



Standard Specification for Hot Water and Chemical Sanitizing Commercial Dishwashing Machines, Stationary Rack Type¹

This standard is issued under the fixed designation F857; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers manually fed, spray-type, stationary rack, automatically controlled, hot water and chemical sanitizing commercial dishwashing machines.

1.2 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.

1.3 The following precautionary caveat pertains only to the test methods portion, Section 12, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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 ASTM Standards:²

[A29/A29M](#) Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought

[A167/A240/A240M](#) Specification for ~~Stainless Chromium~~ and ~~Heat-Resisting Chromium-Nickel~~ [Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications](#) (Withdrawn 2014)

[A276](#) Specification for Stainless Steel Bars and Shapes

[A436](#) Specification for Austenitic Gray Iron Castings

[A554](#) Specification for Welded Stainless Steel Mechanical Tubing

[A582/A582M](#) Specification for Free-Machining Stainless Steel Bars

[B43](#) Specification for Seamless Red Brass Pipe, Standard Sizes

[B75](#) Specification for Seamless Copper Tube

[B127](#) Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip

[F760](#) Specification for Food Service Equipment Manuals

[F861](#) Specification for Commercial Dishwashing Racks

[F1696](#) Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines

2.2 Federal Regulations:³

[OSHA Title 29 Code of Federal Regulations \(CFR\) Chapter XVII, Part 1910](#)

2.3 American National Standards:⁴

[ANSI S1.4](#) Specification for Sound Level Meters

[ANSI S1.13](#) Methods for the Measurement of Sound Pressure Levels

¹ This specification is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.01 on Cleaning and Sanitation Equipment.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

2.4 *National Electrical Manufacturers Association Standards:*⁵

NEMA ICS Industrial Controls and Systems

NEMA MG-1 Motors and Generators

2.5 *National Fire Protection Association Standards:*⁶

NFPA No. 70 National Electrical Code

2.6 *NSF International Standards, Criteria, and Listings:*⁷

NSF/ANSI 3 Commercial Warewashing Equipment

NSF 5 Commercial Hot Water Generating Equipment

NSF/ANSI 29 Detergent/Chemical Feeders for Commercial Spray-Type Dishwashing Machines

NSF/ANSI 51 Plastic Materials and Components Used in Food Equipment

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

2.7 *Underwriters Laboratories Standard:*⁸

UL 921 Commercial Dishwashers

UL 1453 Electric Booster and Commercial Storage Tank Water Heaters

2.8 *American Society of Sanitary Engineering Standards:*⁹

ASSE 1004 Commercial Dishwashers

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *commercial dishwashing machines, n*—machines that uniformly wash, rinse, and sanitize eating and drinking utensils.

3.1.1.1 *Discussion*—

The machines shall be capable of removing physical soil from properly racked and pre-scraped items and sanitizing multiple-use eating and drinking utensils. The dishwashing machines shall consist of the following principal parts: legs, wash chamber hood, tank, doors, spray assemblies, pumps, motors, controls, piping, valves, heating equipment, and accessories. Machines may be either chemical sanitizing or hot water sanitizing.

4. Classification

4.1 *General*—Dishwashing machines shall be of the following category, types, styles, classes, size, and capacity group as specified.

4.2 *Category:*

4.2.1 *Category A (Hot Water Sanitizing Model)*—This machine uses hot water to sanitize the dishes and may be provided with an internal booster heater or an external booster heater.

4.2.2 *Category B (Chemical Sanitizing Model)*—This machine uses a chemical sanitizing rinse and must be provided with a chemical sanitizing feeder.

4.3 *Types:*

4.3.1 *Type I (Straight-Through Model)*—This machine is used in line with the table on each side.

4.3.2 *Type II (Corner Model)*—This machine is used in corner placement forming a 90° (1.57 rad) side.

4.4 *Styles and Classes:*

4.4.1 *Style 1 (Steam Heated)*—Low pressure steam (10 to 15 psi (68.9 to 103.4 kPa)) flowing pressure at point of machine connection.

4.4.1.1 *Class A*—Injector.

4.4.1.2 *Class B*—Heat exchange coil.

4.4.2 *Style 2 (Electrically heated).*

4.4.3 *Style 3 (Gas-heated):*

4.4.3.1 *Class C*—Natural Gas.

4.4.3.2 *Class D*—LP Gas.

4.5 *Size and Capacity*, Racks of 19 ¾ by 19¾ in. (502 mm), nominal, racks at a minimum of 50 racks per hour. (See Specification F861).

⁵ Available from National Electrical Manufacturers Assn., 2101 “L” Street, N.W., Washington, DC 20037.

⁶ Available from National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269.

⁷ Available from NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48105-9723.

⁸ Available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.comm2000, 1414 Brook Dr., Downers Grove, IL 60515, <http://www.shopulstandards.com>.

⁹ Available from American Society of Sanitary Engineering, P. O. Box 9712 Bay Village, OH 44140; ASSE International, 18927 Hickory Creek Drive, Suite 220, Mokena, IL 60448.

4.6 All dishwashing machines of the same classification, model, or material list designation furnished with similar options under a specific purchase order shall be identical to the extent necessary to ensure interchangeability of component parts, assemblies, accessories, and spare parts.

5. Ordering Information

5.1 Purchasers should select the preferred options permitted in this specification and include the following information in the procurement document:

- 5.1.1 Title, number, and date of this standard;
- 5.1.2 Category, type, style, class, and size machine required (see 4.1);
- 5.1.3 Noise level requirements, if other than specified (see 11.2);
- 5.1.4 When a service-supply valve is required (see 7.4);
- 5.1.5 When a standard 40°F (22°C) temperature rise steam, or electric, or gas booster is required, or stipulate if the required temperature rise is more than 40°F (22°C) (see 7.13);
- 5.1.6 Electrical power supply characteristics (current, voltage, phase, frequency) (see Section 8);
- 5.1.7 When a detergent feeder is required (see 7.14);
- 5.1.8 When a rinse agent feeder is required (see 7.15);
- 5.1.9 Sanitizing agent feeder requirements, if applicable (see 7.16);
- 5.1.10 Accessory equipment, spare and maintenance parts required, as suggested by manufacturer;
- 5.1.11 Treatment and painting if other than specified (see Section 10);
- 5.1.12 When energy consumption profiles, water consumption profiles, or productivity profiles are desired (see 12.3); and
- 5.1.13 Manufacturer's certification, when required (see Section 13).

6. Materials and Design

6.1 All materials shall be specified as follows:

6.1.1 Materials used shall be free from defects that would adversely affect the performance or maintainability of individual components of the overall assembly. The dishwashing machines shall meet the material, design, and construction requirements of NSF/ANSI 3.

6.1.2 *Corrosion-Resistant Steel*—Corrosion-resistant steel shall conform to the requirements of any 300 or 400 series stainless steel specified in 2.1.

6.1.3 *Corrosion-Resisting Material*—Corrosion-resisting material is other than corrosion resistant steel that is equivalent in the dishwasher application.

6.1.4 *Nickel-Copper Alloy*—Nickel-copper alloys shall conform to the requirements of Specification B127.

6.1.5 *Plastics*—All plastic materials and components used in the dishmachine rinse system shall conform to NSF/ANSI 3 or NSF/ANSI 51.

7. Construction Requirements

7.1 The dishwashing machine shall be complete so that when connected to the specified source of power, water supply, heating means (steam, electric, or gas), drainage, detergent, and rinse agent feeder as applicable, the unit can be used for its intended function. Dishwashers shall be rigid, quiet in operation, free from objectionable vibration, and so constructed as to prevent objectionable splashing of water or overflow of water to the outside of the machine. Parts requiring adjustment shall be readily accessible. Parts requiring service shall be accessible. The machine shall wash dishes by means of a water and detergent solution pumped from a tank, and shall final rinse the dishes with fresh water from an outside source. Provisions shall be made to fill the wash tank either directly from the regular hot water supply with a hand valve or through the booster, if provided, or solenoid, or both. The wash, dwell, and rinse cycles shall be automatically controlled. A light or equivalent shall be provided to indicate when the machine is in operation. Machines shall be provided with tracks of corrosion-resisting steel not less than 0.070 in. thick, or other suitable corrosion-resisting material. Dishwashers shall have an inside working height, including the door opening (or clearance) of not less than 16 in.

7.2 *Piping, Tubing, Fittings, and Valves (Installation)*—Connections shall be readily accessible to facilitate installation and maintenance. Piping, tubing, and valves shall be located, whenever possible, on the exterior of the machine. See Specifications A29/A29M, A167/A240/A240M, A276, A554, B43, and B75.

7.3 *Piping and Fittings*—Water, steam piping, and fittings shall be of corrosion-resisting material. Fresh water supply to the tank shall be discharged not lower than 2 in. (50.8 mm) above the maximum flood level rim, or an effective air gap or vacuum breaker shall be installed to prevent backflow. Backflow protection shall be in accordance with ASSE 1004. The drain and other plumbing connections shall be standard pipe or tubing connections. Drainage piping shall be corrosion-resisting material, or suitable heat-resisting plastic material. Drains may be joined into a single trunk line requiring only one connection or arranged to permit individual connections to the waste line.

7.4 *Valves*—Steam valves shall be corrosion-resisting material designed for steam applications and for a saturated steam working pressure of 50 psi (344.6 kPa). When specified, a separately packed service supply valve shall be provided for closing