efficiency standards for private lavatory faucets of 1.2 gallons per minute (gpm).[6] The CA IOUs examined the WaterSense database and found that 64.5% of certified products meet a 1.2 gpm maximum flow rate and 0.8 gpm minimum flow rate. Setting WaterSense levels of 1.2 gpm for private lavatory and bar sink faucets is a minimum- or no-risk approach to reducing the maximum flow rate.

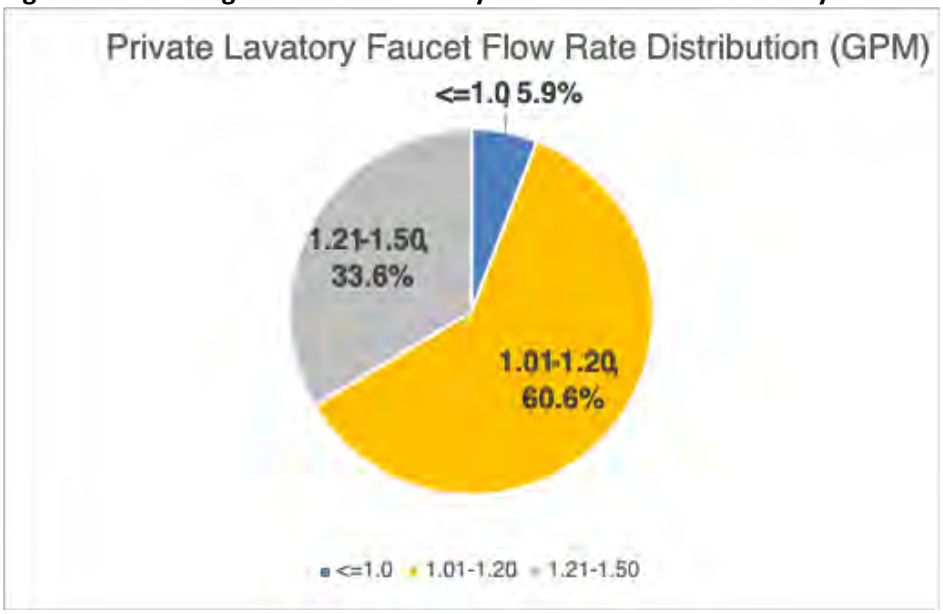
The CA IOUs encourage EPA to investigate opportunities to set a lower maximum flow rate of 1.0 gpm. To help identify appropriate flow rates for these products, we have researched four aspects: product availability, consumer satisfaction, public health concerns, and water saving. The results are presented below.

a. Many products from multiple manufacturers are available with a maximum flow rate of 1.0 gpm.

As shown in Figure 1, the WaterSense database shows that nearly 6% of faucets (not including accessories) already comply with a 1.0 gpm maximum flow rate with a 0.8 gpm minimum flow rate. Adding faucet accessories significantly increases the number of faucets that have a maximum 1.0 gpm flow rate. An analysis of California's Modernized Appliance Efficiency Database System (MAEDbS) reveals that of the 469 total manufacturers for private lavatory faucets, 90[7] have certified faucets at 1.0 gpm or . This information demonstrates that producing a faucet with a maximum flow rate of 1.0 gpm and a minimum flow rate of 0.8 gpm is feasible with existing technologies.

[5] GMP Research Inc., "2019 U.S. WaterSense Market Penetration," June 2019.
[6] PMI, PMI Summary of Current Plumbing Provisions, https://www.safeplumbing.org/technical/pmi-summary-of-current-plumbing-provisions (last visited May 6, 2024).
[7] In MAEDbS, a manufacturer may be an original equipment manufacturer, a private brand packager, a reassembler, or anyone who assumes legal responsibility as such. Products remain certified in the database until removed by the certifier, due to a change in standard, or in response to an enforcement action. Therefore, the number of original equipment manufacturers producing these products will likely be less than MAEDbS shows.

Figure 1. Percentage of Private Lavatory Faucet[8] Models Certified by Flow Rate (gpm)



Source: CA IOU analysis of EPA WaterSense database

b. Low-flow faucets are generally satisfactory to consumers.

A 2005 trio of residential retrofit studies, sponsored by the U.S. Environmental Protection Agency in collaboration with the East Bay Municipal Water Utility District, Seattle Public Utilities, and Tampa Water,[9] assessed the performance of existing and new low-flow fixtures in residential settings. The retrofit study revealed that residents expressed greater satisfaction with their new low-flow fixtures, including shower heads (1.7 gpm), kitchen faucet aerators (1.5 gpm), and bathroom sink aerators (1.0 gpm), compared to their previous non-low-flow counterparts. On a satisfaction scale of 0 to 5, with 5 being the highest, residents rated their new shower heads at 4.4 and kitchen and bathroom sink aerators at 4.0, an improvement from the previous average of 3.5. These studies demonstrate that flow rates as low as 1.0 gpm for private lavatory faucets have generally been satisfactory to consumers.

c. Lower flow faucets are effective at cleaning hands, but more research on plumbing system impacts is needed.

Regarding potential health concerns with lower flow rates, a 2020 CSA study[10] found that the flow rate of touchless faucets, ranging from 0.5 to 2.2 gallons per minute, did not significantly impact the level of bacteria remaining after handwashing, suggesting that flow rates as low as 0.5 gpm are effective at removing bacteria from hands.

[8] Private lavatory faucets only, not including faucet accessories.

[9] "Water and energy savings from high efficiency fixtures and appliances in single family. Combined Retrofit Rep. Vol. 1, U.S. Environmental Protection Agency, Washington, DC. 2005. https://aquacraft.com/wp-content/uploads/2015/09/EPA-Combined-Retrofit-Report.pdf.

[10] "Testing the Effect of Faucet Flowrate on Handwashing Efficacy" (2020). CSA Group. https://www.csagroup.org/wp-content/uploads/CSA-Group-Research-Faucet-Flowrate-Handwashing-Efficacy.pdf.

During California's rulemaking proceeding on setting low-flow rate standards for faucets,[11] commenters expressed concerns about the public health and safety implications of installing low-flow faucets in buildings with plumbing systems not initially designed for water efficiency. These commenters submitted studies showing that low-flow-rate faucets may accumulate pathogen and bacteria buildup from standing water in building pipes and fixtures due to an inadequate flush of these systems. While WaterSense is a voluntary specification, studying the health and safety risks could reveal potential issues and promote proper installation practices of low-flow faucets to prevent problems. The Water Research Foundation has researched this issue (and suggested that further study is needed [12]), but results may inform the EPA's approach to low-flow faucets (see Appendix A).

d. Water savings from lower flow rate faucets may not be realized in every home.

Reducing a faucet's maximum flow rate will not save water for volumetric uses, such as filling a vessel or heating water, but will increase the time required to complete the task. The CA IOUs could not find any research on the time private lavatory faucet users spend performing volumetric versus non-volumetric tasks. We recommend that EPA investigate or conduct field monitoring to establish a duty cycle for faucets based on their average use patterns, as faucet use is often related to volumetric tasks like waiting for hot water. This research will help identify potential water savings from the WaterSense specification at both the user and state or national level.

For non-volumetric uses, reducing the maximum flow rate of a private lavatory faucet will only save water if the new maximum flow rate is lower than the actual historical flow rate preferred by the user. For example, reducing the maximum flow rate from 2.2 to 2.0 gpm will save 0.2 gpm, but only if the user operates the faucet at the maximum flow rate. However, reducing the maximum flow rate from 2.2 gpm to 2.0 gpm will not save any water if the user already operates the faucet at any flow rate less than 2.0 gpm.

The Water Research Foundation conducted two studies in 1999 and 2016 that offer insight into the users' preferred flow rates.[13] The *Residential End Uses of Water* studies collected data by attaching a data logger to the homes' magnetic drive water meters. This method captured time-stamped flow data through the meters. The studies distinguished residential water uses (e.g., toilet flushes, showers, clothes washing) based on flow rate, duration, and volume. Unfortunately, this method did not allow differentiation between lavatory and kitchen faucet or hose bibb use.

The 2016 study identifies an average combined kitchen/lavatory faucet use duration of 30 seconds and an average volume per use of 0.5 gallon, equating to an average flow rate of 1.0 gpm. Table 6.13 from the study further finds that about 63% of faucet events have an average flow rate of 0.48 gpm, and 95% have an average flow rate at or below 1.39 gpm. While the 2016 study does not delineate between kitchen and lavatory faucet use, it indicates that homeowners operate a significant portion of their use

[11] E.g., California Energy Commission, Appliance Efficiency Pre-Rulemaking, Docket 14-AAER-01, https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=14-AAER-01.
[12] Water Research Foundation Project 4379 Final Report, Denver, CO: Water Research Foundation, 2013. https://www.waterrf.org/research/projects/state-science-and-research-needs-opportunistic-pathogens-premise-plumbing
[13] DeOreo WB, P Mayer, B Dzieglelewski, and J Keifer. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. https://www.waterrf.org/research/projects/residential-end-uses-water-version-2; DeOreo, W. B. and P. W. Mayer. 2000. The End Uses of Hot Water in Single-Family Homes from Flow Trace Analysis. Water Research Foundation. https://www.researchgate.net/publication/252083793_THE_END_USES_OF_HOT_WATER_IN_SINGLE_FAMILY_HOMES_FROM_FLOW_TRACE_ANALYSIS.

well below the available maximum flow rate. The report also found that little water savings resulted from a 1.5 gpm specification level for private lavatory faucets.

DrizzleX, Inc.,[14] a company that installs micro-meters on all water-using fixtures and appliances (where possible) in multi-residential apartment suites, has faucet usage data that may inform these questions. DrizzleX provided the CA IOUs a sample of this data for analysis. The micro-meters record time-stamped water flow for each fixture or appliance and are installed on both the hot and cold water supplies to the kitchen and lavatory faucets.[15] The data sample was from two weeks in six randomly selected California-based apartment suites, each fitted with micro-meters that collected flow volume, time of day, and flow duration. The following tables present the average, median, and maximum flow rates for both cold and hot water usage in lavatory faucets across six suites, with a separate discussion of kitchen faucet data further below. This data is useful because it provides insight into the usage patterns at individual fixtures as opposed to total water usage across a home (which most other studies draw on, then disaggregate).

Table 1 – Lavatory Faucet Cold

Parameter	Suite 1	Suite 2	Suite 3	Suite 4	Suite 5	Suite 6
Average Flow Rate, gpm	0.35	0.39	0.74	0.70	0.90	0.47
Median Flow Rate, gpm	0.36	0.37	0.81	0.80	0.92	0.4
Max Flow Rate, gpm	0.53	0.60	0.96	0.86	1.74	1.13
90th Percentile Flow Rate, gpm	0.46	0.58	0.93	0.84	1.37	0.92
Average Number of Draws per Day	11.1	0.29	26.9	1.14	15.6	4.1

Table 2 - Lavatory Faucet Hot

Parameter	Suite 1	Suite 2	Suite 3	Suite 4	Suite 5	Suite 6
Average Flow Rate, gpm	0.61	0.69	0.72	0.69	0.99	0.81
Median Flow Rate, gpm	0.60	0.74	0.77	0.78	0.92	0.85
Max Flow Rate, gpm	1.00	0.82	0.90	0.90	1.66	1.15
90th Percentile Flow Rate, gpm	0.76	0.78	0.86	0.83	1.53	1.09
Average Number of Draws per Day	12.4	11.71	19.5	5.43	7.30	16.1

In addition, four charts detailing the range of flow rates over the two-week monitoring period were created for each of the six suites. These charts are included in Appendix B.

In most of the sampled sites, hot and cold water were controlled by separate handles, so coincident flows of hot and cold water were infrequent. Analyzing the data could reveal instances of concurrent water usage, allowing for an accurate calculation of the total water draw.

We encourage EPA to investigate data sources, such as DrizzleX, to assess the flow rates typically selected by users and compare these to the proposed WaterSense flow rates. Our analysis of the DrizzleX data and the Water Research Foundation reports indicate that users do not necessarily operate

[14] "Submetering Solution," Drizzlex, n.d., https://www.drizzlex.com/submetering-solution.
[15] Version 1 of the micro-meter collected data regarding flow volume and time of day for each water draw. Version 2 of the micro-meter collected flow volume, time of day, and flow duration.

their faucets at the maximum flow rate. Consequently, reducing the flow rate from 1.5 to 1.2 gpm or lower would result in water savings equivalent to the difference between the actual water use and 1.2 gpm. If the average flow rate is less than 1.0 gpm, then setting a maximum flow rate specification of 1.2 gpm would not likely result in significant water savings for most users. The specification will only save water if the maximum flow rate exceeds 1.2 gpm (see Table 2, Suite 5 above) and during use for non-volumetric purposes. EPA could conduct field research along with this metered data analysis to differentiate between volumetric and non-volumetric events. Such data could help identify an optimal flow rate for water conservation in non-volumetric applications and show consumer-preferred flow rates that are typically below the faucet's maximum capacity.

4. **EPA should establish maximum flow rates for kitchen faucets at 1.8 gpm or lower and investigate performance and consumer acceptance below 1.8 gpm.**

California and many other states have set a maximum flow rate of 1.8 gpm for residential kitchen faucets. Additionally, these regulations allow the faucet to temporarily flow at up to 2.2 gpm for users to perform specific tasks, such as pot filling, where a lower flow rate does not save water but instead increases time. Expanding WaterSense to include kitchen faucets, with a cap at 1.8 gpm, is a minimal-risk opportunity to conserve water in some homes. Adding a minimum flow rate can ensure that these faucets also satisfy consumers even in low-pressure situations.

Kitchen faucets are multifunctional, facilitating hand washing, washing or rinsing dishes, utensils, and vegetables, filling pots and kettles, and rinsing sponges and rags. In contrast, private lavatory faucets are typically dedicated to personal hygiene activities, including hand washing, shaving, face washing, and makeup removal, i.e. non-volumetric applications. Therefore, allowing faucets to operate at a temporary flow rate of up to 2.2 gpm could help consumers reduce time spent filling pots without compromising water savings. Conversely, low flow rates may prolong task completion without yielding significant water savings. Delta introduced a kitchen faucet with a “multi-flow” capability to temporarily increase the on-demand flow rate from 1.5 gpm.[16] We encourage EPA to research multi-flow kitchen faucets for their water-saving ability while maintaining container-filling utility. We recommend that EPA allow for a temporary higher flow rate in WaterSense and require the high-flow actuator to automatically return to the default low flow rate once the user releases it. Actuators that remain on the last setting or require user action to switch to a low flow rate may remain on the higher flow, negating the water-saving benefits of a low flow rate, leading to reduced or no water savings.

A minimum flow rate requirement for kitchen faucets in buildings with low water pressure may ensure user satisfaction even in buildings with low water pressure, fostering continued patronage and usage of WaterSense products, and amplifying the program’s water conservation impact. The CA IOUs are unaware of any literature supporting an appropriate minimum flow rate. However, a 0.8 gpm minimum flow rate aligns with private lavatory faucets and reasonably addresses this potential issue.

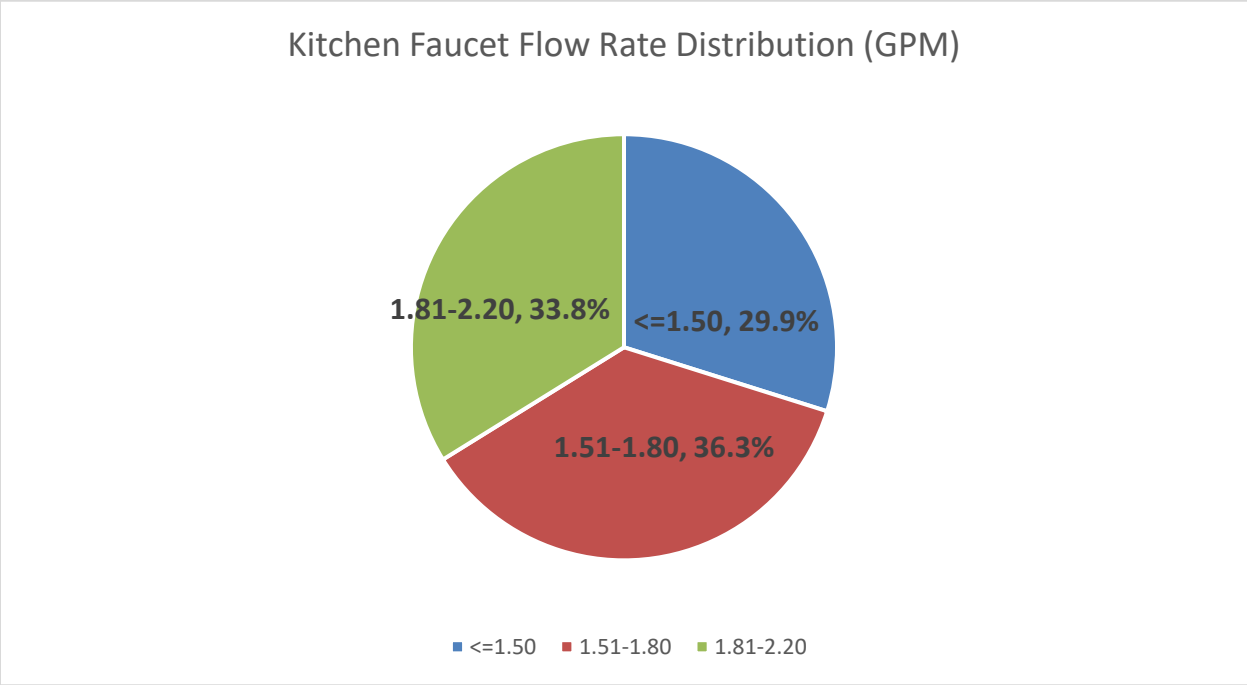
[16] Delta. Multi-flow spray wand. Available at: https://www.deltafaucet.com/design-innovation/innovations/kitchen/multi-flow-spray-wand.

The CA IOUs encourage EPA to investigate setting a maximum flow rate lower than 1.8 gpm for kitchen faucets. To assist EPA in identifying appropriate flow rates for these products, we have researched product availability, consumer satisfaction, and water savings.[17] The results are presented below.

a. Many products with a maximum flow rate of 1.5 gpm are available from multiple manufacturers.

A significant share (almost 30%) of certified kitchen faucets (excluding aerators) in DOE's Compliance Certification Management System (CCMS) database[18] have flow rates at or below 1.5 gpm, as shown in Figure 2 below. The CA IOUs discovered that out of 524 total manufacturers for kitchen faucets, 161[19] offered certified kitchen faucets with a maximum flow rate of 1.5 gpm or lower. Therefore, producing a faucet with a maximum flow rate of 1.5 gpm is feasible with existing technologies. Due to the lack of existing regulations specifying a minimum flow rate and the absence of a requirement for actuators to reset to default levels post-user interaction, additional research may be necessary to verify the technical feasibility of incorporating these technologies while maintaining a 1.5 gpm flow rate.

Figure 2. Percentage of Kitchen Faucet Models Certified by Flow Rate (gpm)



Source: CA IOU analysis of U.S. Department of Energy CCMS database

b. Consumers generally find low-flow faucets satisfactory.

The previously discussed 2005 residential retrofit studies demonstrate that consumers are satisfied with kitchen faucets with a maximum flow rate of 1.5 gpm. Moreover, a 2019 East Tennessee State University

[17] Research on public health concerns related to low-flow faucets is described above for lavatory faucets and also applies to kitchen faucets.
[18] The CA IOUs used CCMS because it includes nationally certified products in this category. It provides a better market view than CEC's MAEDbS, which only includes products at 1.8 gpm or lower.
[19] From CEC's MAEDbS data. As noted above, "manufacturer" is broadly defined, so this data likely overstates the number of individual original equipment manufacturers for these products.

thesis[20] surveyed 626 residents across four apartment complexes, focusing on their experiences with low-flow water devices. The study evaluated devices such as shower heads, kitchen and lavatory faucet aerators, and toilet systems based on performance and the time to deliver hot water. The low-flow rate device for faucets in the study had a maximum flow rate of 1.5 gpm. The study found no significant difference in the performance and satisfaction ratings across different demographic groups and between those who had used nonrestrictive and restrictive devices.

EPA may also consider adding a requirement to WaterSense that kitchen faucets with a flow rate of 1.5 gpm or less have a function or accessory to temporarily increase flow to 2.2 gpm. This addition would address consumer satisfaction issues because kitchen faucets serve more purposes than hand washing. Per our recommendation above, the increase in flow rate should revert to the default low flow rate once the user stops activating the actuator.

c. Further research is needed to determine the water savings associated with a kitchen faucet specification.

As explained above, reducing a faucet's maximum flow rate will not save water for volumetric uses. The CA IOUs found no U.S. research on kitchen faucet usage by task. We recommend that EPA investigate or conduct field monitoring to establish a duty cycle for faucets based on their average use patterns in the U.S. This research will help identify potential water savings from a WaterSense specification at both the user and state or national level.

The tables below present European research on kitchen faucet water use, which revealed significant differences in faucet use by country, emphasizing the need for U.S. data. The researchers used a combination of water meters and webcams to record and categorize use. They found that non-volumetric uses such as dishwashing, cleaning, and washing hands represented most water use by volume. The cooking task shown in the table contains significant non-volumetric use, such as rinsing vegetables.[21]

[20] Farmer, David, "Apartment Residents' Understanding of and Satisfaction with Water Savings Devices" (2019). Electronic Theses and Dissertations. Paper 3595. https://dc.etsu.edu/etd/3595

[21] Richter, C. P., & Stamminger, R. (2012). *Water Consumption in the Kitchen – A Case Study in Four European Countries. Water Resources Management, 26(6), 1639–1649.* doi:10.1007/s11269-012-9976-5, https://typeset.io/papers/water-consumption-in-the-kitchen-a-case-study-in-four-3edrbrhgl6.

Table 3- Average water consumption via kitchen tap per capita per day

Average water use per capita per day in liter(s) (Proportion in diurnal water use in %)	**Germany**	**Italy**	**Sweden**	**United Kingdom**	**Average**
Dishwashing	5.5 (50)	15.6 (66)	12.3 (59)	10.5 (53)	10.9 (58)
Cleaning	1.3 (12)	3.5 (15)	2.6 (12)	3.0 (15)	2.6 (14)
Cooking	1.4 (13)	2.8 (12)	2.2 (11)	2.5 (13)	2.2 (12)
Drinking	1.4 (13)	0.5 (2)	2.4 (11)	1.7 (9)	1.5 (8)
Washing hands	0.7 (6)	1.0 (4)	1.0 (5)	1.4 (7)	1.0 (5)
Other	0.7 (7)	0.2 (1)	0.5 (2)	0.6 (3)	0.5 (3)
Total	11.0 (100)	23.6 (100)	21.0 (100)	19.8 (100)	18.8 (100)

Source: Richter, C. P., & Stamminger, R. (2012). Water Consumption in the Kitchen – A Case Study in Four European Countries. Water Resources Management.

Table 4- Proportions of subcategories in the water consumption for Cleaning and Cooking (All Households)

Cleaning	**Percentage**
Rinsing out cloth/sponge	35.8%
Sink	22.6%
Kitchen	20.7%
Rinsing out packages/containers	9.6%
Other	11.3%

Source: Richter, C. P., & Stamminger, R. (2012). Water Consumption in the Kitchen – A Case Study in Four European Countries. Water Resources Management.

Table 5- Proportions of subcategories in the water consumption for Cooking (All Households)

Cooking	**Percentage**
Washing vegetables	37.4%
Washing fruits	10.2%
Washing meat	3.9%
Water into pot	28.5%
Other	20.0%

Source: Richter, C. P., & Stamminger, R. (2012). Water Consumption in the Kitchen – A Case Study in Four European Countries. Water Resources Management.

The previously mentioned Water Research Foundation studies also offer helpful information on kitchen faucets, which were not disaggregated from residential lavatory faucets or hose bibbs.[22] As the study suggests, if average flow rates are consistently less than 0.5 gpm, implementing a 1.5 gpm maximum water flow specification is unlikely to yield significant water savings in most cases.

[22] DeOreo WB, P Mayer, B Dzieglelewski, and J Keifer. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. https://www.waterrf.org/research/projects/residential-end-uses-water-version-2; DeOreo, W. B. and P. W. Mayer. 2000. The End Uses of Hot Water in Single-Family Homes from Flow Trace Analysis. Water Research Foundation. https://www.researchgate.net/publication/252083793_THE_END_USES_OF_HOT_WATER_IN_SINGLE_FAMILY_HOMES_FROM_FLOW_TRACE_ANALYSIS.

The CA IOUs also analyzed DrizzleX data to show average, median, and maximum flow rates for cold and hot water draws from kitchen faucets in six suites, as shown in the tables below.

Table 6 - Kitchen Faucet Cold

Parameter	Suite 1	Suite 2	Suite 3	Suite 4	Suite 5	Suite 6
Average Flow Rate, gpm	0.63	0.71	0.85	1.25	0.84	1.05
Median Flow Rate, gpm	0.60	0.65	0.90	1.31	0.66	1.06
Max Flow Rate, gpm	1.40	1.20	1.43	1.38	1.80	2.05
90th Percentile Flow Rate, gpm	1.29	1.02	1.20	1.36	1.62	1.80
Average Number of Draws per Day	15.4	3.64	71.9	3.36	12.0	5.14

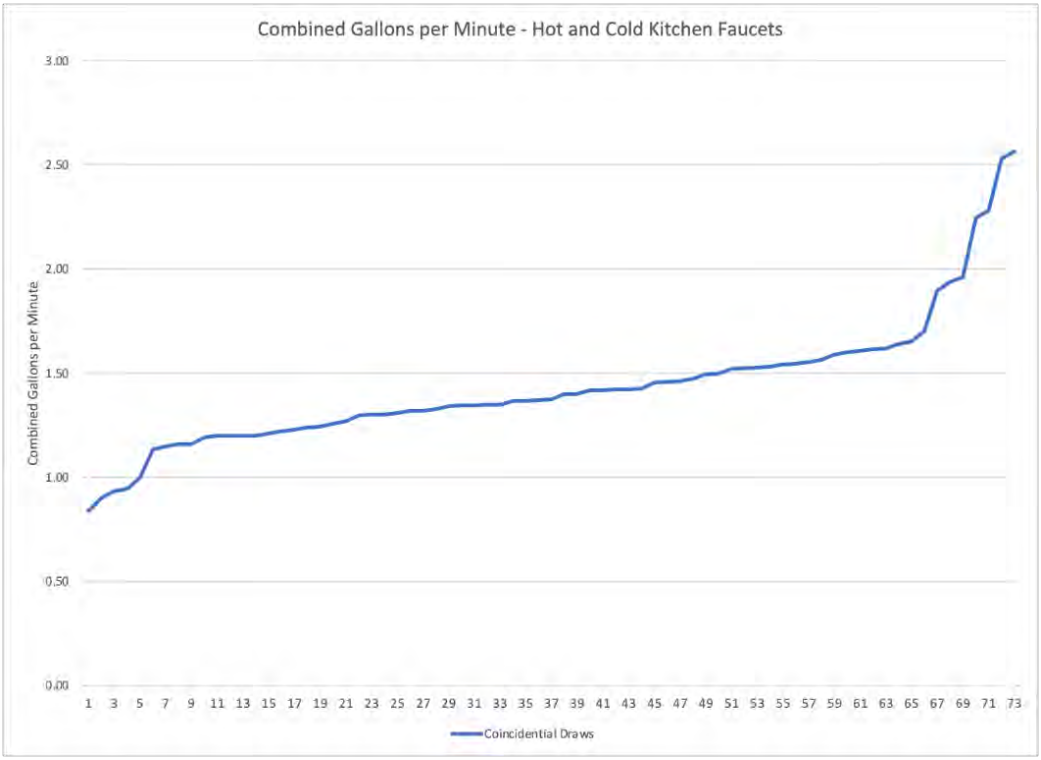
Table 7 - Kitchen Faucet Hot

Parameter	Suite 1	Suite 2	Suite 3	Suite 4	Suite 5	Suite 6
Average Flow Rate, Gpm	0.98	1.00	0.72	1.16	1.01	1.10
Median Flow Rate, Gpm	1.02	1.05	0.74	1.21	0.93	1.08
Max Flow Rate, Gpm	1.38	1.24	1.36	1.4	1.86	2.05
90th Percentile Flow Rate, Gpm	1.29	1.20	1.14	1.38	1.70	1.56
Average Number of Draws per Day	48.1	24.9	25.3	12.14	17.8	27.8

Appendix B's charts further illustrate the range in flow rates for kitchen faucets over the two weeks.

The CA IOUs conducted additional analysis of one site's kitchen faucet to identify the coincident hot and cold water draws and determine the total flow rate at the faucet, which is what a WaterSense specification would affect. This allowed insight into the flow through the fixture whether the water was all hot water, all cold water, or a mixture of both. Over the 14 days, of the 674 hot water draws and 215 cold water draws, about 78 draws involved both hot and cold water. Figure 3 below illustrates the results of this analysis.

Figure 3. Kitchen Faucet Flow Rate in Coincident Hot- and Cold-Water Draws at One Site



Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

As the tables and figure show, most kitchen faucet water draws are lower than a 1.8 gpm flow rate. Under the use profiles exhibited in these studies, a faucet with a maximum flow rate of 1.8 gpm would result in minimal water savings since the conservation achieved is the difference between the maximum flow rate and the actual use in typical situations. The specification may save water when the flow rate exceeds the proposed specification level gpm. However, this savings would only occur if the flow rate is used for non-volumetric purposes. We encourage EPA to conduct additional research on metered flow rates and use case field studies to determine a flow rate for kitchen faucets that can save water in non-volumetric applications without compromising the consumer's use of the faucet for volumetric needs.

d. Kitchen faucets sold with accessories or with different operational modes should be required to certify that all accessories and modes meet the specification requirements.

Kitchen faucets packaged with accessories, such as side sprays, should be required to certify that all accessories comply with the same requirements as stand-alone kitchen faucets. For a kitchen faucet that uses a switch or button to transition between running water and a spray function, both modes would need to comply with the specification requirements. Requiring testing and certification of all accessories sold with the kitchen faucet will ensure that accessories are not achieving higher flow rates that would circumvent the WaterSense specification's goals.

5. WaterSense should consider a specification for commercial kitchen faucets and should require clear marking to distinguish these products from residential kitchen faucets and to allow for data collection and evaluation.

The CA IOUs support developing a WaterSense specification for commercial kitchen faucets. Further research on the usage scenarios, duty cycle, baseline water consumption, and improved efficiency opportunities is necessary to set a standard that meets the market's needs while conserving water. Should EPA decide to include commercial kitchen faucets in the WaterSense certification program, we recommend requiring additional marking and certification to the product to denote its commercial use. By distinguishing WaterSense-labeled commercial kitchen faucets from those intended for residential use, EPA can assess the program's impact on the market share of efficient commercial kitchen faucets and determine the actual water savings from this new specification. If the commercial kitchen faucet specification differs from residential models, they should be marked "For Commercial Use Only" to avoid consumer confusion. This labeling will help consumers choose products that align with their water-saving goals and suit their needs.

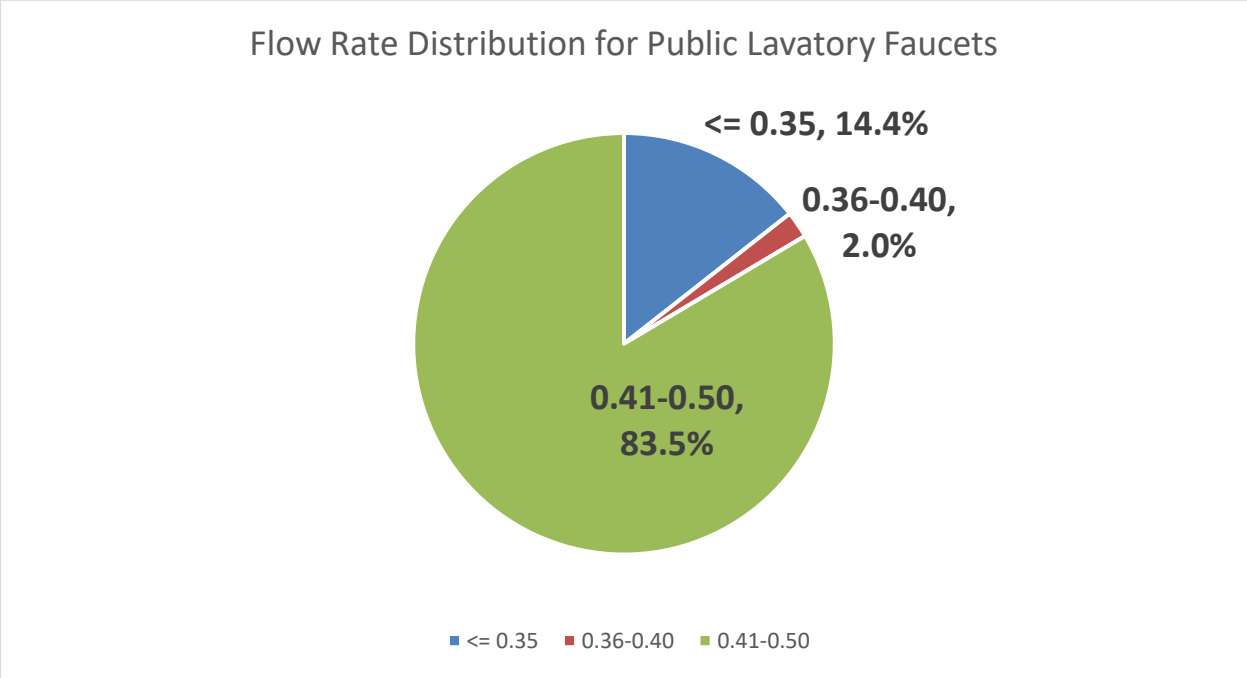
6. EPA should establish maximum flow rates for public lavatory faucets at no higher than 0.4 gpm and investigate performance and consumer acceptance at 0.35 gpm.

a. Flow rates of 0.4 gpm or lower would likely result in significant water savings.

Expanding WaterSense to public lavatory faucets and establishing a maximum flow rate could yield significant water savings. ANSI/ASME A112.18.1 sets a maximum low rate of 0.5 gpm for public faucets. WaterSense should consider levels below 0.5 gpm for public lavatory faucets to increase water savings. The CA IOUs reviewed the CEC's Modernized Appliance Efficiency Database System (MAEDbS) data[23] for low-flow rate products at the levels suggested in the NOI. The data presented in Figure 4 indicates that over 80% of products have flow rates between 0.41 and 0.50 gpm, with at least 14% of certified products at or below 0.35 gpm. Few products are certified with rates between 0.35 and 0.40 gpm. Sixteen manufacturers have products rated at 0.35 gpm or less.

[23] The CA IOUs used MAEDbS data as the only complete source of certified public lavatory faucets. Although CCMS appears to include public lavatory faucets, they are not distinguished from private ones, making them difficult to analyze.

Figure 4. Percentage of Public Lavatory Faucet Models Certified by Flow Rate (gpm)



Source: CA IOU analysis of MAEDbS data

The EPA's decision-making process regarding public lavatory faucet levels should be distinct from private lavatory faucets. Design professionals, building owners, and building managers, rather than end consumers, are usually responsible for selecting public lavatory faucets, which are almost exclusively used for hand washing. Businesses typically do not base their purchasing decisions on user preferences. However, EPA should consider factors like balancing a low flow rate and the duration required for effective handwashing, ensuring that extended use does not negate water conservation efforts. Public health and safety concerns with low-flow-rate faucets are also important to enhance market penetration.

Automatic public lavatory faucets have the potential to save even more water than manual faucets at equivalent flow rates.[24] However, we recommend that EPA allow both manual and automatic public lavatory faucets to qualify for the WaterSense label, allowing for more product options at various price points to meet business needs.

b. EPA should require manufacturers to mark public lavatory faucets as "Not for Home Use."

EPA proposes that public lavatory faucets be marked as "not for private lavatory use" to discourage installation in private settings where users may experience dissatisfaction. We agree that marking public lavatory faucets is important, but we recommend that these faucets be marked as "Not for Home Use" or "For Commercial Use Only" to advertise the intended use for consumers more clearly.

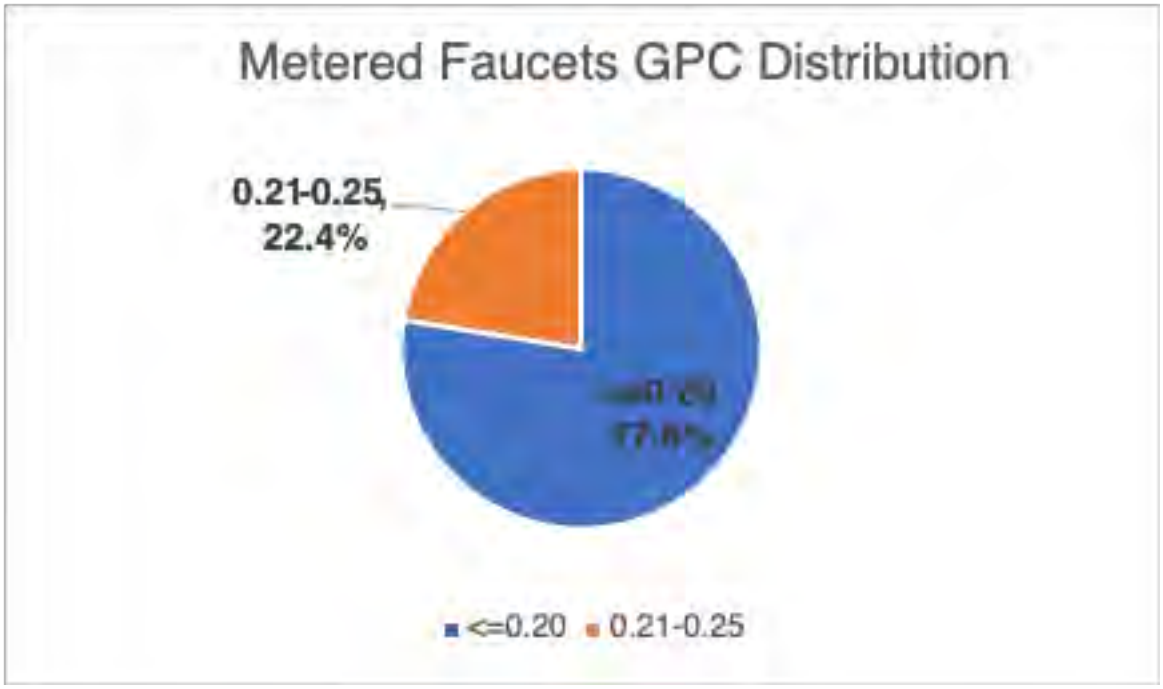
[24] Harmon, Alyssa. 2016. "Do automatic water faucets actually save water? A comparative test of manual and automatic water faucets at California State University, Sacramento." https://www.csus.edu/experience/innovation-creativity/sustainability/_internal/_documents/ir-faucet.pdf.

7. **EPA should set a maximum gallons-per-cycle rate of 0.2 for metering and self-closing faucets.**

Expanding the WaterSense program to include metering and self-closing faucets presents an additional opportunity for water savings. However, the CA IOUs disagree with EPA's proposal to treat these products like public and private lavatory faucets by establishing a maximum gpm flow rate. Automatic faucets conserve water by turning off the flow of water after a set time or amount of water. Establishing a maximum flow rate for a product that uses time as the flow constraint will not yield water savings. Because federal standards for these products apply a maximum gallon-per-cycle (gpc) requirement, using a maximum gpm flow rate will cause market confusion and increase the testing and certification burden for manufacturers.

The CA IOUs suggest the maximum flow rates for metering and self-closing faucets align with California's 2022 CALGreen code's mandatory 0.2 gpc requirement rather than with the gpm flow rate for public and private lavatory faucets. This alignment will yield savings over the 30-year-old Energy Policy Act of 1992 federal standard of 0.25 gpc. We determined that more than 77% of CCMS-certified metering faucets have a maximum rate of 0.20 gpc or less and are produced by multiple manufacturers, as illustrated in Figure 5.

Figure 5. Percentage of Metering Faucet Models Certified by gpc



Source: CA IOU analysis of CCMS Database

We also recommend EPA require manufacturers to report either flow rate in gpm or the length of the faucet cycle as part of cetifying to WaterSense. This would allow consumers to compare metering faucets with other types of lavatory faucets in terms of total water consumption over time and decide which faucet type is most appropriate for their application.

8. **EPA should incentivize cold-start faucets as an energy-saving measure.**

Cold-start faucets require a deliberate hot water release, saving energy associated with hot water use. The CA IOUs encourage EPA to consider a mark or certification for cold-start faucets, highlighting the energy-saving benefits. However, EPA should **not require** faucets to have a cold-start feature to qualify for the WaterSense label, nor should it allow a cold-start feature to be a trade-off for meeting the specification's maximum flow rates, as this would degrade the meaning of the WaterSense label and reduce the program's water savings.

9. **The CA IOUs submit available data and studies and recommend further research related to low-flow faucets.**

The CA IOUs have sourced studies that contribute valuable information to the EPA's water savings analysis and other aspects of the faucet specification. Appendix A has a bibliography of available studies and data. We recommend that EPA conduct additional research on water savings, public health and safety concerns, and user satisfaction with lavatory and kitchen faucets at varying low-flow rates.

WaterSense has a mandate to save water. Although engineering analyses can be used to calculate water savings at lower flow rates, residential end-use studies are more ambiguous about the impact of low-flow faucets.[25] The 2016 Water Research Foundation residential end-use study found that WaterSense faucets did not significantly save water because 95% of faucets had an average flow rate of 1.39 gpm or less, and the average flow rate overall was about 1.0 gpm (both are below the maximum allowable flow rate for the fixture).[26] The study did not disaggregate different faucet types (e.g., lavatory, kitchen, or laundry) or monitor faucet uses (e.g., washing hands or dishes versus filling a receptacle), which would affect the potential water savings at various flow rates. This research suggests that WaterSense faucets did not attain significant water savings because the maximum flow rates in the specification were too high; thus lower maximum flow rates may be necessary to achieve desired water savings.

Further investigation is required to understand baseline water consumption and the efficacy of low-flow faucets. The research should determine the average water usage per activation (considering that faucets are not always operated at maximum flow rate), the duty cycle (the proportion of time faucets are used for various tasks such as handwashing, shaving, filling a receptacle, rinsing dishes, and waiting for hot water), the comparative savings from using hot versus cold water, and the difference across faucet categories (such as lavatory, kitchen, or hose bibb). This will inform future opportunities for water savings from faucets and ensure that WaterSense-labeled products result in significant water savings for consumers.

Because WaterSense is a voluntary specification, ensuring user satisfaction with the products is critical to the program's success. A few studies suggest that users are satisfied with water-efficient faucets. However, further research may be necessary to understand user satisfaction with flow rates lower than those mandated in California.

The CA IOUs appreciate the opportunity to comment on the EPA's "WaterSense NOI to Revise the *High-Efficiency Lavatory Faucet Specification*." We thank EPA for its consideration. We look forward to the next steps in the process.

[25] DeOreo et al., Residential End Uses of Water, Version 2, Water Research Foundation, 2016, https://www.waterrf.org/research/projects/residential-end-uses-water-version-2.
[26] Ibid., page 213.

Sincerely,

Rob Bohn
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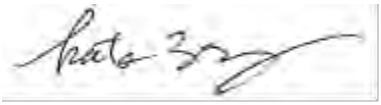

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ETP/C&S/ZNE Manager
Customer Programs
San Diego Gas & Electric Company

Appendix A: Faucet and Water Use Studies and Data

In response to the NOI, the CA IOUs conducted a non-exhaustive search for additional studies and data to inform EPA's revision to the WaterSense faucet specification. Below are the studies and data we found that may aid EPA in its investigation of lower flow rate levels for the different faucet types.

Aquacraft. 2005. Water and Energy Savings from High-Efficiency Fixtures and Appliances in Single-Family Homes. Prepared for U.S. Environmental Protection Agency. http://www.aquacraft.com/wp-content/uploads/2015/09/EPA-Combined-Retrofit- Report.pdf.

Chen, Y, H Fuchs, J Schein, VH Franco, H Stratton, TA Burke, and C Dunham. 2021. *Water heating energy use reduction from EPA WaterSense lavatory plumbing fittings*, Resources, Conservation and Recycling 174, 105781. https://doi.org/10.1016/j.resconrec.2021.105781

Chen, Y, H Fuchs, J Schein, VH Franco, H Stratton, and C Dunham. 2020. *Calculating average hot water mixes of residential plumbing fixtures.* Lawrence Berkeley National Laboratory, Berkeley, California. Microsoft Word - LBNL_HW Mixes_Final Draft_HF-7.docx (lbl.gov)

CSA Group. 2020. "Testing the Effect of Faucet Flowrate on Handwashing Efficacy" (2020). CSA Group. https://www.csagroup.org/wp-content/uploads/CSA-Group-Research-Faucet-Flowrate-Handwashing-Efficacy.pdf

DeOreo, W.B., P. Mayer, B. Dzieglelewski, and J. Keifer. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. https://www.waterrf.org/research/projects/residential-end-uses-water-version-2.

DeOreo, W. B. and P. W. Mayer. 2000. The End Uses of Hot Water in Single-Family Homes from Flow Trace Analysis. Water Research Foundation. https://www.researchgate.net/publication/252083793_THE_END_USES_OF_HOT_WATER_IN_SINGLE_FAMILY_HOMES_FROM_FLOW_TRACE_ANALYSIS

Edwards, Mark. 2015. "Green Building Design: Water Quality Considerations" Water Research Foundation Report #4383. https://www.waterrf.org/research/projects/green-building-design-water-quality-considerations

Farmer, David. 2019. "Apartment Residents' Understanding of and Satisfaction with Water Savings Devices." *Electronic Theses and Dissertations*. Paper 3595. 2019. https://dc.etsu.edu/etd/3595.

GMP Research Inc. 2019. "2019 U.S. WaterSense Market Penetration," June 2019. https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

Harmon, Alyssa. 2016. "Do automatic water faucets actually save water? A comparative test of manual and automatic water faucets at California State University, Sacramento." https://www.csus.edu/experience/innovation-creativity/sustainability/_internal/_documents/ir-faucet.pdf.

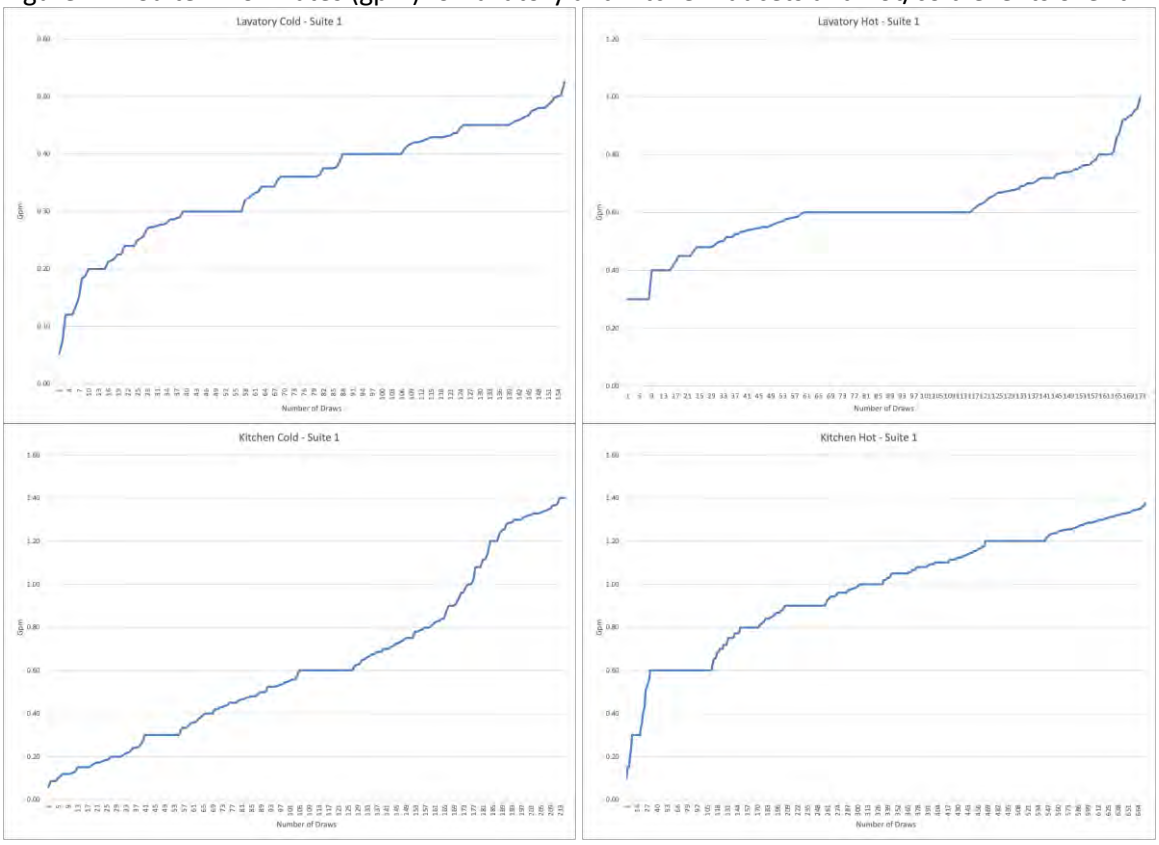
Pruden, Amy. 2013. *State of the Science and Research Needs for Opportunistic Pathogens in Premise Plumbing*. Water Research Foundation Report #4379. https://www.waterrf.org/research/projects/state-science-and-research-needs-opportunistic-pathogens-premise-plumbing

Richter, C. P. & Stamminger, R. 2012. Water consumption in the kitchen–a case study in four European countries. *Water resources management*, *26*, 1639-1649. https://doi.org/10.1007/s11269-012-9976-5

Appendix B: Faucet Flow Rate (gpm) over a two-week period

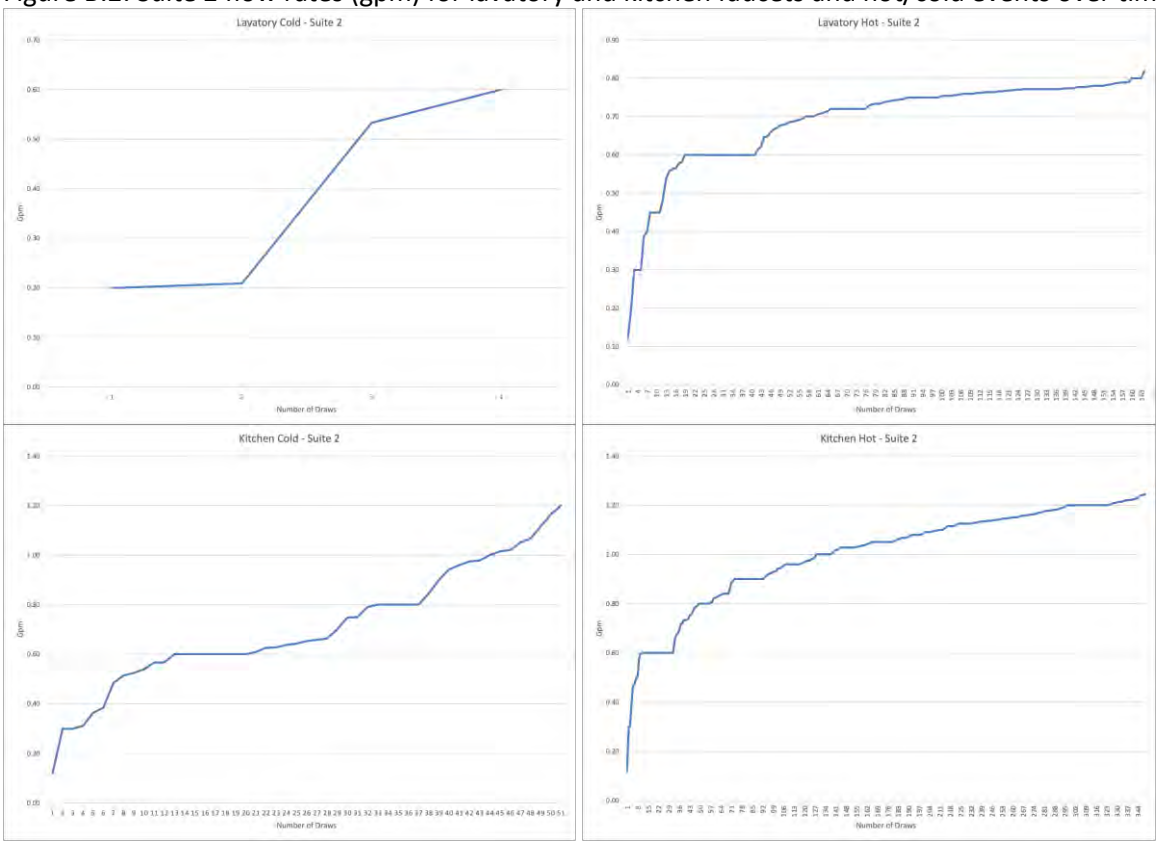
The following charts illustrate the range in flow rates over a two weeks from six suites monitored with DrizzleX Version 2 micro-meters. The six suites were randomly selected from a database of sites in California.

Figure B.1: Suite 1 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



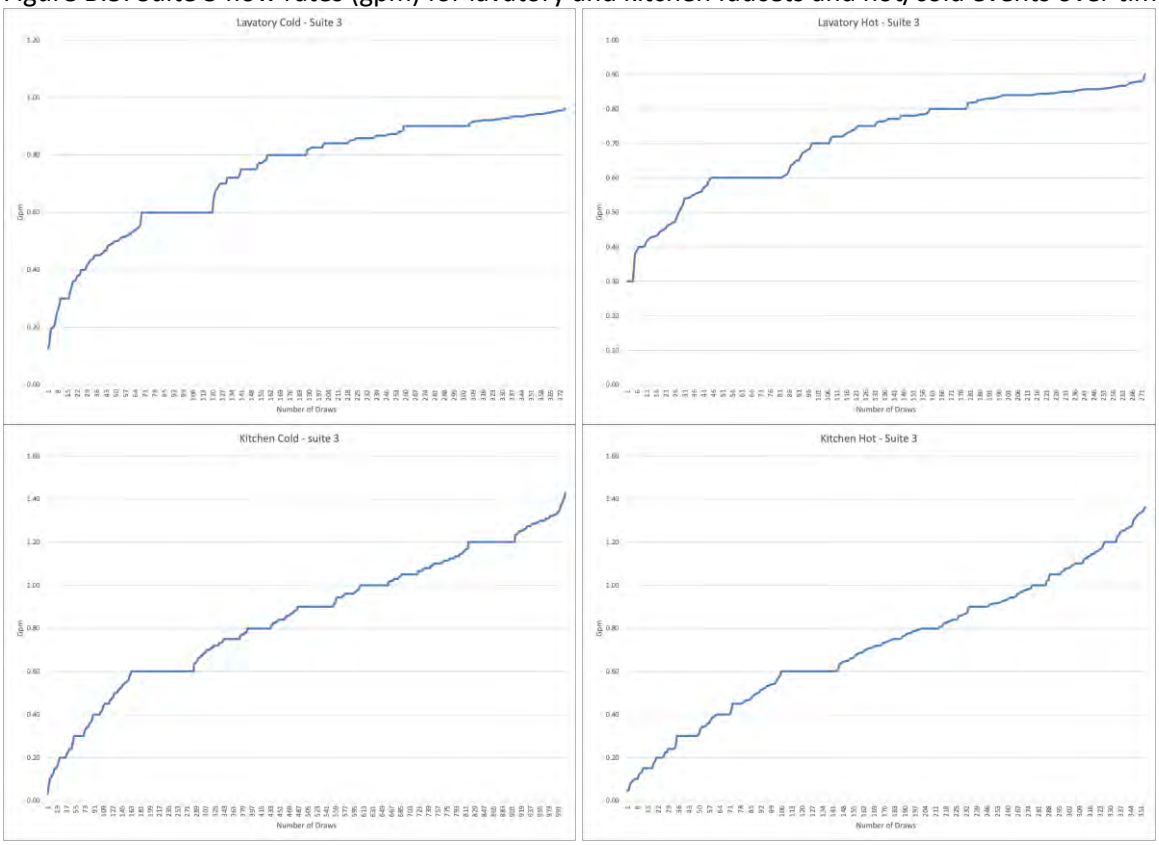
Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Figure B.2: Suite 2 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



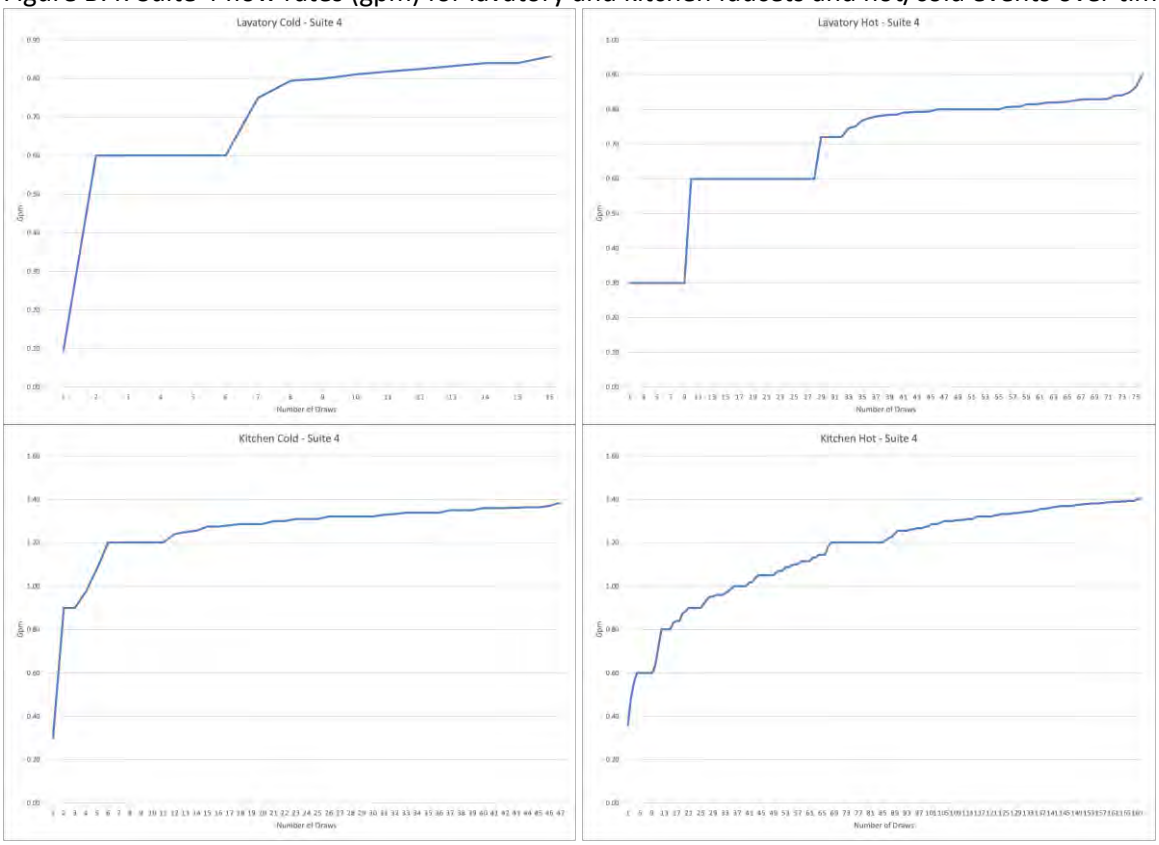
Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Figure B.3: Suite 3 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



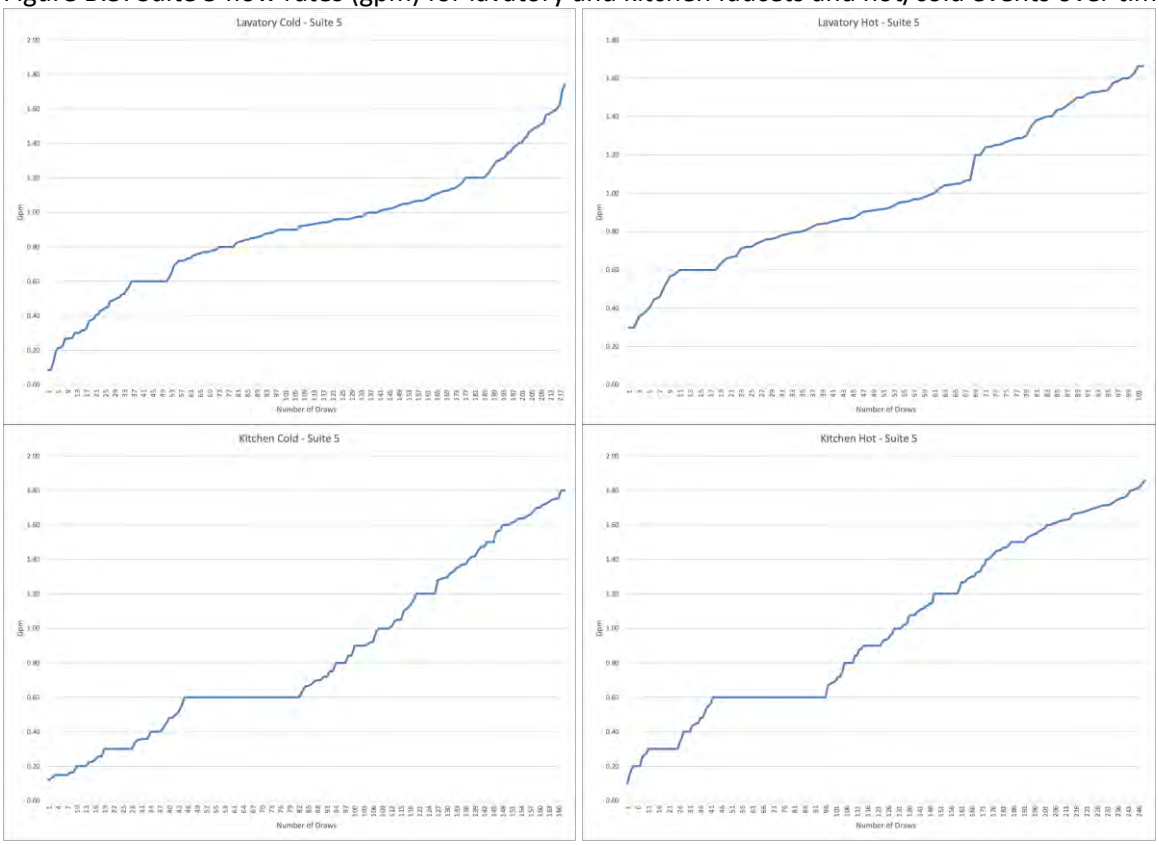
Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Figure B.4: Suite 4 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



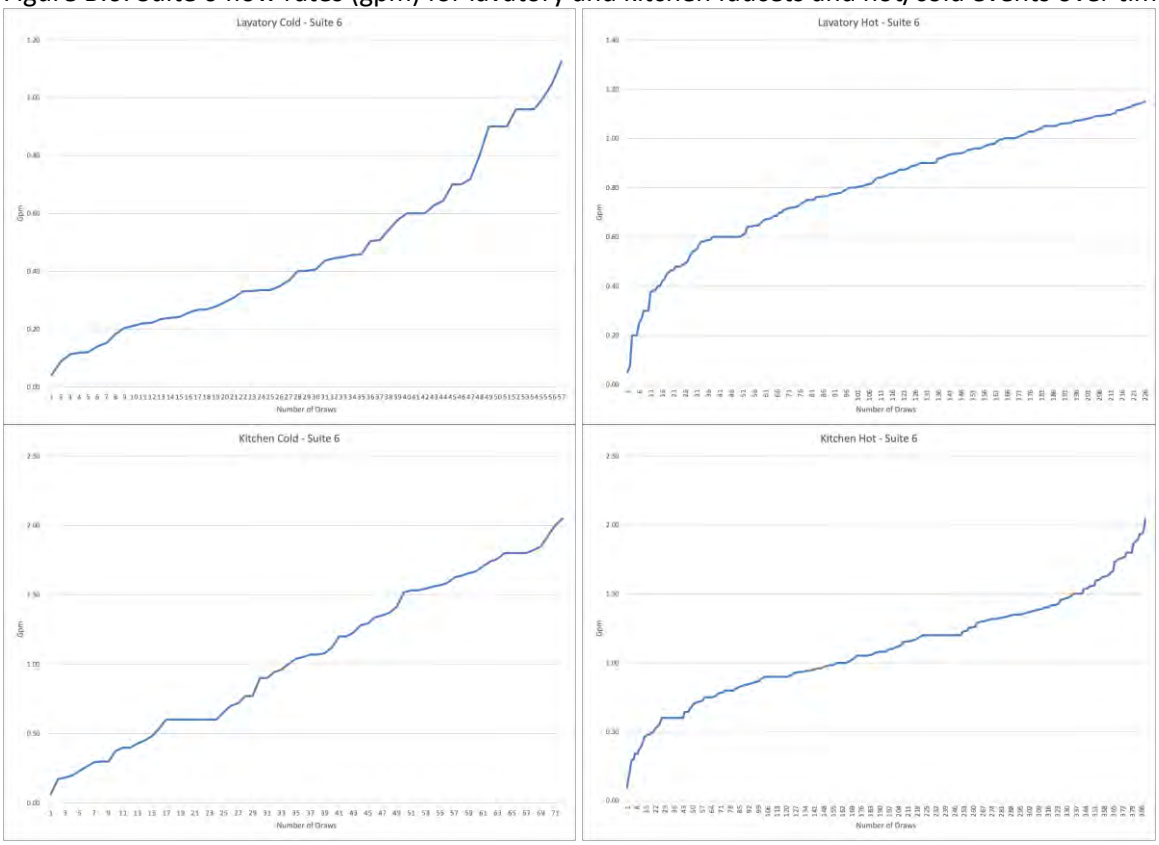
Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Figure B.5: Suite 5 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Figure B.6: Suite 6 flow rates (gpm) for lavatory and kitchen faucets and hot/cold events over time



Source: Gauley Associates analysis of DrizzleX data on behalf of CA IOUs

Appendix C: Water Saving Calculation Estimates

The CA IOUs estimated the national and household potential water and energy savings from an updated WaterSense faucet specification. Several assumptions were necessary to identify potential savings. This appendix provides these assumptions as a starting point for EPA's consideration of water savings based on an updated WaterSense faucet specification. Table C.1 summarizes the national technical savings potential from an updated WaterSense faucet specification.

Table C.1. Estimated national savings from updated WaterSense faucet specification

Product	Baseline Flow Rate	Updated Flow Rate	Year 1 Water Savings (gallons per year)	Water Savings (gallons per year) for full stock turnover	Quad Savings for Full Stock Turnover
Private Lavatory Faucets	1.5 gpm	1.2 gpm	7.2 billion	110.0 billion	0.05
		1.0 gpm	12.1 billion	183.3 billion	0.08
Residential Kitchen Faucets	2.2 gpm	1.8 gpm	24.3 billion	364.9 billion	0.15
		1.5 gpm	42.5 billion	638.5 billion	0.27
Public Lavatory Faucets	0.5 gpm	0.4 gpm	N/A	2.3 billion	0.00
		0.35 gpm	N/A	3.4 billion	0.00

Source: CA IOU engineering analysis

Energy Savings

Heating water for faucet use requires energy. This analysis assumes that the average water temperature would be heated from 57°F to 120°F, representing a 63°F increase.

The temperature of shallow groundwater in the U.S. varies from 37°F to 77°F. The analysis uses the median value of the range, 57°F. Based on EPA's recommendation for water storage temperature, the assumed hot water supply temperature is 120°F.[27]

Standard thermodynamics calculations are then used to determine the amount of energy required to heat a gallon of water, as shown below.

$$Q = c\rho\Delta T$$

where, Q = energy required to heat water (BTU/gal)
c = specific heat of water (BTU/lb-°F)
ρ = density of water (lb/gal)
ΔT = temperature change (°F)

Losses due to water heater inefficiencies are accounted for by dividing by water heater energy factors for electric or natural gas heating, as listed in Table C.2. The analysis uses energy efficiency assumptions for water heaters based on the U.S. Department of Energy's (DOE) data, specifically drawn from the

[27] "Pollution Prevention Tips for Energy Efficiency," US EPA, January 2, 2024, https://www.epa.gov/p2/pollution-prevention-tips-energy-efficiency.

"Energy and Water Use Analysis" section in the *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Dishwashers, April 2023.*[28]

Standard energy conversion factors were used to convert BTUs into electricity or natural gas required to heat one gallon of water.

$$\frac{therms}{gallon} or \frac{kWh}{gallon} = Q \div Water\ Heater\ Energy\ Factor\ x\ Energy\ Conversion\ Factor$$

Finally, the annual energy consumption of natural gas or electricity required for heating faucet water is calculated by multiplying the energy required to heat one gallon by the volume of hot water used per faucet per year. We assumed that 73% of the water used in lavatory faucets is hot water, per the EPA WaterSense Calculator.[29] According to the 2020 Residential Energy Consumption Survey (RECS), residential electric and natural gas water heaters are nearly equally prevalent.[30] Therefore, we assumed a 50/50 split between electric and natural gas consumption for the energy-saving calculations. Commercial facilities have a 57/43% split between natural gas and electric heaters, based on the 2018 Commercial Buildings Energy Consumption Survey (CBECS) for energy end uses by floor space.[31]

Table C.2 presents the assumptions used to calculate the annual electricity and natural gas use for water heating per faucet.

[28] Energy Efficiency and Renewable Energy Office, "2023-04 Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Dishwashers, April 2023," Regulations.gov, May 4, 2023, https://www.regulations.gov/document/EERE-2019-BT-STD-0039-0032.

[29] "How The WaterSense Calculator Works," US EPA, February 13, 2024, https://www.epa.gov/watersense/how-watersense-calculator-works. https://www.epa.gov/watersense/how-watersense-calculator-works.

[30] U.S. Energy Information Administration, "Table HC1.1 Fuels Used and End Uses in U.S. Homes, by Housing Unit Type, 2020," eia.gov, March 2023, https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%201.1.pdf.

[31] U.S. Energy Information Administration, "Table B22. Energy End Uses, Floorspace, 2018," eia.gov, December 2018. https://www.eia.gov/consumption/commercial/data/2018/bc/pdf/b22.pdf.

Table C.2. Assumptions Used to Calculate Annual per Unit Energy Use for Water Heating

Metric	Value	Source
Physical Properties of Water		
Specific Heat of Water at 100°F, 1 atm	0.998 BTU/lb-°F	
Density of Water at 100°F, 1 atm	8.29 lbs/gal	
Energy Conversion Factors		
	3,412 BTU/kWh	U.S. EIA
	100,000 BTU/therm	U.S. EIA
	1,000,000,000,000,000 BTU/quad	U.S. EIA
Electric Water Heater Efficiency	1.03	DOE TSD for Dishwashers (2023)
Natural Gas Water Heater Efficiency	0.80	DOE TSD for Dishwashers (2023)
Percentage of residential water heaters that are natural gas	50%	RECS 2020 (EIA)
Percentage of residential water heaters that are electric	50%	RECS 2020 (EIA)
Percentage of commercial water heaters that are natural gas	57%	CBECS 2018 (EIA)
Percentage of commercial water heaters that are electric	43%	CBECS 2018 (EIA)
Temperature Change (ΔT)	63 °F	
Cold water inlet temperature	57 °F	EPA (Average ground water temp)
Hot water supply temperature	120 °F	EPA Recommendation
Percent of all Water Use that is Hot Water	73%	EPA WaterSense Calculator

Private Lavatory Faucets

To calculate water usage and savings for private lavatory faucets, we determined the frequency of faucet use per day and the associated water consumption per use event. To estimate daily household lavatory usage, we assumed that with every flushed toilet and shower, the bathroom faucet was used. This estimate is conservative, considering that lavatory faucets are also used for other activities such as washing faces, shaving, and brushing teeth. The number of faucets per household is derived by dividing the total number of faucets by the number of U.S. households. The annual water use per faucet is calculated assuming that the average duration of a faucet event is 30 seconds. These factors are assumed to be constant regardless of the flow rate.

Table C.3 presents the assumptions used to calculate the annual per-unit water use and savings for private lavatory faucets with flow rates ranging from 1.5 to 1.0 gallons per minute. According to the PMI Report, the total number of faucets is 488.5 million and 99% of new faucets for sale today meet the EPA WaterSense criteria. Faucet sales per year were derived by taking the current faucet stock and dividing it

by PMI's assumed faucet design life of 15 years. This figure is based on data from the NAHB/Bank of America Study of Life Expectancy of Home Components, InterNACHI's standard estimated life expectancy for homes, and input from manufacturers.

The Aquacraft 2016 PowerPoint report states that the average duration of a faucet event is 30 seconds. Additionally, it indicates five toilet flush events per person per day and 0.69 showers per person per day. The average household size is 2.57 people per the U.S. Census Bureau, with an estimated 14.6 lavatory faucet events per day per household. This number is derived by adding the shower and flush events per person and multiplying by the average number of people per household. The total number of U.S. households is 137.4 million, with 334.5 million total bathrooms, averaging 3.56-bathroom faucets per household.

Table C.3. Assumptions Used to Calculate the Annual Water Savings from Updated EPA WaterSense Standards for Private Lavatory Faucets

Metric	**Value**	**Source**
Total faucets	488,508,357	PMI Report
% of faucets for sale that meet EPA WaterSense criteria	99%	PMI Report
Faucet sales per year	32,567,224	PMI Report – faucet design life of 15 years
Average duration of faucet event (seconds)	30	Aquacraft 2016 PowerPoint
Flushes per person per day	5	Aquacraft 2016 PowerPoint
Showers per person per day	0.69	Aquacraft 2016 PowerPoint
People per household	2.57	U.S. Census Bureau (2018-2022)
Lavatory faucet events per day per household	14.6	
US Households	137,407,308	PMI Report
Total bathrooms	334,594,765	PMI Report
Bathroom faucets per household	3.56	

Table C.4. Annual Water Savings from Updated EPA WaterSense Standards for Private Lavatory Faucets

GPM Flow rate	**1.5**	**1.2**	**1.0**
Water consumption (gallons per household per year)	4,003	3,203	2,669
Total household water consumption (Billion gallons per year)	550	440	367
Total baseline energy consumed for water heating (quads/year)	0.2324	N/A	N/A
Savings relative to 1.5 gpm flow rate, per household (gallons per household per year)	N/A	801	1,334
Savings relative to 1.5 gpm flowrate over faucets lifetime (gallons)	N/A	12,009	20,016
Savings relative to 1.5 gpm flow rate, per faucet (gallons per faucet per year)	N/A	225	375
Total annual savings (year 1, billion gallons, total faucets)	N/A	7	12
Total annual savings (year 15, full stock turnover, billion gallons, total faucets)	N/A	110	183
Total annual energy savings (year 1, quads, total faucets)	N/A	0.003	0.005
Total annual energy savings (year 15, full stock turnover, quads, total faucets)	N/A	0.046	0.077

Table C.4 presents the potential water and energy savings from using faucets with lower flow rates with two scenarios: replacing 1.5 GPM faucets with either 1.2 GPM or 1.0 GPM. In the first scenario, replacing faucets and aerators with 1.2 GPM flow rates can save an average household around 801 gallons of water annually, amounting to 12,009 gallons over the faucet's lifetime. Consumers could save approximately 110 billion gallons of water and 0.0464 quads of energy if every person made this replacement. In the second scenario, using 1.0 GPM faucets instead can increase the annual savings to 1,334 gallons per household, or 20,016 gallons over the faucets' lifetime. If implemented nationwide, the savings could reach 183 billion gallons of water and 0.077 quads of energy.

Kitchen Faucets

The methodology for calculating the annual water used from kitchen faucets (and thus, potential savings for reductions in flow rates) is the same as the methodology described above for private lavatory faucets, with the following two modifications.

The lavatory faucet events are subtracted from estimates of total faucet events per household per day to calculate the number of kitchen faucet events per household per day.

Consumers use kitchen faucets to fill pots and basins. Reducing the faucet flow rate will decrease the water used for washing and rinsing dishes, but it will not reduce the water used for filling a vessel. The 2013 Codes and Standards Enhancement (CASE) report for residential faucets and accessories estimates

that each faucet uses three gallons of water per day to fill basins. Table C.5 presents the assumptions used to calculate annual water usage for kitchen faucets and potential savings for flow rate reductions.

Table C.5. Assumptions Used to Calculate the Annual Water Savings from Updated EPA WaterSense Standards for Kitchen Faucets

Metric	**Value**	**Source**
Number of kitchen faucets per household	1.04	CASE Report
US Households	137,407,308	PMI Report
Total kitchen faucets	142,903,600	
Kitchen sink lifespan, years	15	Household Manuals
Kitchen faucet sales per year, US	9,526,907	PMI Report; assuming same assumptions for design life of bathroom faucets
Water used for pots/pan filling (gal/day)	3	CASE Report
Average duration of faucet event (seconds)	30	Aquacraft 2016 PowerPoint
Total faucet events per day	51	Aquacraft 2016 PowerPoint
Kitchen faucet events per day per household	36.4	Aquacraft 2016 PowerPoint
People per household	2.57	U.S. Census Bureau (2018-2022)

Table C.6. Annual Water Savings from Updated EPA WaterSense Standards for Kitchen Faucets

GPM Flow rate	**2.2**	**1.8**	**1.5**
Water consumption (gallons per household per year)	14,605	11,950	9,958
Total household water consumption (billion gallons per year)	2,007	1,642	1,368
Total baseline energy consumed for water heating (quads/year)	0.85	N/A	N/A
Savings relative to 2.2 gpm flow rate, per household (gallons per household per year)	N/A	2,655	4,647
Savings relative to 2.2 gpm flowrate over faucets lifetime (gallons)	N/A	39,832	69,707
Savings relative to 2.2 gpm flow rate, per faucet (gallons per faucet per year)	N/A	2,553	4,468
Total annual savings (year 1, billion gallons, per faucet)	N/A	24	43
Total annual savings (year 15, full stock turnover, billion gallons)	N/A	365	639
Total annual energy savings (year 1, quads, total faucets)	N/A	0.01	0.02
Total annual energy savings (year 15, full stock turnover, quads, total faucets)	N/A	0.15	0.27

Table C.6 illustrates the potential savings for each household and faucet compared to a 2.2 GPM flow rate. It also shows the total annual savings for the first year and after 15 years, assuming a full stock turnover. In the first scenario, replacing 2.2 GPM faucets and aerators with 1.8 GPM flow rates can save an average household around 2,655 gallons of water annually. This figure equates to 39,832 gallons over the faucets' lifetime. If every house made this switch, it could lead to savings of approximately 364.8 billion gallons of water and 0.1542 quads of energy. In the second scenario, using 1.5 GPM faucets instead can increase the annual savings to 4,647 gallons per household, or 69,707 gallons over the faucets' lifetime. If implemented nationwide, the savings could reach 638.5 billion gallons of water and 0.2698 quads of energy.

Public Lavatory Faucets

The methodology for calculating annual water used from public lavatory faucets (and thus potential savings for reductions in flow rates) differs slightly from the above methodologies for kitchen and bathroom sinks due to limited market data available for these faucets.

Table C.7 lists assumptions for calculating potential water savings for public lavatory faucets. According to the PMI Report, public restrooms have 124 million toilets and 54.5 million urinals. The total number of faucets, 151.4 million, is calculated based on a 1:1 ratio to toilets and a 1:2 ratio to urinals per the IPC Code.

The Centers for Disease Control and Prevention (CDC) recommends washing hands for at least 20 seconds to reduce the spread of germs. A Bradley Corporation survey revealed that 60% of Americans

use public restrooms one to five times per week, while an additional 21% use them between six to fifteen times per week. Assuming an average of three visits per week for the former group and ten visits for the latter, we estimate that faucets are used approximately 604.6 million times per week by 60% of the population and 705.3 million times per week by 21% of the population.

Table C.7. Assumptions Used to Calculate the Annual Water Savings from Public Lavatory Faucets

Metric	Values	Source
Total toilets	124,126,937	PMI Report
Total urinals	54,565,990	PMI Report
Total faucets (1:1 ratio to toilets, 1:2 ratio urinals)	151,409,932	IPC Code
Duration of hand washing event (seconds)	20	CDC
US Population	335,900,000	U.S. Census Bureau
Weekly faucet events for 60% of population	604,620,000	Bradley Corporation
Weekly faucet events for 21% of population	705,390,000	Bradley Corporation

Table C.8 provides calculations for the total water consumed annually in gallons at different flow rates, specifically from 0.5 to 0.35 GPM. For flow rates of 0.5, 0.4, and 0.35 GPM, the total water consumed per year are 11.3 billion gallons, 9.0 billion gallons, and 7.9 billion gallons respectively. This equates to water consumed per faucet per year as 75 gallons, 60 gallons, and 52 gallons respectively.

Consider two scenarios where all public lavatory faucets are replaced with more efficient flow rates, assuming a 0.5 GPM flow rate baseline:

- Scenario 1: Replacing faucets with 0.4 GPM flow rates could save 15 gallons of water per faucet, leading to a total savings of 2.3 billion gallons per year. This water conservation translates into 0.0009 quads of energy saved.
- Scenario 2: Replacing faucets with 0.35 GPM flow rates could save 22 gallons of water per faucet, leading to a total savings of 3.4 billion gallons per year. The energy saved would be 0.0014 quads.

Table C.8. Annual Water Savings from Public Lavatory Faucets

GPM Flow rate	0.5	0.4	0.35
Total water consumed per year (billions gallons/year)	11,353,420,000	9,082,736,000	7,947,394,000
Water consumed per faucet per year (gallons)	75	60	52
Savings per faucet per year (gallons)	N/A	15	22
Total annual savings (billions gallons per year)	N/A	2	3
Total annual energy savings (quads, total faucets)	N/A	0.001	0.002

Metering Faucets

The available data on the market share of metering faucets versus non-metering faucets is limited. However, a 2000 EPA-cited study revealed that push-top metering faucets led to a 100% increase in water consumption compared to manually controlled faucets. However, retrofitting these metering faucets to operate for 7 seconds instead of 15 reduced water usage significantly.

Given the limited information, calculating precise water savings is challenging. However, a basic calculation suggests a 20% reduction in water consumption when reducing the gpc from 0.25 to 0.2 for metering faucets.

Commenter: Chris Cueman and Chris Corcoran
Affiliation: New York State Energy Research and Development Authority (NYSERDA)
Comment Date: May 24, 2024

Email Text:

NYSERDA is grateful for the opportunity to respond to this inquiry and respectfully submits the attached document for consideration by the Watersense team.

Thank you for the important work performed by your organization and enjoy the upcoming holiday weekend.

Sincerely,
Chris Cueman

Chris Cueman | Senior Project Manager – Codes, Products, & Standards
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nyserda.ny.gov

Email Attachment:
See pages 109 and 110.

Comment Submission on WaterSense Draft Specification for Faucets

Commenter Name: Chris Corcoran

Commenter Affiliation: New York State Energy Research and Development Authority (NYSERDA)

Date of Comment Submission: May 24, 2024

Topic: General Support

Comment: NYSERDA appreciates the opportunity to submit comments to WaterSense on the Faucets Notice of Intent. NYSERDA's mission is to advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all. In June 2023, New York established appliance standards that include faucets. NYSERDA looks to the WaterSense program to help establish meaningful opportunities for water savings. NYSERDA supports WaterSense revising the specification for this product category. A new specification for faucets that includes additional products is expected to result in water and associated bill savings for New Yorkers. Please do not hesitate to reach out with any questions. Thank you.

Rationale: N/A

Suggested Change (or Language): N/A

Topic: Relevant New York State Standards

Comment: As noted above, New York adopted appliance standards for faucets in June 2023. These standards generally align with the standards established by the California Energy Commission and are within the range of what is proposed in the Notice of Intent. The faucet standard levels in New York are listed below. More information and a link to the final rule text are available at this website: https://www.nyserda.ny.gov/All-Programs/New-York-State-Appliance-and-Equipment-Efficiency-Standards/Current-Standards

- Lavatory private use faucets – 1.2 gpm at 60 psi
- Kitchen faucets – 1.8 gpm at 60 psi, kitchen faucets are permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm at 60 psi and must revert to a maximum flow rate of 1.8 gpm at 60 psi upon valve closure
- Public lavatory faucets – 0.5 gpm at 60 psi

NYSERDA wants to call attention to the more stringent standard of 1.2 gpm for lavatory private use faucets, aligning with the adopted standards in California, Hawaii, Oregon, Washington, Maine and Colorado.

NYSERDA recommends that WaterSense set new specification levels that are aligned with or more stringent than those listed above adopted by New York. As Watersense evaluates a range of stakeholders and issues, including but not limited to ADA compliance, performance metrics, use of add-ons such as aerators, and health and safety concerns for older buildings with oversized pipes, we are confident that the

appliance standard levels established by New York and several other states will be determined to be viable for WaterSense adoption and that more stringent efficiency levels can and should be considered as well.

Rationale: 24.2% of the United States population[1] live in a state that has faucet level efficiency standards that aligns with New York State standards, across a wide variety of housing stocks and statewide infrastructure. There are 19,597 faucets listed in the State Appliance Standards Database[2] that are compliant with these state standards. The New York state standard efficiency levels are achievable and widely applicable for a WaterSense specification.

Suggested Change (or Language): N/A

[1] https://www.census.gov/library/stories/promote-content/state-by-state-list.html, based on the 2020 population.
[2] www.appliancestandards.org as of April 17, 2024

Commenter: Dain Hansen
Affiliation: International Association of Plumbing and Mechanical Officials (IAPMO)
Comment Date: May 24, 2024

Email Text:

Please see our comments attached.

Thank you,

Dain M. Hansen
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See pages 112 and 113.

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May 24, 2024

The Honorable Michael S. Regan
Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460

SUBJECT: Public Comments: Notice of Intent (NOI) to Revise the WaterSense® High-Efficiency Lavatory Faucet Specification

Dear Administrator Regan,

On behalf of the International Association of Plumbing and Mechanical Officials (IAPMO), we are pleased to submit comments to the EPA in response to the Notice of Intent (NOI) to revise the WaterSense® High-Efficiency Lavatory Faucet Specification. IAPMO is a nearly 100-year-old trade association that focuses its comprehensive services on the technical aspects of the plumbing and mechanical industries and is a globally recognized leader in plumbing product testing and certification. IAPMO is comprised of 13 different business units with offices and staff in 11 countries. Our membership includes trained labor and contractors, engineers, product manufacturers, suppliers, safe water advocates, plumbing and mechanical inspectors, and building officials.

Since the program's inception, the IAPMO Group has been a leading certifying body for the WaterSense® program, working with manufacturers to certify thousands of products to WaterSense® standards. IAPMO R&T was among the first certification bodies to be ANSI-ANAB accredited as a WaterSense® third-party certification body, building confidence in the performance, quality, and safety of the products it certifies. As a technical leader in the industry, we are ready to provide the EPA with the support needed to ensure lavatory faucets are certified and tested to meet whatever specification the EPA ultimately determines to codify.

With that said, while the EPA is looking to reduce flow rates in residential occupancies further to promote water conservation, one concern is the potential increase in water age, particularly in water systems designed using the 80-year-old Hunter's Curve Methodology. In residential occupancies, reducing water age is essential to improving water quality. It is recommended that the water system be right-sized to prevent oversizing. In other words, reducing flow rates further in residential occupancies increases the risk of waterborne pathogen outbreaks unless the piping diameters of mains and branches are reduced. Currently, the only updated methodology to right-size plumbing systems in the US is IAPMO's Water Demand Calculator. Using the Water Demand Calculator to lower flow rates is the best holistic way to promote water savings and

energy reduction. Therefore, it is recommended that EPA utilizes the Water Demand Calculator to reduce flow rates further within the WaterSense® Program.

In addition to the proposed change to the lavatory flow rate, IAPMO wholeheartedly supports the EPA's efforts to use water more efficiently through WaterSense® standards. We are encouraged by the EPA's commitment to work with industry to achieve additional water efficiency. We believe that WaterSense® can make significant strides by collaborating with industry through the ASME/CSA plumbing products consensus standards process. In essence, we advocate for the development of standards that are technically sound and result in increased water efficiency without sacrificing user satisfaction, all while working hand in hand with industry through industry standards.

Thank you again for your leadership on this critical policy. IAPMO stands ready to provide further input or technical expertise as the rule progresses.

Sincerely,

Dain M. Hansen
Executive Vice President