



July 22, 2008

**Subject: Clarification of Method to Determine the Minimum Flow Rate of a WaterSense Labeled Faucet or Faucet Accessory**

Dear Interested Party:

Since the release of the final WaterSense *High-Efficiency Lavatory Faucet Specification* (Specification) in October 2007, a question has been raised regarding the application of the testing verification protocol to the minimum flow rate requirement. Section 2.3 of the Specification states, "The flow rate, tested in accordance with the procedures in ASME A112.18.1/CSA B125.1, shall meet the testing verification protocol as described in 10 *CFR* 430 Subpart F, Appendix B." This verification protocol defines the procedures for evaluating, with statistical significance, the compliance of a product's flow rates to the requirements contained in the Specification.

According to 10 *CFR* 430 Subpart F, Appendix B, Step 6(b), given a sample size of four or more units, the mean of the first sample ( $X_1$ ) is compared with the upper and lower control limits ( $UCL_1$  and  $LCL_1$ ) to determine one of the following:

- (1) If the mean of the first sample is above the upper control limit, then the basic model is in noncompliance and the testing is at an end.
- (2) If the mean of the first sample is equal to or less than the lower control limit, then the basic model is in compliance and testing is at an end.
- (3) If the sample mean is equal to or less than the upper control limit but greater than the lower control limit, then no determination of compliance or noncompliance can be made and a second sample size is determined.

This procedure is applicable for determining, with statistical significance, the compliance of a faucet or faucet accessory's maximum flow rate to the requirements contained in the Specification, as the intent is to ensure that any given faucet or faucet accessory has at least a 95 percent probability that its flow rate will be less than or equal to the maximum flow rate of 1.5 gallons per minute (gpm) required by the Specification (Scenario 2 above). This same logic, however, does not apply for determining, with statistical significance, the compliance of a faucet or faucet accessory's minimum flow rate to the requirements contained in the Specification, as WaterSense's intent is to ensure that any given faucet or faucet accessory has at least a 95 percent probability that its flow rate will be greater than or equal to the minimum flow rate of 0.8 gpm required by the Specification. The following example further illustrates this point:

Maximum Flow Rate Example	
Sample	Flow Rate (gpm)
1	1.51
2	1.49
3	1.48
4	1.50
Sum	5.98
Mean (X1)	1.50
UCL <sup>1</sup>	1.5
LCL <sup>1</sup>	1.5

Minimum Flow Rate Example	
Sample	Flow Rate (gpm)
1	0.71
2	0.74
3	0.80
4	0.69
Sum	2.94
Mean (X1)	0.74
UCL <sup>1</sup>	0.8
LCL <sup>1</sup>	0.8

For the *maximum flow rate*, according to the criteria in 10 *CFR* 430 Subpart F, Appendix B, Step 6(b), the sample set above is in compliance with the Specification because “the mean of the first sample is equal to or less than the lower control limit” (meets Scenario 2).

For the *minimum flow rate*, intuitively the sample set is not in compliance because the mean of the sample is less than the lower control limit (0.74gpm is less than the required 0.8gpm minimum), however, according to the criteria in 10 *CFR* 430 Subpart F, Appendix B, Step 6(b), the sample set is in compliance with the Specification because “the mean of the first sample is equal to or less than the lower control limit” (meets Scenario 2).

With this memorandum, WaterSense is issuing clarifying guidance to address how to apply the testing verification protocol, as described in 10 *CFR* 430 Subpart F, Appendix B, to the minimum flow rate requirement contained in the Specification.

The testing verification protocol as described in 10 *CFR* 430 Subpart F, Appendix B will continue to apply to the maximum flow rate as currently referenced in the Specification. The testing verification protocol as described in 10 *CFR* 430 Subpart F, Appendix B and as applied to the **minimum flow rate** is modified as indicated below.

- (1) If the mean of the first sample is ~~above-less than~~ the ~~upperlower~~ control limit, then the basic model is in noncompliance and the testing is at an end.
- (2) If the mean of the first sample is equal to or ~~less-greater~~ than the ~~lowerupper~~ control limit, then the basic model is in compliance and testing is at an end.
- (3) If the sample mean is ~~equal to or~~ less than the upper control limit but ~~equal to or~~ greater than the lower control limit, then no determination of compliance or noncompliance can be made and a second sample size is determined.

<sup>1</sup> Calculated per 10 *CFR* 430 Subpart F, Appendix B. The UCL and LCL are not impacted by this clarification.



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If you have any questions or concerns regarding this issue, please contact me at 202-564-2660  
or [tanner.stephanie@epamail.epa.gov](mailto:tanner.stephanie@epamail.epa.gov).

Sincerely,

A handwritten signature in cursive script that reads "Stephanie Tanner".

Stephanie Tanner, CEM  
WaterSense Products Lead  
Environmental Protection Agency

