Designation: F2324 – 13 (Reapproved 2019)

An American National Standard

Standard Test Method for Prerinse Spray Valves[1]

This standard is issued under the fixed designation F2324; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the water consumption flow rate and spray force of prerinse spray valves. The food service operator can use this evaluation to select a prerinse spray valve and understand its water consumption and spray force.

1.2 The following procedures are included in this test method:

1.2.1 Water consumption (see 10.2).

1.2.2 Spray force test (see 10.3).

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This test method may involve hazardous materials, operations, and equipment. It does not address all of the potential safety problems associated with its use. It is the responsibility of the users of this test method to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to its use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *NSF Documents:*[2]

NSF Listings Food Equipment and Related Products, Components and Materials, NSF International

2.2 *ASME Standard:*[3]

ASME A112.18.1/CSA B125.1 Plumbing Supply Fittings

3. Terminology

3.1 *Definitions:*

3.1.1 *prerinse spray valve*—a handheld device containing a release to close mechanism that is used to spray water on dishes, flatware, etc.

3.1.2 *spray force*—the amount of force exerted onto the spray disc.

3.1.3 *test method*—a definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or service that produces a test result.

3.1.4 *uncertainty*—measure of systematic and precision errors in specified instrumentation or measure of repeatability of a reported test result.

3.2 *Abbreviations:*

3.2.1 *gpm*—gallons per minute.

4. Summary of Test Method

4.1 The flow rate of the prerinse spray valve is measured at a water pressure of 60 ± 2 psi (413.7 ± 13.8 kPa) and 60 ± 10°F (15.6 ± 2.6°C) to verify that the prerinse spray valve is operating at the manufacturer's rated flow rate. If the measured flow rate is not within 5 % of the rated flow rate, all further testing ceases and the manufacturer is contacted. The manufacturer may make appropriate changes or adjustments to the prerinse spray valve.

4.2 The amount of force exerted by the prerinse spray valve is determined by the spray force test.

5. Significance and Use

5.1 The flow rate test is used to confirm that the prerinse spray valve is operating at the manufacturer's rated flow rate at the specified water pressure. The result from this test would also assist the operator in controlling the water and sewer consumption and reduce water heating bills.

5.2 The spray force is a measure of the impact from a prerinse spray valve on the target surface and can be used to select a model that meets an end-user's force profile.

5.3 Flow rate and spray force can be used along with spray pattern, coverage area, usage time, and flow control to select a prerinse spray valve that meets an end-user's performance requirements.

[1] This test method is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.06 on Productivity and Energy Protocol.

Current edition approved May 1, 2019. Published June 2019. Originally approved in 2003. Last previous edition approved in 2013 as F2324 – 13. DOI: 10.1520/F2324-13R19.

[2] Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140.

[3] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, http://www.asme.org.

6. Apparatus

6.1 *Analytical Balance Scale,* or equivalent, for measuring the weight of the water carboy. It shall have a resolution of 0.01 lb (5 g) and an uncertainty of 0.01 lb (5 g).

6.2 *Calibrated Exposed Junction Thermocouple Probes,* with a range from 50 to 200°F (10 to 93.3°C), with a resolution of 0.2°F (0.1°C) and an uncertainty of 1.0°F (0.5°C), for measuring water line temperatures. Calibrated K-type 24-GA thermocouple wire with stainless steel sheath and ceramic insulation is the recommended choice for measuring the water line temperatures. The thermocouple probe can be fed through a compression fitting so as to submerse exposed junction in the water lines.

6.3 *Carboy,* or equivalent container, for measuring the weight of the water during the flow rate test. A 5-gal (19-L) carboy water bottle has been found to be suitable (the carboy is the standard water bottle that is used for water coolers).

NOTE 1—The 5-gal (19-L) carboy container is the preferred container. With a narrow opening, the carboy captures all the water during the test at higher water pressure which can result in excess splashing.

6.4 *Force Gauge*—Digital force gauge with a maximum force between 500 and 1000 g-force (1.1 and 2.2 lb-force) and an accuracy of ±2 g-force (±0.071 oz-force).

NOTE 2—When specifying a forge gauge, kilograms and grams are the industry standard unit of measurement and will be used as an exception for this specific test method. For this reason, ounce and pounds equivalents are listed in parentheses.

6.5 *Hot Water Temperature Control Valve,* to maintain and limit mixed hot water to the prerinse spray valve during testing. It shall have a double throttling design to control both the hot and cold water supply to the mixed outlet. The flow characteristics of the valve shall have a resolution temperature control of ±4°F (±2°C) combined with low pressure drop check valves in both the hot and cold water inlets to protect against cross flow.

6.6 *Pressure Gauge,* for measuring pressure of water to the prerinse spray valve. The gauge shall have a resolution of 0.5 psig (3.4 kPa) and a maximum uncertainty of 1 % of the measured value.

6.7 *Spray Disc*—A 10-in. diameter disc made of acrylic or similar material used as a target during the force test. The spray disc will be rigidly attached to the force gauge and be 4.0 ± 0.4 oz (113.44 ± 11.45 g) and at a thickness of 0.08 ± 0.004 in. (2.03 ± 0.1 mm).

6.8 *Spring-Style Prerinse Unit, Deck-Mounted,* with a 36-in. (914.4-mm) flex hose which will have the testing sample prerinse spray valve attach at the end of the flex hose. See Fig. 1.

6.9 *Stopwatch,* with a 0.1-s resolution.

7. Reagents and Materials

7.1 Water used will be from the local municipal water supply.

8. Sampling

8.1 *Prerinse Spray Valve*—Three representative production models shall be selected for performance testing.

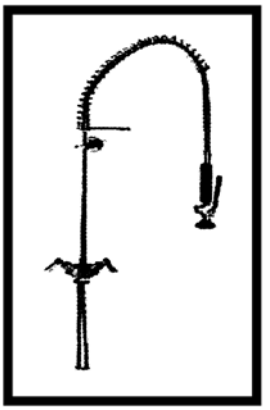

FIG. 1 Illustration of Spring-Style, Deck-Mounted Prerinse Spray Valve

9. Preparation of Apparatus

9.1 Attach the prerinse spray valve to a 36-in., spring-style (flex tubing) prerinse spray valve in accordance with the manufacturer's instructions. The minimum flow rate of the flex tubing, with no prerinse spray valve connected, shall be 3.5 gpm (13.25 L/min) at a pressure of 60 ± 2 psi (413.7 ± 13.8 kPa).

NOTE 3—Specifying a minimum flow rate for the flex tubing ensures that the prerinse spray valve is performing to the manufacturer's specifications and prevents the flex tubing from dictating the flow rate of the prerinse spray valve.

9.2 Connect the mixing valve to the municipal water supply and set the mixing valve to maintain an outlet water temperature of 60.0 ± 10.0°F (15.6 ± 2.6°C). The mixing valve shall be located within 6 ft of the inlet of the flex tubing.

9.3 Install a water line pressure regulator down stream of the mixing valve at the base of the flex tubing. Adjust the pressure regulator so that the water line pressure to the prerinse spray valve can be maintained at 60 ± 2 psi (2.9 ± 0.5 kPa) when water is flowing through the prerinse spray valve.

9.4 Install a temperature sensor in the water line down stream from the mixing valve. The sensors should be installed with the probe immersed in the water. See Fig. 2 for a schematic of the setup for the water supply, mixing valve, pressure regulator, and gauge that are used for testing the prerinse spray valves.

NOTE 4—Install the thermocouple probe described in 9.4 downstream from the temperature mixing valve and upstream from the prerinse spray valve. The thermocouple probe must be installed so that the thermocouple probe is immersed in the incoming water. A compression fitting or equivalent connection should be used to secure the thermocouple without leaks or flow restriction.

9.5 *Force Test Apparatus:*

9.5.1 Rigidly attach a 10 ± 0.25 in. (254 ± 6.4 mm) diameter disc (spray disc) to the force gauge. An example of a suitable rigid connection is illustrated in Fig. 3, where a flat top 'tip' is glued to the center of the spray disc.

9.5.2 Securely mount the force gauge and spray disc apparatus such that the spray disc is positioned in a vertical orientation parallel to the face of the prerinse spray valve. The center of the spray disc and center of the prerinse spray valve

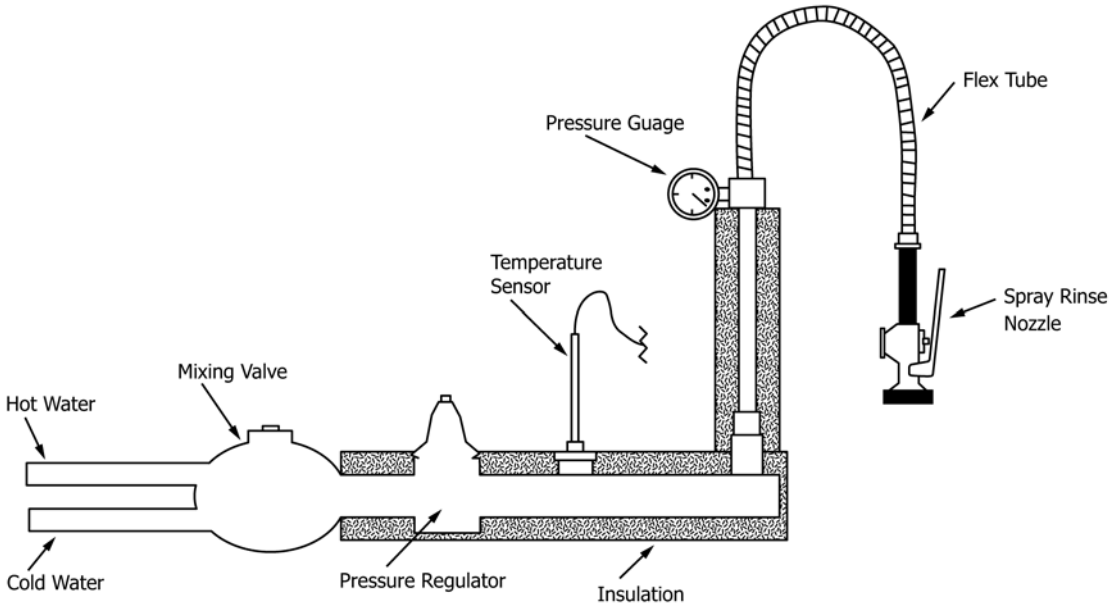

FIG. 2 Sample Schematic of Water Lines and Test Setup

FIG. 3 Attaching the Force Gauge to Spray Disc

faceplate are aligned on the same axis at 8.00 ± 0.25 in. (203.2 ± 6.4 mm) apart. See Fig. 4.

9.5.3 The use of a splash guard is not necessary but may be included to help protect the force gauge from splashing water. A splash guard of any design may be used, as long as the guard does not interfere with the operation of the force test rig. An example of a suitable splash guard is as follows:

9.5.3.1 An acrylic sheet 24 by 24 in. (610 by 610 mm) in size with a thickness of 0.08 in. (2.0 mm). The sheet has a 1-in. (25.4 mm) diameter hole in the center of the sheet, and a 0.5 in. (12.7 mm) wide slot cut in the sheet from one edge of the sheet to the center hole. The slot enables proper positioning of the force gauge and 10-in. spray disc without the need to detach the spray disc from the gauge. An example of a splash guard installation is shown in Fig. 5.

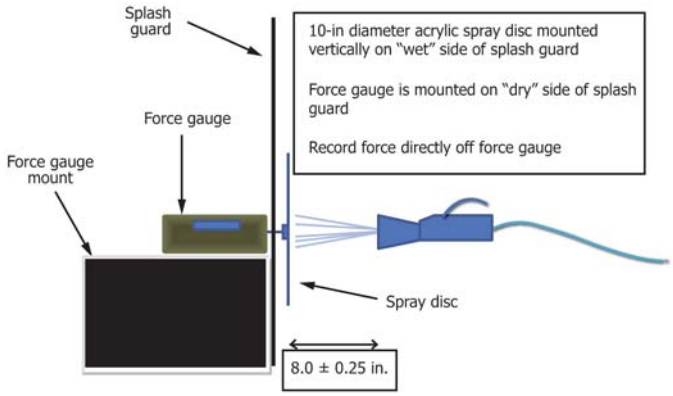

FIG. 4 Force Test Apparatus Diagram (Side View)