Comments on the February 2007 Draft Specification for High-Efficiency Bathroom Sink Faucets

July 2007

Commenter: Colin Thielman
Affiliation: Delta Faucet Company
Comment Date: February 27, 2007

Dear John,

Recently one of our engineers, who works on commercial products, questioned me about the new draft lavatory faucet spec. In hospitality applications where recirculated hot water is the norm, many hotel operators are asking for 1.0 gpm at 60 psi aerators because hot water wait times are not an issue at this lower flow rate and they save significantly more water than 1.5 gpm aerators.

The concern is that because you have a minimum flow rate in the spec it appears that a 1.0 gpm aerator or even a 0.5 gpm aerator that are commonly used in commercial applications would not meet the WaterSense specification. I think that this issue is something our working group should address before this specification becomes effective in July. As the sub-committee leader would you like me to work with Birute to put a conference call together to discuss this?

Colin

Commenter: Norman Kummerlen, P.E.
Affiliation: Moen, Inc.
Comment Date: March 5, 2007

Comments are in ~~strike through~~ and underline format.

Title: **High-Efficiency Lavatory (Bathroom Sink) Faucet Specification**

Reason: the industry has called these devices lavatory faucets for years.

This specification establishes the criteria for a high-efficiency ~~bathroom sink (~~lavatory~~)~~[1] faucets under the U.S. Environmental Protection Agency (EPA) WaterSense[SM] program. It is applicable to all types of lavatory faucets, lavatory faucet accessories[2] specifically designed to control the flow of water, and any other lavatory faucet technologies that meet these performance specifications.

[2] Accessory, as defined in ASME 112.18.1/CSA B125.1, means 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 purpose of this specification, an accessory can include, but is not limited to lavatory faucet flow restrictors, flow regulators, aerator devices, laminar devices, and pressure compensating devices.

Reason: the industry has called these devices as lavatory faucets for years and the correct title of the standard is as shown in the correction.

Lavatory faucets and lavatory faucet accessories must conform to applicable requirements in ASME A112.18.1/CSA B125.1.[3] In addition; the flow rate shall be tested in accordance with the procedures in ASME A112.18.1/CSA B125.1 and shall meet the following criteria:

[3]Reference to this ASME/CSA standard applies to the most current version.

Reason: the correct title of the standard is as shown in the correction.

- The Maximum flow rate shall not exceed 1.5 gallons per minute (gpm)[4] (5.7 liters per minute) at a pressure of 60 pounds per square inch (psi) at the inlet, when water is flowing; and
- The Minimum flow rate shall not be less than ~~1.2~~ 0.8gpm (~~4.5~~ 3.0 liters per minute) at a pressure of ~~20~~ 30 psi at the inlet, when water is flowing:

The flow rate tested ~~at 60 psi~~ in accordance with the procedures in ASME A112.18.1/CSA B125.1, shall ~~not vary beyond +/- 0.1 gpm of the certified flow rate of the product~~ meet the testing verification protocol as described in Appendix b to Subpart F of Part 430- Sampling Plan for Enforcement Testing of 10CFR Ch II(1-1-99 Edition).

Reasons: Add maximum and minimum for clarity.

Utilize the Federal Code method for flow rate and sampling rather than an arbitrary tolerance.

Revise the minimum flow rate to 0.8 gpm at 30psi to allow for a Uniform minimum regardless of the Maximum Flow Rate. This would allow for non-pressure compensating devices and provides a lower minimum value that would allow for lower maximum flow rates.
See attached WaterSense Flow Rate table. If a 0.8 gpm at 30psi minimum was established as the lowest acceptable value for all cases, then fixed orifice devices could be used down to 1.1 gpm maximum and below 1.1 gpm maximum Pressure compensating devices would have to be used. The maximum flow rate could go a low as an estimated 0.8 gpm based on NEOPERL data. Comparisons of using a Maximum Flow rate with a 20, 25, or 30% reduction for Minimum Flow rate shows that the Maximum flow rate would be limited to 1.1 gpm at 60psi using the same 0.8 gpm at 30psi minimum flow rate.

5.0 Definitions

~~**Certified flow rate:** The intended flow rate at a pressure of 60 psi, when water is flowing, based on the design of the product, as marked on the product or product packaging.~~

Maximum flow rate: The maximum flow rate as specified and verified by this specification or the actual flow rate, if lower than the maximum, as verified by this specification.

Note: Neither of these flow rates shall violate the minimum flow rate requirements as specified by this specification.

Reason: the proposed draft actually certifies flow rate at 60psi and 20psi. Therefore this definition is misleading.

A definition should never contain performance requirements. In this case the labeling requirements'. If labeling is to be a part of this specification then it should be clearly specified in the body of the specification. This language implies that if a manufacturer marks the product or its package then the product is certified.

Proposed marking section:

Flow rate marking
The product and the product packaging shall be marked with the Maximum Flow rate in GPM and L/min in compliance with this specification and 16 CFR Ch I (1-1-04 Edition) par. 305.11. Marking shall be in GPM and L/min in 2 digit resolutions. Examples; 1.5 gpm (5.7 L/min), 1.4 gpm (5.3 L/min), 1.3 gpm (4.9 L/min), 1.2 gpm (4.5 L/min),1.1 gpm (4.2 L/min), 1.0 gpm (3.8 L/min), 0.9 gpm (3.4 L/min), or 0.8 gpm (3.0 L/min).

Reason: Utilize the Federal Code method for marking product and packages.

Water Sense Flow Rate Table
Norm Kummerlen 3/6/07

Green Areas indicate acceptable Product based on 0.8 gpm Minimum Flow at 30psi

Max Flow Rate vs. % Reduction Model			
Maximum Flow Rate	% reduction	GPM Reduction	Minimum Flow Rate
1.5	20	0.3	1.20
1.5	25	0.37	1.13
1.5	30	0.45	1.05
1.4	20	0.3	1.10
1.4	25	0.37	1.03
1.4	30	0.45	0.95
1.3	20	0.3	1.00
1.3	25	0.37	0.93
1.3	30	0.45	0.85
1.2	20	0.3	0.90
1.2	25	0.37	0.83
1.2	30	0.45	0.75
1.1	20	0.3	0.80
1.1	25	0.37	0.73
1.1	30	0.45	0.65
1	20	0.3	0.70
1	25	0.37	0.63
1	30	0.45	0.55
0.9	20	0.3	0.60
0.9	25	0.37	0.53
0.9	30	0.45	0.45
0.8	20	0.3	0.50
0.8	25	0.37	0.43
0.8	30	0.45	0.35

Max Flow Rate vs. Minimum Flow rate Fixed Orifice			
Maximum Flow Rate	Pressure Flowing	GPM Reduction	Minimum Flow Rate
1.5	60	0	
1.5	30	0.44	1.06
1.5	20	0.63	0.87
1.4	60	0	
1.4	30	0.41	0.99
1.4	20	0.59	0.81
1.3	60	0	
1.3	30	0.38	0.92
1.3	20	0.55	0.75
1.2	60	0	
1.2	30	0.35	0.85
1.2	20	0.51	0.69
1.1	60	0	
1.1	30	0.32	0.78
1.1	20	0.46	0.64
1	60	0	
1	30	0.29	0.71
1	20	0.42	0.58
0.9	60	0	
0.9	30	0.26	0.64
0.9	20	0.38	0.52
0.8	60	0	
0.8	30	0.23	0.57
0.8	20	0.34	0.46

Max Flow Rate vs. Minimum Flow rate Pressure Compensating			
Maximum Flow Rate	Pressure Flowing	GPM Reduction	Minimum Flow Rate
1.5[(1)]	60	0	
1.5	30	0.15	1.35
1.5	20	0.20	1.30
1.4	60		
1.4	30		
1.4	20		
1.3	60		
1.3	30		
1.3	20		
1.2	60		
1.2	30		
1.2	20		
1.1	60		
1.1	30		
1.1	20		
1	60		
1	30		
1	20	~0.10	~0.90
0.92[(2)]	60	0	
0.92	30	0.00	0.92
0.92	20	0.02	0.90
0.8	60		
0.8	30		
0.8	20		

[(1)] NEOPERL PCA Perlator 1.5 B2.D707.1
[(2)] NEOPERL PCA Spray 1.0 A5.9036.1

Commenter: Pete DeMarco
Affiliation: American Standard
Comment Date: March 9, 2007

To Whom It May Concern:

Thank you for the opportunity to comment on the WaterSense specification for bathroom sink faucets. American Standard is of the opinion that the specification is acceptable with minor revisions as detailed below.

First, we would like to reiterate our verbal comments regarding the need to retain a minimum flow rate requirement. We feel that allowing the use of fixed orifice flow restrictors could result in user dissatisfaction. Please refer to the attached file which details flow rates using both fixed orifice and flow control device restrictors. 1.5 gpm fixed orifice restrictors can result in flow rates considerably less than 1 gpm (0.79 gpm) at 20 psi running pressure when taking upstream restriction from the faucet into account. With the same upstream restriction, a variable flow control device will result in a flow rate of 1.18 gpm at 20 psi, which is 33% higher than the fixed orifice flow.

The argument that consumer research should determine the minimum requirement is valid, but as that type of research takes considerable time to conduct, we see no harm in adopting a safe specification while this research takes place. If the research shows that allowing products that flow at lower rates is indeed acceptable to end users, the specification can always be revised accordingly.

As discussed, resistance from the faucet upstream of the aerator is a valid concern. As the data shows, a 1.5 gpm variable flow control device flows at 1.25 gpm @ 60 psi when installed on a single lever bathroom sink faucet and a drop below 1.2 gpm at 20 psi. Faucets with different valve configurations could provide even more restriction.

Taking the above into account, we recommend the following changes to the specification which would render it acceptable to American Standard.

1. Revise the minimum flow rate from 1.2 gpm at 20 psi to 1.0 gpm at 20 psi

2. Eliminate the +/- 0.1 gpm tolerance requirement at 60 psi from the stated flow rate

3. In place of this tolerance on the high flow rate end of the specification, require that the DOE/EPACT '92 statistical evaluation procedure for maximum flow rates be employed as a method of determining compliance. Manufacturers currently conduct this testing in order to certify products with the DOE, so this would not create an additional burden.

Should manufacturer's wish to certify faucets with even lower flow rates to the WaterSense program for specific installation applications such as hotels, that can be accommodated through alternative specifications for commercial uses.

Respectfully submitted,

Peter DeMarco
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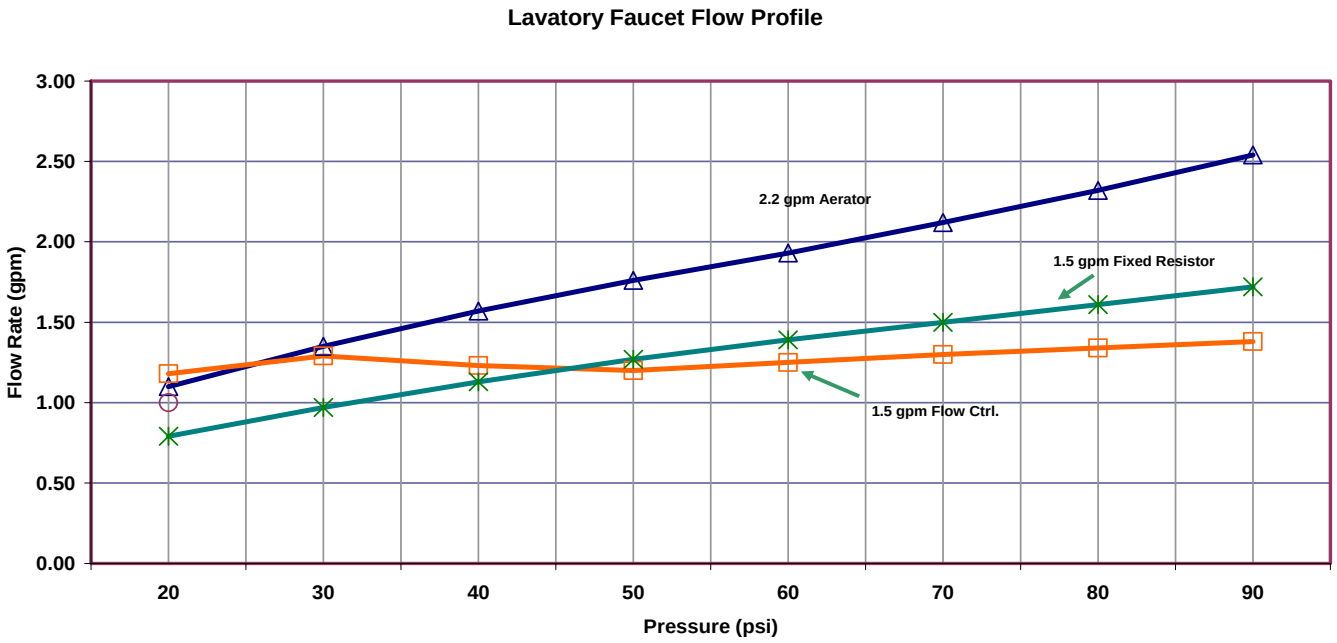

Flow Rate Profile

		Pressure (psi)								
Pressure (psi)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Standard Aerator (2.2 gpm)	0.77	1.10	1.35	1.57	1.76	**1.93**	2.12	2.32	2.54	2.75
1.5 gpm Fixed Resistance Aerator	0.54	0.79	0.97	1.13	1.27	**1.39**	1.50	1.61	1.72	1.83
1.5 gpm Flow Ctrl.	0.89	1.18	1.29	1.23	1.20	**1.25**	1.30	1.34	1.38	1.43

Commenter: Jeremy Brown
Affiliation: NSF International
Comment Date: March 15, 2007

Stephanie Tanner, CEM
WaterSenseSM Products Lead
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue NW 4204M
Washington, DC 20460

Dear Ms. Tanner:

Thank you for the opportunity to comment on High-Efficiency Bathroom Sink Specification. A reference to NSF/ANSI Standard 61 should be made to demonstrate the specification is consistent with the requirements of the US Safe Drinking Water Act.

Section 1417 (a) (3) of the SDWA makes it unlawful to introduce into commerce any pipe, plumbing fitting or fixture that is not lead free. Section 1417 (e) of the SDWA state that lead free with regard to plumbing fittings and fixtures intended to dispense water for human consumption means those fittings and fixtures that are in compliance with a standard established under that section. EPA recognizes that standard as NSF/ANSI Standard 61, Section 9 in Federal Register Notice, 62 FR 44684-44685.

In addition, major model plumbing codes such as the International Plumbing Code, International Residential Code, Uniform Plumbing Code require compliance with NSF/ANSI Standard 61, Section 9. The reference to NSF/ANSI Standard 61 also demonstrates transparently the specification is consistent with the code requirements for bathroom faucets in the United States. Suggested language is contained below with changes underlined in blue.

2.0 Water Efficiency and Performance Criteria
Lavatory faucets and lavatory faucet accessories must conform to applicable requirements in ASME A112.18.1 and NSF/ANSI Standard 61, Section 9.[3] In addition, the flow rate shall be tested in accordance with the procedures in ASME A112.18.1 and shall meet the following criteria:

[3] Reference to the ASME and NSF standards apply to the most current version.

If you have questions, comments or need further information, please contact me directly.

Regards,
Jeremy Brown

Jeremy Brown
Codes & Regulatory Manager
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Commenter: Ann Marie Gebhart
Affiliation: Underwriters Laboratories
Comment Date: March 15, 2007

Thanks. We just looked at the draft specification and do not see any issues with it.
Ann Marie

Commenter: Tony Gregg, P.E. and Drema Gross
Affiliation: Austin Water Utility
Comment Date: March 20, 2007

Comments from Austin Water Utility's Water Conservation Program on Draft Specification for High-Efficiency Bathroom Sink Faucets

After reviewing the draft specification for high-efficiency faucets and faucet accessories, we strongly recommend that minimum flow rate requirements be removed for faucet aerators and similar after-market accessories.

We recognize that the EPA does not want the WaterSense label to be associated with products that perform poorly. However, faucet accessories are generally not expected to improve the performance of existing faucets, only to reduce the water used. Holding these accessories to the same performance standard as whole faucet assemblies creates a false comparison that reduces the potential for water savings.

Additionally:

- In the supporting material for the Draft Specification, no reason is provided for the extension of the minimum flow rate to faucet accessories; only bathroom sink faucets are mentioned.

- A customer with a poorly-performing faucet or low pressure is unlikely to add an accessory designed to further reduce flow. Even if a customer with reduced pressure did purchase a flow restrictor, the device by definition can be "readily added, removed, or replaced" at the user's discretion. A low-cost accessory that doesn't satisfy the consumer can be easily removed and returned to the point of sale. We believe a consumer with low-pressure is likely to blame their water provider, and not the WaterSense label, in such a case.

- There are quality faucet aerators on the market today that use as little as 0.5 gallons per minute. Adding a 0.5 gpm aerators to a an existing faucet can save 77% while a 1.0 gpm aerator saves 55% over existing flow rates (2.2 gpm). The Draft Specification allows for only 32% savings.

- Of the studies cited in the Supporting Statement to the Draft Specification, the study with the highest consumer rating (Tampa, Florida) used 1.0 gpm faucet aerators. Those aerators, which 89% of the participants would recommend to friends, would not receive a WaterSense label under the Draft Specification.

- Austin has provide free 1.0 gpm aerators to our customers for many years and so far we have not received any complaints about these aerators.

If WaterSense is to be as successful as the Energy Star programs, it will be necessary for the consumer to feel that the WaterSense label indicates not a somewhat more efficient product, but the most efficient product currently available. By subjecting faucet aerators and similar after-market accessories to minimum flow rates, the most efficient products will not be WaterSense-labeled. Consumers will either avoid these efficient-but-unlabeled products, or be convinced by

manufacturers and perhaps by conservationists that the WaterSense label has little bearing on efficiency.

As the first WaterSense partner, we are proud to support the EPA's water conservation efforts, and we appreciate the opportunity to comment on this draft specification.

Sincerely,

Tony Gregg, P.E.
Water Conservation Division Manager

Drema Gross
Water Conservation Specialist Senior

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Austin, TX 78767
(512) 974-2787
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drema.gross@ci.austin.tx.us

Commenter: Al Dietemann
Affiliation: Seattle Public Utilities
Comment Date: March 22, 2007

March 22, 2007

TO: WaterSense Program Staff c/o ERG

FROM: Al Dietemann, Seattle Public Utilities

RE: Proposed High Efficiency Bathroom Sink Faucet (aerator) Specification

Thanks for a chance to provide feedback on the proposed WaterSense specification. As you know Seattle has been a key instigator in the development of the EPA WaterSense Program and we continue to be a strong partner and supporter.

COMMENT SUMMARY

We would encourage revision of the proposed specification. Critical information is missing. The specification should be based on actual testing data, not staff opinions or a "20% improvement over code" guideline. The lack of referenced testing data, and the errors in the justification provided, suggests not enough time and research has gone into development of the specification. Specifically, the proposed specification inadequately addresses both homeowner satisfaction and optimum water efficiency. We believe these are two critical elements for ANY WaterSense labeled product.

SPECIFIC COMMENTS

1) A broad specification for high-efficiency bathroom sink faucets has some appeal, but this name is very misleading and will result in reduced water savings for the nation. Both manufacturers and utilities have pointed out that a faucet without an aerator is unlikely to be developed that can meet the specification due to clogging and pressure compensation issues. It is clear to everyone that this specification only covers bathroom faucet aerators at this time. The downside to calling it a faucet spec is that the nation has a huge aerator replacement potential, (most bathroom aerators are inefficient) and a WaterSense labeled aerator will be applicable for retrofit for most households, but replacing a faucet with a WaterSense faucet will be done in a much smaller percentage of new and existing homes. The Specification name needs to be changed to just an Aerator Spec. Provision in the aerator spec should be made so that if, in the future, a manufacturer produces a faucet product meeting the spec without using an aerator, they should be allowed to use the WaterSense label.

2) A WaterSense spec at 1.5 gpm would result in significant water waste in Washington State. By 2008, 75% of single and multifamily bathrooms in our area will already have aerators with a maximum flow of 1.0 gpm. The 18 utilities in the Saving Water Partnership have already invested hundreds of thousands of dollars to replace customer's inefficient aerators with 1.0 gpm pressure compensating aerators. Increased water waste would occur if customers replaced their 1.0 gpm aerator with a WaterSense aerator at 1.5 gpm. Therefore,

utilities in the Seattle area would neither partner nor promote WaterSense faucet aerator products flowing at 1.5 gpm.

3) Before a maximum aerator flow rate is set for WaterSense, testing data is needed on consumer satisfaction at various flow rates and pressures. A program goal of saving 20% (or in this case 32%) off existing national standards is a very poor rational for selecting a flow rate. Such rational does not maximize potential water savings while maintaining high consumer satisfaction. We suggest EPA consider a WaterSense goal of finding the lowest water use (or in this case flow rate) that still obtains a 95% or greater consumer satisfaction. While WaterSense has a limited budget and performance and consumer satisfaction testing is expensive, the testing cost needs to balance the national water and energy saving benefits. WaterSense partners might also assist in funding independent third party testing but they were never asked.

4) Data on consumer uses of bathroom faucets is absent from the WaterSense justification materials but it is fundamental to a rational decision about flow rate. Even with a high efficiency aerator, most of the water used is going down the drain and being wasted. What types of uses are there and what flow rates are needed to perform the intended function with high satisfaction? This list is not very long. Brushing teeth, shaving, cleaning razors, filling glasses, filling sink bowls, washing hands, wetting facecloth's, cleaning combs, and perhaps a few others. Consumer surveys could quickly identify and rank the frequency of various uses. Common uses that require higher flow rates or pressures could then be researched. Many of these uses have water saving behaviors that could reduce the need for flow rate.

5) WaterSense staff referenced AWWARF residential end use of water research survey data and additional follow up retrofits on page 2 and 3 (error note: Seattle used 1.0 gpm aerators as well as Tampa). The Tampa survey data showed a very high customer satisfaction rate (89%) for aerators at 1.0 gpm. We have new data for Seattle showing even higher customer satisfaction than previously reported. Yet this data was ignored when selecting a maximum flow rate. What is the rational for a minimum flow rate of 1.2 gpm at 20 psi when Seattle and Tampa customers report high satisfaction with aerators that flow below 1.0 gpm at low pressures. No product is going to have 100% consumer satisfaction. But where is the data that supports this 1.2 gpm at 20 psi at the correct level for high consumer satisfaction? WaterSense staff has the AWWARF study showing high consumer satisfaction at flows of 1.0 gpm. Where is the study that refutes this data? Minimum flow rates and pressure should be established by consumer satisfaction data, not staff opinions. If a manufacturer can produce an aerator that has high user satisfaction at flow rates below 1.2 gpm at 20 psi, they should be able to use the WaterSense label. We see no need for a minimum WaterSense flow rate, but we do see the need for a minimum consumer satisfaction score, using satisfaction criteria developed by WaterSense.

6) Long term durability of savings is not addressed in the spec. What good is a WaterSense faucet aerator that clogs all the time and can't be easily cleaned? How likely are these to be retained by the consumer if non-clogging aerators are readily available in the marketplace? How will clogging influence consumer opinions about this and other WaterSense labels?

7) Hot water wait times is a real concern in many bathrooms. However, it has little to do with water efficiency. Will WaterSense so easily trade-off water efficiency for energy efficiency? Proper design of bathroom plumbing can eliminate long hot water wait times. Why should WaterSense accept "waste" of additional faucet water just to counteract poor hot water distribution system design? Customer satisfaction should be considered, but why should

WaterSense partners accept a high water-using product just because that product could save a little energy?

8) Marking of WaterSense products should be addressed in the Specification. A label on packaging helps during purchase decisions but does not identify a WaterSense Product after installation. We suggest adding the word WaterSense as an impression on qualifying aerators, accompanying other certification markings on the product. Make sure uses can identify WaterSense aerators without the packaging.

9) The cost and savings analysis presented on page 6 in the justification needs to be corrected. Retail cost needs to be put into a perspective. Consumers are purchasing and installing a new faucet (aerator) anyway. They have a choice between a premium WaterSense product and a standard product. The cost of the WaterSense product is not the actual retail cost, but the incremental cost above the cost of a standard product. The manufacturing cost of a 1.5 gpm pressure compensating aerator above a standard aerator is under $1. We know this because utilities can buy them for under $1, and the standard aerator has an average retail cost. Add to the $1 manufacturer cost any profit the manufacturer wants to obtain from selling a premium WaterSense aerator. The total is certainly NOT ten dollars. Four dollars would be a very generous assumption. The cost calculation presented on page 6 also ignores the imbedded value of energy in water supply and wastewater treatment. This is a real saving for the nation, and it needs to be added to the consumer household energy, water, and wastewater savings. Assuming this savings will be passed on to consumers by lower utility rates is wrong, since many utilities don't pay these embedded energy costs for a variety of reasons.

Commenter: Sally Remedios
Affiliation: Delta Faucet Company
Comment Date: March 22nd 2007

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

EPA WaterSense Program

The following are our comments on your recent draft specification for high efficiency lavatory faucets.

2.0 Water Efficiency and Performance Criteria.

It is not clear from the requirements specified and the last sentence of this Section, whether it was the intent to allow for flow restriction devices with a maximum flow rate of less than 1.5 gpm at 60 psi to be WaterSense certified.

We would recommend that such wording be added to clarify that such devices are acceptable with some minimum performance at 20psi.

The last sentence of this section should be further revised to indicate that the certified flow rate of a device is determined by the statistical measurement technique used in the DOE program related to EPACT 92.

We would like to point out that the national consensus standard for plumbing supply fittings is now ASME A112.18.1-2005/CSA B125.1-05. We would recommend that this be used as the reference document to which WaterSense certified products are evaluated.

5.0 Definitions

Change the standard reference as above and change the word “intended” to “maximum” before “flow rate” in the definition of **Certified flow rate.**

All of us at Delta look forward to supporting the goal of promoting the use of reduced water-use products.
If you have any questions please do not hesitate to contact us.

Sincerely,

Sally Remedios,
Manager, Product Compliance.
Ph: 317 587 1270
Fax: 317 848 0750
e-mail: sar@deltafaucet.com

Commenter: David Viola
Affiliation: Plumbing Manufacturers Institute
Comment Date: March 26, 2007

Dear Ms. Tanner,

The Plumbing Manufacturers Institute (PMI) appreciates the opportunity to provide comment on the proposed WaterSense Specification for Bathroom Faucets. PMI is the trade association of plumbing product manufacturers. PMI members are the producers of the vast majority of faucets in North America.

PMI supports the development of the WaterSense Specification for Bathroom Lavatory Faucets and agrees with establishing a maximum flow rate of 1.5 gpm.

However, with regard to the proposed minimum flow rate criteria, PMI believes that additional time is needed to fully discuss and research the impact it has on available product lines and product development. Upon completion of PMI member testing and investigations, and PMI committee discussions, it is likely that further comments will be provided. As such, we urge the EPA to grant a 45 day extension from March 23, 2007 to allow industry the opportunity to complete its work.

PMI also offers the following comments to the draft specification:

- Terminology - Revise the title of the specification and related terminology to High-Efficiency Lavatory (Bathroom Sink) Faucet Specification. Lavatory faucet is the terminology used within the industry to describe this category of product.
- Referenced Standard - Update reference of ASME A112.18.1 to ASME A112.18.1/CSA B125.1 throughout to include the full title of the appropriate standard.
- Maximum and Minimum Flow Rate - Clarify that the flow rate criteria in Section 2 are maximums and minimums.
- Flow Rate Tolerance - Replace the flow rate tolerance in Section 2.0 and utilize the test and sampling method referenced in the DOE Rule 10CFR Part 430. The 0.1 gpm tolerance is arbitrary and cannot take precedence over the Federal requirements for faucet flow rate testing and sampling.
- Definitions - Delete the definition of certified flow rate and replace with: § Maximum flow rate - The maximum flow rate as specified and verified by this specification or the actual flow rate, if lower than the maximum, as verified by this specification. Reason: The proposed draft actually certifies maximum flow rates at 60 psi and a lower flow rate at 20 psi.

Flow rate marking - Establish a new section addressing flow rate marking as follows:

Section X.0 Flow Rate Marking
The product and the product packaging shall be marked with the maximum flow rate in GPM and L/min in compliance with this specification and 16 CFR Ch I (1-1-04 Edition) par. 305.11. Marking shall be in GPM and L/min in 2 digit resolutions. Example; 1.5 gpm (5.7 L/min).

Reason: This will ensure that the product marking practices will be consistent with the WaterSense Specification and those found in the FTC Rule.

If you have any questions or need additional information, please do not hesitate to contact me by email at dviola@pmihome.org or by telephone at (847) 884-9764.

Respectfully submitted,
David Viola
Technical Director
Plumbing Manufacturers Institute

Commenter: Jim Meierotto
Affiliation: Tualatin Valley Water District
Comment Date: April 5, 2007

I would like to add Tualatin Valley Water District and other large regional water districts in the Portland Area use and hand out the Niagara 1.0 gpm aerator, bubble spray and have not seen any problems with performance. I personally use it at home and see no issues. We have used the 1.0 gpm needle spray and do not like that version. The difference is the bubble spray (there may be a better terminology) has a screen and emits water like a regular aerator and the needle spray has no screen and emits water in tight streams. The needle spray seems to splatter at this flow.

I would like to suggest that the minimum gpm be 1.0 gpm. And specify the correct type of aerator, as the needle spray should not be endorsed at this gpm flow.

Thank you,

Jim Meierotto
Tualatin Valley Water District
503.848.3036

Commenter: Kenyon Potter, PE
Affiliation: University of California
Comment Date: April 16, 2007

Dear WaterSense:

In response to the request for comments to the Draft High-Efficiency Bathroom Sink Faucet Specification, I respectfully submit the following comments in support of a "1/4 turn" performance standard:

1. My main concern is that the draft specification (as currently written) does not address the performance of bathroom sink faucets in respect to total water usage but only the flow rate. To maximize water conservation for bathroom faucets, an end user must be able to easily shut-off the water from a faucet such as when brushing teeth. A well-designed faucet can facilitate the shut-off of water. Fortunately, the trends toward ergonomic design of faucets and ease of maintenance have resulted in many bathroom faucets having valves (e.g. disk, ball, or other washer less valves) that permit open-full closed position with one quarter or less turn of a handle (or raise/lower of a handle). Yet, many faucets sold today still utilize compression valves that require an end user to make several full rotations of a handle to shut-off the valve. While such handles are designed for utility room sinks, they are often marketed and installed in bathrooms. This can significantly discourage water use, e.g. when brushing teeth.

2. Even if there is no historical performance standard to measure total water usage for bathroom sink faucets, there is a less obvious performance standard based on the ergonomics of faucet operation. To minimize total water usage and maximize water conservation, an end user should be capable of shutting off water with minimal effort. A faucet having value(s) requiring limited rotation enables the end user to easily shut off water. Thus, in additional to a performance standard for water efficiency, another performance standard should be:

"Every faucet having manually operated valve(s) shall permit an end user to shut-off the water flow through the value by rotation of a handle not more than 1/4 turn (or lowering a handle through an arc of less than 90 degrees)."

Note: Faucets having an automatic shut-off (e.g. timer or sensor based) would not be subject to this additional performance standard.

3. The proposed high-efficiency bathroom faucet specification uses gallons per minute (gpm). In contrast, other specifications uses different units that measure total water use such as the FEMP for bathroom faucets in federal buildings uses gallons per cycle (gpc) and the EPA's specification for WaterSense certified HETs uses different units: gallons per flush (gpf). Each of these units has a performance standard based in part on total water use. The effectiveness of the proposed performance standard is capable of measurement in "gallons" by employing probabilistic analysis. Each manually operated faucet that is shut-off when brushing of teeth saves a quantifiable amount of water (1.5 gpm* x 2 min** = 3 gallons) and a straightforward survey of end users could determine the percentage of end users who report they are likely/unlikely to shut-off the faucet when brushing teeth and their respective faucet type. Notes: *Proposed new efficiency standard **Recommended by dentists. I predict that analysis will

confirm that faucets that do not enable an end user to easily shut off water will lead higher total usage.

4. In the draft specification's supporting statement, the EPA states, "Meeting or exceeding user expectations via the establishment of performance criteria for WaterSense labeled products is an important aspect of the WaterSense Program. From the outset of discussions with interested stakeholders, WaterSense was aware that performance of water-efficient bathroom sink faucets is significantly impacted at low water pressures. " In the context of user expectations, a conscientious end user who seeks to purchase a faucet with the "WaterSense" certification may desire the ability to turn-off the faucet during use. Without adoption of this additional performance standard, a consumer would not realize from a typical manufacturer's packaging that the faucet has compression valve(s), and thus, requires multiple rotations to shut off the water.

5. Also, a performance standard does not have to limit product offerings by manufacturers. For example, manufacturers would still be able offer products with various handle types, finishes, styles to satisfy consumers. The limitation on manufacturers would be the type of value(s) used in the faucet if intended for use in bathrooms. In fact, many faucets designed for bathrooms already utilize 'washer less' valves for reasons of ergonomics and lower maintenance. Thus, the negative impact on manufacturers should be minimal to none while the positive impact to consumers seeking high efficiency faucets could be substantial.

Please confirm receipt of these comments. Thank you.

Sincerely,

Kenyon Potter, PE
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Commenter: John Schommer
Affiliation: WATERMISER®
Comment Date: April 26, 2007

To EPA WaterSense:

In the EPA's WaterSense objective to establish the criteria for a water efficient bathroom faucet, Watermiser® has been successful in the reduction of bathroom faucet flow rates for more than eight years by using the Watermiser Custom Flow Control Valve. As one of the original stakeholders in the EPA's WaterSense formation, it is our understanding that WaterSense is committed to the recognition of new technologies that provide sustainable, efficient water use along with a high degree of user satisfaction.

Facts:

- To date faucet flow control has been regulated by the use of screw on aerators which are located at the end of the faucet.
- Faucet aerators are susceptible to removal, theft, vandalism and alteration simply by removing one or more parts, or the removal of the entire aerator.
- Most bathroom faucets, once the aerator is removed, will allow water to flow at the rate of 3 to 8 GPM depending on faucet type and water pressure.
- Besides wasting an incredible amount of water, sewer and energy costs, almost all faucets without aerators splash the faucet user and the floor, creating a slip and fall issue, particularly in public places.

Watermiser Flow Control Valves

- Cost Effective
- No need to replace existing faucets
- Anti-clog – Self Cleaning
- Easy to install
- Tamper proof
- Ability to customize water flow depending on the need of the end user

Watermiser Flow Control Valves work with any standard manual or sensor faucet to provide a sustainable efficient water savings along with a high level of user satisfaction for all bathroom faucets.

Please advise me as to what steps should be taken in order that the Watermiser Flow Control Valve be considered by the U.S. Environmental Protection Agency WaterSense(sm) program as a viable option for their High-Efficiency Bathroom Sink Faucet Specification.

I look forward to hearing from you.

WATERMISER®
Water Conservation Products
John Schommer
JV MFG. INC. 228 Venture Street, Suite 102, San Marcos, CA 92078
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Commenter: David Viola
Affiliation: Plumbing Manufacturers Institute
Comment Date: May 7, 2007

Dear Ms. Tanner,

As indicated in our March 26, 2007 comments, the Plumbing Manufacturers Institute (PMI) supports the development of the WaterSense Specification for Bathroom Lavatory Faucets and agrees with establishing a maximum flow rate of 1.5 gpm. PMI also appreciates EPA accommodating our request for an extension to allow additional time to investigate the full impacts of the proposed minimum flow rate criteria.

With regard to establishing a minimum flow rate, PMI agrees that this performance requirement should be included in the specification, and believes it should be set at 1.1 gpm at 20 psi. This will provide manufacturers a greater degree of flexibility in designing faucets that meet consumers' needs while maintaining performance at lower pressure.

PMI and its members are continuing to examine the feasibility of even greater lavatory faucet efficiencies through the ASME/CSA Joint Harmonization Task Group. The resultant work could result in further recommended changes to the future editions of the EPA High-Efficiency Bathroom Sink Faucet Specification. As such, we encourage EPA to continue participating in this task group activity.

If you have any questions or need additional information, please do not hesitate to contact me by email at dviola@pmihome.org or by telephone at (847) 884-9764.

Respectfully submitted,
David Viola
Technical Director
Plumbing Manufacturers Institute

High-Efficiency Bathroom Sink Faucet Public Meeting Comments
Thursday, March 1, 2007 from 2:00 p.m. to 4:00 p.m.

Participants
Shabbir Rawalpindiwala, Kohler
Pete DeMarco, American Standard
Norm Kummerlen, Moen
Al Dietemann, Seattle Public Utilities
Dave Viola, PMI
Jeremy Brown, NSF
Larry Himmelblau, Chicago faucets
Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products
Tony Gregg, Austin Water Utility
Rob Zimmerman, Kohler
Fernando Fernandez, TOTO USA, Inc.
Dave Broustis, Seattle Public Utilities
Colin Thielmann, Delta Faucet
Sheila Frace, U.S. EPA
Stephanie Tanner, U.S. EPA
Matt Richardson, U.S. EPA
Virginia Lee, U.S. EPA
John Koeller, Koeller & Company
Roy Sieber, ERG
Kim Wagoner, ERG
David Frank, ERG

Stephanie Tanner, U.S. EPA welcomed all participants and provided a brief introduction to the WaterSense Program. Discussion was then begun on the *Draft High-Efficiency Bathroom Sink faucet Specification*.

Maximum Flow Rate

Colin Thielmann, Delta Faucet raised the issue of use of standard residential faucet fixtures in guestrooms by the hospitality industry and that many hotel chains are looking to manufacturers for faucets with 1.0 gpm flow rates. He pointed out that this is especially common in Las Vegas, where the Southern Nevada Water Authority has been very aggressive in terms of creating incentives for lower flows. Many hotels use hot water recirculating systems, so increased wait time is not an issue. His concern is that these faucets will not meet the WaterSense labeling criteria, even though they are LEED certified, which could be an embarrassing situation for the WaterSense Program.

Norm Kummerlen, Moen voiced the concern (raised previously at the AMSE meeting) that a 1.5 gpm aerator does not necessarily flow at 1.5 gpm when attached to a faucet, and that the impact will be even greater at the lower end of the specification (i.e., at 20 psi).

An Unidentified Speaker questioned whether pressure compensation was being factored into the specification?

Colin Thielmann, Delta Faucet commented that to meet the specification as written manufacturers will have to use pressure compensating devices.

Norm Kummerlen, Moen mentioned that at the ASME meeting, there was discussion that the maximum is only a maximum and that there could be lower maximums. He said WaterSense indicated that another alternative to the way the current draft specification is written would be to allow some percentage change or flow rate differential from the maximum to the minimum. He questioned that if WaterSense is struggling with customer/user satisfaction concerns, how it will justify dropping below the 1.2 gpm range. He also asked how WaterSense will establish user satisfaction for 1.0 gpm hospitality faucets.

Colin Thielmann, Delta Faucet commented that user satisfaction should be considered different than pressure compensation, because manufacturers want to ensure that manufacturing quality is sufficient so that whatever the specified flow rate is, the product is within some sort of range.

Pete DeMarco, American Standard cautioned that WaterSense needs to be careful if it wants to go below 1.5 gpm because the ability to market and distribute faucets for general consumption has the ramifications of dissatisfaction with hot water delivery times, etc. he raised two issues; 1) what to supply for general consumption, and 2) can WaterSense include wording in the specification for specific commercial applications where the WaterSense label could be used when flow rates less than 1.5 gpm would be appropriate. He was reluctant to recommend from the industry standpoint that the specification be open to allow for lower flow rates in general than what is currently specified.

Shabbir Rawalpindiwala, Kohler expressed his opinion that, based upon the comments and discussion, there should be no minimum flow rate at all.

Colin Thielmann, Delta Faucet felt the issue with having a minimum flow rate is that it will require a pressure compensating flow control device and most manufacturers are not using these at this time. He pointed to the NeoPerl flow curves that indicate that products cannot achieve the specification targets with the current non-pressure compensating aerators most manufacturers use. He also raised the issue of the cost difference between a pressure compensating and non-compensating aerator. He acknowledged that if all manufacturers switched to pressure compensating devices on their products, then the cost would come down because of the volumes involved, but emphasized that this is an issue that needs to be considered because it will require that manufacturers make special products for WaterSense labeling.

Shabbir Rawalpindiwala, Kohler expressed his agreement with Thielman's assessment.

Norm Kummerlen, Moen also agreed that there is an associated cost increase when using pressure compensating aerators. He also returned to the point he raised previously that once an aerator is put on a faucet, the flow rates are likely to drop from the NeoPerl flow rate curves. He explained that the NeoPerl curves are for aerators without upstream faucet restrictions, and that they had data showing that once the aerator is put onto the faucet, the flow rates are different. He cautioned that this will become an issue if WaterSense establishes a minimum flow rate.

Colin Thielmann, Delta Faucet added that Delta Faucet does not received a lot of calls saying that people are not getting good flow rates out of their faucets. Subsequently, he felt it is hard to get excited about incremental costs for not a lot of perceived value by the consumer.

Shabbir Rawalpindiwala, Kohler noted that Kohler tested one faucet and confirmed Kummerlen's assertion that the flow rate is different once an aerator is attached to a faucet.

[Discussion redirected by Roy Sieber, ERG to discuss whether the max/min flow rates should be constrained or not? If yes, how should that be done?]

Colin Thielmann, Delta Faucet asserted that if WaterSense eliminates the minimum flow rate, then the issue of 1.0 gpm fixtures for hospitality uses is no longer an issue.

Dave Broustis, Seattle Public Utilities expressed his concern that with not having some range of performance that poor quality manufacturing could result in a 1.5 gpm rated aerator in reality flowing at a significantly lower rate, such as 1.0 gpm.

Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products wondered if any of the manufacturers or anyone else had any data showing how much water [i.e., what flow rate] is required to wash hands?

Norm Kummerlen, Moen stated that Moen did not have that information.

Colin Thielmann, Delta Faucet said they did not have any formal studies, but provided some anecdotal information about Delta Faucet changing all of the standard 2.2 gpm aerators to 1.5 gpm aerators in its building and not getting any complaints from employees. He did mention that the water pressure in their building is between 45 and 60 psi, and not 20 psi.

Pete DeMarco, American Standard cautioned that the satisfaction quotient has to be more involved than just washing hands. He felt that there are going to be a lot of other things people are going to do with their bathroom faucet such as rinsing razors, filling basins, and, of course, getting hot water to the outlet in a reasonable amount of time.

Dave Broustis, Seattle Public Utilities commented that they have installed hundreds of thousands of 1.0 gpm aerators in their service area with extremely high customer satisfaction. He also cited the very high customer satisfaction shown in studies with 1.0 gpm pressure compensating aerators. He also offered that he had replaced his own 2.5 gpm aerator in the bathroom with a 1.0 gpm aerator and it was able to clean the whiskers out of a razor that the 2.5 gpm faucet could not.

[Discussion redirected by Roy Sieber, ERG asking if a minimum of 1.0 gpm poses any customer satisfaction issues and if anyone has studies or anecdotal information on this flow rate?]

Norm Kummerlen, Moen explained that a fixed orifice faucet, which most manufacturers produce, with an established 1.5 gpm flow rate at 60 psi, will flow at approximately 0.86 gpm at

20 psi, and that these types of faucets will not be able to achieve the 1.2 gpm at 20 psi minimum flow specified in the draft specification.

Shabbir Rawalpindiwala, Kohler said Kohler tested one fixed orifice faucet with a 1.5 gpm aerator and it flowed at 0.7 gpm at 20 psi.

Norm Kummerlen, Moen further explained that if a 1.5 gpm NeoPerl aerator is placed on a fixed orifice faucet, the faucet restriction is now in series with the aerator restriction and the net flow will be less than 1.5 gpm. He than explained that a faucet designed to flow at 1.5 gpm at 60 psi will flow at almost 0.9 gpm at 20 psi. He acknowledged that this is different than putting a 1.5 gpm aerator on a faucet, but felt that it would be much easier to stay with non-pressure compensating devices with the resulting pressure at 20 psi being approximately 0.9 gpm.

Pete DeMarco, American Standard felt that regardless of the type of restriction used—pressure compensating or fixed orifice—the impediment of the faucet upstream is going to have an impact on the flow rate through the assembled product. He stressed that a 1.5 gpm restrictor installed into a faucet will cause the faucet to flow at 1.4 gpm at 60 psi and 0.79 at 20 psi. He felt the issue that needs to be considered is that placing a 1.5 gpm flow restricting device on a faucet is going to have a different effect for each faucet (i.e., some could flow at 1.2 gpm, some at 1.3 gpm) and that this will vary according to faucet design. He stressed that this issue need to be considered relative to the established maximum flow rate. He stated that what the acceptable minimum flow rate is is a very important, but a separate discussion.

Norm Kummerlen, Moen cautioned that the specification needs to cover both aerators separately and faucets since it will not be possible to get the same level of user satisfaction if the specification is just for aerators.

Colin Thielmann, Delta Faucet noted that the specification states that products needs to be tested according to ASME standards, and asked whether testing is being required for the whole faucet or just the aerator. He stated that the specification as written is ambiguous and that this needs to be clarified.

Norm Kummerlen, Moen agreed with Thielman's statement.

Colin Thielmann, Delta Faucet further explained that under the current ASME standards, manufacturers can take an aerator that meets the standard and put it on a faucet without testing the faucet because it is assumed that since the aerator conforms, the faucet conforms. He explained that this is possible because the ASME standard only addresses maximum flow rates, but once a minimum is added manufacturers will now have to test each model of faucet because the performance is going to be different even if the same aerator is used due to the designs differences. He felt that WaterSense could not just refer to the ASME standard, but that more detail on testing is needed.

Minimum Flow Rate

[Discussion shifted to the issue of the proposed minimum flow rate]

Shabbir Rawalpindiwala, Kohler reiterated and expanded upon his opinion that there should not be a minimum flow rate because the situations where the products will be used vary, such as the previously mentioned 1.0. gpm units used in a LEED project where a hot water recirculation was being used. He felt that the minimum flow rate should be determined on a case-by-case basis.

Shelia Frace, U.S. EPA asked if there was another metric, other than a minimum flow rate, that WaterSense could use to ensure performance and user satisfaction?

[None of the participants knew of another metric to use]

Stephanie Tanner, U.S. EPA asked if there was a minimum flow rate beyond which WaterSense should not go to ensure performance and user satisfaction.

Shabbir Rawalpindiwala, Kohler offered that another alternative is to have 1.1 or 1.0 gpm as the minimum to allow for the testing variance of the faucets.

Norm Kummerlen, Moen pointed out that according to the NeoPerl flow curve for the 1.0 gpm pressure compensating aerator the flow rate is 0.9gpm at 20 psi. He explained that figure is for the aerator alone and once this aerator is placed on a faucet the flow rate could easily drop to 0.8 gpm or less—about the same as what a 1.5 gpm fixed orifice would flow at 20 psi.

Dave Broustis, Seattle Public Utilities added that the aerator that the 1.0 gpm pressure compensating aerator he has at home is at 30 psi and is flowing at 1.0 gpm.

Kim Wagoner, ERG asked whether manufacturers would recommend a 1.0 gpm pressure compensating aerator if the flow rate will be 0.8 gpm at 20 psi or lower.

Colin Thielmann, Delta Faucet replied that it would depend upon the user of the faucet and whether they will be satisfied or not.

Dave Broustis, Seattle Public Utilities brought up the issue of the incremental costs of using pressure compensating devices raised by manufacturers and questioned what that incremental cost would be and what kind of problems it would create if WaterSense factored in required pressure compensation in the Specification.

Colin Thielmann, Delta Faucet offered that pressure compensating aerators typically are two to three times more expensive than fixed orifice devices.

Stephanie Tanner, U.S. EPA added that the WaterSense research suggested the difference was approximately one dollar versus 4 to 5 dollars.

Dave Broustis, Seattle Public Utilities stated that Seattle Public Utilities pays $1.12 for the NeoPerl 1.0 gpm pressure compensating, which they procure through a vendor, which increases the cost to some degree. He asked if he was correct in assuming that the cot difference for manufacturers using pressure compensating devices was between 20 and 40 cents per faucet.

Colin Thielmann, Delta Faucet replied that 20 to 40 cents would be the cost to the manufacturer, but that every 50 cents increase in cost to the manufacturer translates into $2 or $3 to the consumer and that the retail faucet market is very price sensitive.

Stephanie Tanner, U.S. EPA said that all of WaterSense's cost-benefit analyses were calculated with pressure compensating aerators, and they all still proved to be cost effective for the consumer.

Dave Broustis, Seattle Public Utilities expressed his opinion that as a consumer, he would not be happy if he purchased a 1.5 gpm that actually flowed at 0.8 gpm when installed. He contrasted this to purchasing a 1.0 gpm device that flowed at 0.9 or 0.8 gpm when installed, feeling this was a more acceptable scenario. He felt that WaterSense might have higher user satisfaction with a more narrow range of variation of product flow rates.

Stephanie Tanner, U.S. EPA explained that the goal of the specification and the purpose of including the minimum flow rate requirement is to ensure that a consumer purchasing a 1.5 gpm WaterSense faucet is going to get a faucet that flows at a rate reasonably close to that, even at low pressure conditions. She asserted that to avoid ruling out 1.0 gpm faucets, WaterSense could set the "minimum" to be a differential from the labeled flow rate. Referring to the NeoPerl flow curves for the 1.0 gpm fixed orifice, she pointed out that it flows at about 0.5 gpm at 20 psi, and, as previously discussed, when that aerator is attached it to a faucet it will likely flow at an even lower rate. She did not think that this would be acceptable. She emphasized that WaterSense needs to have a higher standard of performance and this is what is trying to be achieved with the minimum flow rate requirement.

Norm Kummerlen, Moen disagreed. He felt that WaterSense was making the assumption that the consumer will be able to differentiate between actual and labeled flow rates when in reality most people will not be able to make that distinction. He felt that if WaterSense establishes the specification as a differential between the max and the minimum flow rates that there is going to be some number that falls below the level of customer satisfaction. He did not believe that most consumers will be able to make that differentiation and WaterSense is going to end up with unhappy customers.

Norm Kummerlen, Moen explained that If WaterSense only specifies a differential, say a 25 percent differential (for example, a 1.3 gpm at 60 psi max faucet that could drop to a 0.9 gpm minimum flow rate), there is no way to know or guarantee that a customer will be satisfied with that lower flow rate. He felt the consumer would just see the WaterSense label and assume it is an efficient product.

Stephanie Tanner, U.S. EPA agreed that WaterSense needs to have some sort of a minimum below which it is no longer a WaterSense product and that there is a need to set the lower end point somehow. This, she explained, is the reason WaterSense set the minimum in the draft specification; it was not to exclude high performing 1.0 gpm faucets, but to ensure that when someone goes out and purchases a WaterSense product that it performs up to their expectation.

Pete DeMarco, American Standard felt that the discussion was becoming needlessly complicated. He asserted that because the majority of WaterSense products are going to be sold at retail and the manufacturers have no way of knowing at what pressure the faucets will be installed that there needs to be a definitive minimum flow rate. He disagreed with the differential range approach because if WaterSense is going to allow a 1.0 gpm unit to go down to 0.8 gpm, then there is no good reason it should not allow a 1.5 gpm to go down to 0.8 gpm. He argued that if users will be satisfied with a 1.0 gpm flowing at 0.8gpm then there is no reason that they would not also be satisfied with a 1.5 gpm flowing at 0.8 gpm.

Colin Thielmann, Delta Faucet believes that the manufacturers need to be savvy enough to ensure a 1.0 gpm aerator is only going in an application, like the hospitality industry, where recirculating hot water systems are being used.

Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products agreed that there ought to be a reasonable expectation of performance on the part of the purchaser across a likely range of pressure/installation scenarios, and he also liked the idea previously submitted of having the WaterSense label available for projects that are commercially specified where there is an assurance that there is the right match for the location.

Colin Thielmann, Delta Faucet did not object to this approach, but asserted that this would need to be clearly specified in the specification.

Virginia Lee, U.S. EPA did not believe that WaterSense can accurately estimate user satisfaction as everyone's expectations are different. She does believe that what WaterSense is trying to accomplish with this brand is to represent the same or better performance than less efficient counterparts. She agreed that a consumer very likely will not know what a 1.0 gpm flow rate feels like, but they will know what their less efficient faucet feels like and WaterSense's goal is not to make a faucet feel like a 1.5 or 1.0 gpm faucet, but to make it feel similar to what they are used to.

Al Dietemann, Seattle Public Utilities explained that the industry went down a similar road when developing the specification for high-efficiency toilets when it looked at MaP testing and asked what a reasonable criterion for an efficient toilet is. They did not try to set some specific number of minimum gallons for a toilet to achieve to reach that performance level. He feels a similar approach is needed for faucets and aerators. We went on to say that he has not seen any data yet that gives any indication of a relationship between flow and customer satisfaction. He feels that WaterSense needs this data to determine if a higher or lower flow rate than what has been proposed should be used to achieve reasonable user satisfaction. He also advocated performing additional performance testing and setting up some criteria to figure out what gives customers a high level of satisfaction, regardless of what the flow rate is.

Colin Thielmann, Delta Faucet commented that the discussion and specification were devolving to a lowest common denominator problem where the less than 25 percent of the population that are on private wells are driving the specification criteria. He further expresses his concern, positing that it is probably even less than 25 percent of the population because a good well system with an adequate pump will provide water pressures better than 20 psi. He does not believe that at normal water pressures, 40 psi and up, that the 1.5 gpm maximum flow rate is

going to create a problem. He further asked whether WaterSense should be expecting that 100 percent of the people that buy a WaterSense faucet will be satisfied.

Stephanie Tanner, U.S. EPA recognized that 100 percent satisfaction is not likely, but that with the HET specification the target was a confidence interval of 95 percent or greater. She also said that WaterSense does not want to knowingly have a subset of the population that will be dissatisfied.

Fernando Fernandez, TOTO USA, Inc. commented that manufacturers can influence which industry segment gets which of their products, for instance, manufacturers can make sure that 1.5 gpm faucets are marketed for residential use and 1.0 gpm faucets are installed in the hospitality sector and commercial environment. He felt that WaterSense can establish a range maximum and minimum flow rates that go as low as 1.0 gpm, however, the responsibility lies with the manufacturers to some degree to determine which segment of the market gets which of their products.

Colin Thielmann, Delta Faucet stated that using the differential range would keep the specification simple. He provided the examples of a 1.5 gpm device being allowed a 1.2 gpm minimum flow rate—a 20 percent differential—and allowing a 1.0 gpm faucet the same 20 percent range would give a minimum flow rate of 0.8 gpm. He also reiterated Fernandez's point that it is up to the manufacturer to know their market, know their customer, and know the situation their product is going in, and deal with it accordingly.

Dave Broustis, Seattle Public Utilities restated that Seattle Public Utilities has distributed hundreds of thousands of the 1.0 gpm pressure compensating aerators in its service area and does not receive complaints on flow rates. He suggested that if research is performed and finds that people are satisfied with a 1.0 gpm faucet, but WaterSense's specification is for a 1.5 gpm faucet, that a lot of water savings have been lost.

Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products reminded the group that the specification development process is a dynamic one and that this initial specification will be subject to periodic review and refreshing the criteria to account for new technologies and new research, such as any new or future customer satisfaction data.

Colin Thielmann, Delta Faucet stated that he hated for the initial specification to not include 1.0 gpm fixtures in the hospitality settings, because they work very well, and it appears that Seattle has had great success with them. He added that Delta has been testing non-pressure compensating devices on a city water supplied system with normal pressure systems and having positive results. He also accepted requiring the use of pressure of compensation within the specification because of what WaterSense is trying to achieve.

Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products returned to the idea of allowing some of these commercial applications to be custom certified based upon individual applications.

Colin Thielmann, Delta Faucet felt that the only problem with this approach is that it creates an extra bureaucracy and burden and if he was responsible for a LEED project, he would focus on that and not the WaterSense label because of the added burden.

He also stated that he liked the proposal of using a percentage to get determine the minimum flow rate and allowing manufacturers to use aerators that flow at less than 1.5 gpm in specific applications and still be WaterSense certified.

Stephanie Tanner, U.S. EPA asked if there should there be a floor, even if the 20 percent differential were to be use, below which not faucet is allowed to go and what that lower limit should be.

Colin Thielmann, Delta Faucet felt an absolute minimum would be appropriate only if WaterSense wanted to limit this specification to residential and hospitality settings. He said that commercial restroom faucets are already at 0.5 gpm, and if WaterSense does not to include these fixtures at this time then the floor should be above 0.5 gpm.

Roy Sieber, ERG clarified that this was indeed the intent and that commercial faucets were being purposefully excluded at this time.

Pete DeMarco, American Standard cautioned that they were talking about putting a very narrow band on these allowable flow rates when the first part of the discussion was that the starting point based on the resistance of the faucet cannot even be guaranteed. He felt that the proposed 1.5 maximum and 1.2 minimum flow rates are too narrow. He also felt the +/- 0.1 gpm at 60 psi is potentially problematic because the starting point can't be guaranteed. He was concerned that manufacturers would potentially need to have a custom made flow control device for every faucet to meet the specification.

Tony Gregg, Austin Water Utility asked what would stop some one from having a 0.5 gpm faucet in a residence if they have a water recirculating system and wouldn't everyone want to encourage that. He was afraid that if the range is too narrow or the minimum is too high this could preclude the use of these types of faucets. He also put out the idea of a WaterSense specification that required the use of hot water recirculation systems with 0.5 gpm devices.

Colin Thielmann, Delta Faucet cautioned against this approach since Seattle has at least anecdotal evidence that they are having a lot of success with 1.0 gpm pressure compensating aerators that are not on recirculating systems.

Dave Broustis, Seattle Public Utilities further pointed out that the Tampa study also retrofitted with 1.0 gpm aerators and had 89 percent customer satisfaction ratings as evidence high levels of user satisfaction are achievable without hot water recirculating systems. He also agreed with DeMarco that the parameters surrounding the outliers need to be studied to be sure that 95 percent customer satisfaction is achieved. He felt this was a reasonable target that was set for toilets and there is no reason why it shouldn't be the same for faucets.

Ed Osann, Potomac Resources Inc./Steering Committee for Water Efficient Products raised the concern that there is anything in the specification addressing technologies that prevent drips

and leaks. He felt if this was not included in this version, then it should definitely be included in future versions. He felt a WaterSense faucet should be a dripless faucet.

He also brought up that in the future in developing WaterSense specifications, utilities and NGOs should be involved in the early calls that EPA has with manufacturers or on separate calls.

Norm Kummerlen, Moen addressed Osann's concern about dripless faucets by pointing out that the current ASME standard requires 500,000 lifecycle tests at 50 psi flowing and 80 psi static and the faucet is not allowed to leak or drip at the end of the testing. He acknowledged that Osann's comment has merit, but did not really think this is an issue in the field anymore because of the stringent test requirement for kitchen and lavatory faucets.