



Designation: F 858 – 96

Standard Specification for Hot Water Sanitizing Commercial Dishwashing Machines, Single Tank, Conveyor Rack Type¹

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

1. Scope

1.1 This specification covers single tank, automatic rack type, commercial dishwashing machines.

2. Referenced Documents

2.1 ASTM Standards:

A 167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip²

A 276 Specification for Stainless and Heat-Resisting Steel Bars and Shapes³

A 436 Specification for Austenitic Gray Iron Castings⁴

A 554 Specification for Welded Stainless Steel Mechanical Tubing⁵

A 582 Specification for Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished³

B 43 Specification for Seamless Red Brass Pipe, Standard Sizes⁶

B 75 Specification for Seamless Copper Tube⁶

B 127 Specification for Nickel-Copper Alloy (UNS NO 4400) Plate, Sheet, and Strip⁷

F 760 Specification for Food Service Equipment Manuals⁸

F 861 Specification for Commercial Dishwashing Racks⁸

2.2 Federal Regulation:

OSHA Title 29⁹

2.3 American National Standards:

ANSI S1.4 Specification for Sound Level Meters¹⁰

ANSI S1.13 Methods for Measurement of Sound Pressure Levels¹⁰

2.4 National Electrical Manufacturers Association Standards:

NEMA ICS Industrial Controls and Systems¹¹

NEMA MG-1 Motors and Generators¹¹

2.5 National Fire Protection Association Standard:

NFPA No. 70 National Electrical Code¹²

2.6 NSF International Standards, Criteria, and Listings:

NSF 3 Spray Type Dishwashing Machines¹³

NSF 5 Commercial Hot Water Generating Equipment¹³

NSF 14 Plastic Piping System Components and Related Materials¹³

NSF 29 Detergent/Chemical Feeders for Commercial Spray-Type Dishwashing Machines¹³

NSF 51 Plastic Materials and Components Used in Food Equipment¹³

NSF Criteria C-2 Special Equipment and/or Devices¹³

NSF Food Equipment and Related Products, Components, and Materials¹³

2.7 Underwriters Laboratories Standard:

UL 921 Commercial Electric Dishwashers¹⁴

2.8 American Society of Sanitary Engineering Standards:

ASSE 1001 Pipe Applied Atmospheric Vacuum Breakers¹⁵

ASSE 1004 Dishwashers¹⁵

3. Terminology

3.1 *Definition*:—*commercial dishwashing machines*—machines that uniformly wash, rinse, and hot water sanitize eating and drinking utensils. The machines shall be capable of removing physical soil from properly racked and pre-scraped items, and sanitizing multiple use eating and drinking utensils. These machines shall automatically convey racks of soiled dishes through the treatment stages of the machine, conveying them out at the clean end of the machine. The dishwashing

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² *Annual Book of ASTM Standards*, Vol 01.03.

³ *Annual Book of ASTM Standards*, Vol 01.05.

⁴ *Annual Book of ASTM Standards*, Vol 01.02.

⁵ *Annual Book of ASTM Standards*, Vol 01.01.

⁶ *Annual Book of ASTM Standards*, Vol 02.01.

⁷ *Annual Book of ASTM Standards*, Vol 02.04.

⁸ *Annual Book of ASTM Standards*, Vol 15.07.

⁹ Code of Federal Regulations, Chapter XVII, Part 1910, available from Superintendent of Documents, Government Printing Office, Washington, DC 20402.

¹⁰ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

¹¹ Available from National Electrical Manufacturers Assn., 2101 “L” Street, N.W., Washington, DC 20037.

¹² Available from National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269.

¹³ Available from NSF International, P.O. Box 130140, Ann Arbor, MI 48113-0140.

¹⁴ Available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.

¹⁵ Available from American Society of Sanitary Engineering, P. O. Box 9712 Bay Village, OH 44140.



machines shall consist of the following principle parts: base, or legs, or both, wash chamber, rinse chamber, tanks, doors, spray assemblies, pumps, motors, controls, piping, valves, heating equipment, conveying mechanism, and accessories.

4. Classification

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

4.2 *Types*:

4.2.1 *Type I*—This machine shall be designed and supplied to accept the feeding of soiled tableware from the right side, when facing the front of the machine.

4.2.2 *Type II*—This machine shall be designed and supplied to accept the feeding of soiled tableware from the left side, when facing the front of the machine.

4.3 *Styles and Classes*:

4.3.1 *Style 1 (Steam Heated)*—(20 to 35 psi 137.9 to 241.3 kPa) flowing pressure at point of machine connection.

4.3.1.1 *Class A*—Injector.

4.3.1.2 *Class B*—Heat exchange coil.

4.3.2 *Style 2 (Electrically heated)*.

4.3.3 *Style 3 (Gas-heated)*.

4.3.3.1 *Class C*—Natural gas.

4.3.3.2 *Class D*—LP gas.

4.4 *Size and Capacity*:

4.4.1 *Group A*— $19\frac{3}{4}$ by $19\frac{3}{4}$ in. (nominal) racks at 162 per hour minimum.

4.4.2 *Group B*— $19\frac{3}{4}$ by $19\frac{3}{4}$ in. (nominal) racks at 180 per hour minimum.

4.4.3 *Group C*— $19\frac{3}{4}$ by $19\frac{3}{4}$ in. (nominal) racks at 194 per hour minimum.

4.5 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 procurement documents:

5.1.1 Title, number, and date of this standard,

5.1.2 Type, style, class, and group 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 7.15),

5.1.8 When a rinse agent feeder is required (see 7.16),

5.1.9 Accessory equipment, such as end cowls with vent opening, or spare and maintenance parts required, as suggested by manufacturer,

5.1.10 Treatment and painting if other than specified (see Section 10),

5.1.11 When energy consumption profiles, water consumption profiles, or productivity profiles are desired (see 12.3), and

5.1.12 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 No. 3, and Criteria C-2, where applicable.

6.1.2 *Corrosion-Resistant Steel*—Corrosion-resistant steel shall conform to the requirements of any 300 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 B 127.

6.1.5 *Plastics*—All plastic materials and components used in the dishwashing machine rinse system shall conform to NSF 14.

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 to the outside of the machine. The machine shall be equipped with splash curtains to prevent excessive splash and spray carryover. Parts requiring adjustment or service, or both, shall be readily accessible from the front and side of the machine. The machine shall wash dishes by means of a water and detergent solution pumped from the wash 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 or through a booster. The dishwashing machine shall have a conveyor for handling $19\frac{3}{4}$ by $19\frac{3}{4}$ in. (nominal) racks. The conveyor shall be protected by an adjustable slip clutch or other device. Means shall be provided for releasing or disconnecting the driving power, or the drive, in case of jamming. The conveyor shall be driven by a motor-driven gear reduction unit. The pumped wash and final rinse treatment shall be controlled by means of the conveyor speed as determined by NSF 3 for single tank conveyor type machines. The final rinse spray control shall have a positive return to the OFF position when there are no racks in process to ensure the conservation of final rinse water. The machine shall be provided with tracks of corrosion-resistant steel or other corrosion-resisting material 0.070 in. or equivalent die formed 0.059 in. Dishwashers shall have an inside working height of not less than $17\frac{1}{2}$ in. (444.5 mm) above the track.