



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

**Notification of Intent (NOI) to Develop Draft Performance Specifications for
High-Efficiency Pre-Rinse Spray Valves**

I. Introduction

Currently there are an estimated 1.35 million commercial pre-rinse spray valves in use in the United States. Up to 50 percent (675,000) of these pre-rinse spray valves may be inefficient units, with flow rates exceeding the current 1.6 gallon per minute (gpm) maximum flow rate allowed by federal standards (the Energy Policy Act of 2005 [EPAAct 2005]) by between 1.0 and 3.0 gpm. Since Congress enacted the federal standard, manufacturers have developed even more efficient pre-rinse spray valves that use significantly less water than the standard 1.6 gpm models. Based on current advertised product flow rates, these new valves can use between 0.35 and 1.1 gpm less than standard models, resulting in savings of 6,400 to 20,000 gallons per pre-rinse spray valve per year. Since pre-rinse spray valves use hot water, reducing the flow rate and total gallons of hot water used also leads to significant energy savings of about 1,100 to 3,500 kilowatt hours (kWh) of electricity per year or 5,600 to 17,500 cubic feet (5.6 to 17.5 Mcf) of natural gas per year¹. Replacing older, inefficient pre-rinse spray valves with these new models can save even more water and energy.

To capitalize on this opportunity for potential water and energy savings, and to raise consumer awareness, further improve water and energy efficiency, and promote the use of more efficient pre-rinse spray valves, the U.S. Environmental Protection Agency (EPA) is announcing its intent to develop a specification for water-efficient, energy-efficient, and high-performing pre-rinse spray valves for both the WaterSense® and ENERGY STAR® programs. The specification, once final, will establish performance criteria to identify and differentiate those products that meet criteria for water efficiency, energy efficiency, and performance. Manufacturers whose products meet the specification may then use both the WaterSense and ENERGY STAR labels to highlight the efficiencies of these models.

Though EPAAct 2005 specifies the maximum flow rate for pre-rinse spray valves, it does not address the performance of these products. In order for utilities to compare pre-rinse spray valves on the market and choose appropriate water- and energy-efficient models that do not sacrifice product performance for their conservation programs, the American Society of Testing and Materials (ASTM) F2324-03, *Standard Test Method for Pre-Rinse Spray Valves*, was developed. The test method provides a methodology for measuring flow rate (in gallons per minute) and performance, which is measured in terms of "cleanability," or the time it takes for the product to clean preset media from a plate in units of seconds per plate. Several states and utilities, including the California Urban Water Conservation Council (CUWCC) and the California Energy Commission (CEC), are specifying the test method to measure product performance against a particular target flow rate and performance (cleanability) requirement. Clearly, there is a need to ensure that as pre-rinse spray valves achieve lower flow rates, they continue to perform as expected, particularly with respect to usage time

¹ Energy savings are based on the total estimated gallons of water saved per year, 6,400 to 20,000 gallons, and an estimated 175.6 kWh of energy use per 1,000 gallons of water or 0.8768 Mcf of natural gas use per 1,000 gallons of water.

for dish cleaning.

With growing interest in the promotion of water conservation practices and technologies by water utilities to head off projected water shortfalls and infrastructure cost increases, the increasing interest from electric and gas utilities to reduce energy use, and the growing popularity of “green” building practices and certifications, manufacturers are marketing an increasing number of pre-rinse spray valves with more efficient flow rates. According to market research, there are at least 13 manufacturers offering more than two dozen models of pre-rinse spray valves with flow rates lower than the 1.6 gpm federal standard.

With this NOI, EPA has preliminarily identified the water- and energy-efficiency criteria and performance test method it intends to include in a draft specification for pre-rinse spray valves. While the major criteria have been identified, some technical points require further consideration and assessment before a draft specification can be published. To establish and better define these criteria, EPA is requesting supporting information and data from all interested parties (e.g., researchers, manufacturers, water utilities, water-efficiency organizations) on the topics discussed in this NOI. Interested parties are encouraged to submit data and comments to EPA regarding any of the issues presented in this notice by submitting written comments to watersense-products@epa.gov. Comments and information on the issues presented in this NOI are welcome and will be taken into consideration as EPA develops a draft specification for WaterSense and ENERGY STAR.

II. About WaterSense and ENERGY STAR

WaterSense and ENERGY STAR are voluntary partnership programs between government, businesses, and purchasers designed to encourage the manufacture, purchase, and use of efficient products. The primary objective of both programs is to make it easy for buyers to identify efficient products in the marketplace by differentiating them with the WaterSense or ENERGY STAR label. Because these are voluntary, market-based programs, it is not EPA’s intention to design a specification that will allow every model to qualify. When EPA sets a specification, it strives to recognize the top performers in the market, which offer attractive savings to the buyer at that time. For products that do not initially meet the specification, it is EPA’s hope that manufacturers will redesign for efficiency over time, thus leading to more efficient product choices.

For more information, please visit the program Web sites: www.epa.gov/watersense or www.energystar.gov.

III. Scope

EPAAct 2005 defines a commercial pre-rinse spray valve as “a handheld device designed and marketed for use with commercial dishwashing and ware washing equipment that sprays water on dishes, flatware, and other food service items for the purpose of removing food residue before cleaning the items.” EPA is considering developing a specification for any product that would fall under this definition.

EPA is considering excluding from the scope of a pre-rinse spray valve specification those spray valves used for pot and kettle filling as well as kits used to retrofit the water efficiency of existing non-EPAAct-2005-compliant pre-rinse spray valves. EPA intends to exclude pot and kettle fillers as their use is primarily volume dependent, and as such, lowering the flow rate could unnecessarily impact user satisfaction by significantly increasing wait times. EPA intends to exclude retrofit kits because the intent of a specification for pre-rinse spray valves is to recognize and label complete, fully functioning devices, and not individual components or parts.

IV. Efficiency

The goal of the WaterSense program is to label products that are at least 20 percent more efficient than their standard counterparts, while ensuring the same or better performance. The goal of the ENERGY STAR program is to label products that represent the top quartile of products currently available in the market that are cost effective to the purchaser and deliver the same or better functionality. To achieve the water-efficiency

component of these goals, EPA seeks to establish a new maximum flow rate for pre-rinse spray valves.

With this NOI, EPA is announcing the intent to develop a draft WaterSense and ENERGY STAR specification for “high-efficiency” pre-rinse spray valves. The flow rate selected must meet both the stated WaterSense and ENERGY STAR program goals for efficiency and performance. The draft specification will establish a maximum allowable flow rate that is at least 20 percent lower than the current standard for pre-rinse spray valves. Thus, the flow rate may match the voluntary flow rate of 1.25 gpm for “low-flow commercial pre-rinse spray valves” proposed by the American Society of Mechanical Engineers (ASME) in the draft revision of standard A112.18.1. It may also match the Federal Energy Management Program’s (FEMP’s) December 2008 purchasing specification, requiring a 1.25 gpm maximum flow rate for pre-rinse spray valves purchased by the federal government. Several manufacturers are already selling pre-rinse spray valves that are at or below this flow rate requirement. Some of these products have been on the market for years and have well-documented performance and customer satisfaction records.

V. Performance

With all of its specifications, EPA develops criteria to ensure that labeled products perform as well as or better than their standard counterparts on the market. Though there is a federal standard specifying the maximum flow rate for pre-rinse spray valves, the standard does not address the performance of these products. Currently, the only performance test established for pre-rinse spray valves is ASTM F2324-03. The test method provides a mechanism to evaluate product performance via the output of a cleanability time in seconds per plate cleaned. This test method was originally designed as a means to compare product performance side-by-side and not as a means to compare a product to a specific performance requirement or even to its performance in the field. As such the test method does not include or specify a specific performance value (i.e., cleanability time) that a product must meet in order to ensure user satisfaction.

EPA is considering incorporating the ASTM F2324-03 test method in its draft specification for high-efficiency pre-rinse spray valves for WaterSense and ENERGY STAR, but has identified several unresolved issues of concern that need to be addressed. First and foremost is the repeatability and reproducibility of the ASTM test method and the correlation between cleanability times from the ASTM test method and actual product usage time in the field, coupled with user satisfaction. If these issues are resolved to the satisfaction of EPA, then EPA will need to evaluate and determine the impact of water pressure (both high and low) on the spray characteristics and performance of high-efficiency pre-rinse spray valves and where to set the performance level for cleanability (i.e., seconds per plate).

A. Test Method Repeatability and Reproducibility

As a requirement for labeling, all products must be tested and certified for conformance with the relevant specification by an independent third-party certifying body. Thus it is essential that any performance test referenced in a specification be both repeatable and reproducible among testing laboratories. As part of its initial technical and market research, EPA had preliminary conversations with several stakeholders who have expressed some concern regarding the repeatability of the ASTM test method and reproducibility of the results. Some stakeholders indicated that the test method is subjective to the individual performing the test, based on how the tester chooses to spray each plate with the pre-rinse spray valve and how they visually verify when a plate is considered clean. In addition, some stakeholders are concerned about the lack of specificity regarding the makeup of the test media; the shade, finish, and manufacturer of the test plates; the room conditioning requirements; and other test conditions. Proponents of the test method point out that it requires 60 iterations of the cleanability test in order to achieve a statistically significant population of data to calculate the cleanability average, and the high number of iterations allays any subjective variations.

In addition to issues with subjectivity, only one independent third-party laboratory, the Food Service

Technology Center (FSTC), currently performs the ASTM cleanability test, and as such the inter-laboratory repeatability of the test method and reproducibility of the results have not been evaluated.

EPA is seeking input regarding the repeatability and reproducibility of the ASTM test method. In particular, EPA is seeking to compare and evaluate performance data for the same make and model pre-rinse spray valves tested at multiple laboratories in accordance with the ASTM test method.

B. Correlation Between Performance Test Results and Actual Usage Time and User Satisfaction

In recent years, manufacturers have begun to meet demands for more efficient products and have introduced high-efficiency and even ultra-high-efficiency pre-rinse spray valve models (with rated flow rates of 1.0 gpm or less) to the market. These spray valves have demonstrated ASTM-tested cleanability times equal to or better than standard models. Based on test reports available on the FSTC's Web site (www.fishnick.com/equipment/sprayvalves), pre-rinse spray valves with flow rates between 1.0 and 1.6 gpm score an average cleanability time of 21.63 seconds per plate on the ASTM test, while pre-rinse spray valves with flow rates less than 1.0 gpm score an average cleanability time of 21.41 seconds per plate.

Minimal research has been done, particularly with these ultra-high-efficiency spray valves, to evaluate actual field usage times, water and energy savings, and user satisfaction. The limited data that do exist from a small-scale pilot study conducted in the Pacific Northwest suggest that usage time may increase with ultra-high-efficiency pre-rinse spray valves and user satisfaction may vary. Since ultra-high-efficiency pre-rinse spray valves statistically appear to have the same ASTM cleanability time as higher flow valves, yet some limited research indicates that users have demonstrated increased usage times with use of the ultra-high-efficiency valves in the field, it suggests that actual field usage time may not correlate to the results of the ASTM cleanability test. To determine the correlation between the ASTM cleanability test, field usage time, and user satisfaction, EPA seeks data that answers the following questions:

1. How do water usage and time usage vary among pre-rinse spray valves currently on the market?
2. Do usage times in the field correlate to cleanability times achieved using the ASTM F2324-03 test method?
3. How do flow rate, actual field usage time, and ASTM-tested cleanability time correlate to user satisfaction?

EPA has concluded it is premature to draft a specification without sufficient data to answer these outstanding questions and has outlined a detailed research study scope to assist with this data collection and evaluation. Please e-mail watersense-products@erq.com any data which might address these questions. Please let us know as soon as possible if you are interested in participating in the research program to obtain these data. EPA is planning to hold a meeting to discuss the above research in early August 2009. More information will be available on the WaterSense Web site, www.epa.gov/watersense.

C. Water Pressure Issues

EPA's initial technical and market research indicates that flow rates and subsequent performance of high-efficiency pre-rinse spray valves can be impacted by water pressure. Some high-efficiency pre-rinse spray valves installed in commercial food establishments with low water pressure might not clean kitchenware quickly enough, which may impact user satisfaction and may negate water and energy savings if significantly more time is necessary to clean dishes. Conversely, high-efficiency pre-rinse spray valves installed in commercial food establishments with high water pressure might cause overspray and splashing when used on kitchenware. As a result, purchasers may turn down their valve or tap to compensate for the excessive flows. The plumbing industry does not recommend throttling back a shutoff valve to a partially open position because it may result in excessive turbulence in the valve and cause unnecessary wear on the valve seat. When the

purchaser goes to completely close the valve, it may leak due to this wear, contributing to excessive unintentional water use and potentially greater repair and maintenance costs for the purchaser in the future.

EPA has obtained information with diverging views on the significance of this issue with respect to high-efficiency spray valves. Some available data suggest that high-efficiency pre-rinse spray valves may be less sensitive to the impact of pressure than standard models. Other data suggest the opposite, that high-efficiency pre-rinse spray valves are more sensitive to water pressure variations than their less efficient counterparts. More data are needed to determine the extent of the impact of pressure variation on flow rate and performance of high-efficiency valves. In particular, EPA is soliciting data to show the relationship between flow rate and flowing water pressure for a variety of spray valves. Please submit any data to further clarify the nature and extent of this issue to EPA via watersense-products@erg.com.

D. Selecting Performance Levels

The ASTM test method has been adopted by several organizations looking to specify the minimum performance of pre-rinse spray valves, including CEC, CUWCC, FEMP, and the New York State Energy and Research Development Authority. These organizations have had to select a performance level (cleanability time) that they believe is representative of adequate product performance. These performance levels, coupled with the maximum flow rates specified by each organization, are summarized in Table 1.

Table 1. Flow Rate and Performance Criteria Specified by Other Organizations

Organization	Specification	Maximum Flow Rate Requirement (gpm)	Minimum Performance Requirement (seconds/plate) based on ASTM F2324-03
CEC	<i>California Appliance Efficiency Regulations, CEC-400-2005-12, April 2005, required state standard</i>	1.6	30
CUWCC	<i>Rinse & Save direct-installation program, 2002, required for installation</i>	1.6	21
FEMP	<i>Purchasing Specification for Pre-Rinse Spray Valves, December 2008, standard</i>	1.25	26
New York State Energy and Research Development Authority	<i>Focus on Hospitality high-efficiency commercial kitchen rebate program, required for rebate</i>	1.6	26

If EPA is able to satisfactorily resolve the outstanding technical issues identified in this NOI and determine that it will incorporate the ASTM test method into a draft specification for high-efficiency pre-rinse spray valves for WaterSense and ENERGY STAR, it must then decide upon a performance level (i.e., cleanability time) that represents adequate product performance. This level may be established based on:

- Data received regarding product performance and correlation of the ASTM test method to actual field usage times and water savings,
- The range of product performance on the market, and/or
- Other data received in response to this NOI.

EPA is seeking any data to determine which cleanability time will best serve as the performance level in a high-efficiency pre-rinse spray valve specification for WaterSense and ENERGY STAR. If you have experience with the ASTM cleanability test or suggestions for where to set the performance level, please e-mail watersense-products@erg.com.

References

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