Designation: ~~F858 – 18~~ F858 – 24

An American National Standard

Standard Specification for Hot Water Sanitizing Commercial Dishwashing Machines, Single Tank, Conveyor Rack Type[1]

This standard is issued under the fixed designation F858; 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 single tank, automatic rack conveyor type, 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 *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]

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
B127 Specification for Nickel-Copper Alloy Plate, Sheet, and Strip
F760 Specification for Food Service Equipment Manuals
F861 Specification for Commercial Dishwashing Racks
F1920 Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines

2.2 *Federal Regulation:*

OSHA Title 29[3]

2.3 *NSF International Standards, Criteria, and Listings:*[4]

NSF/ANSI 3 Commercial Warewashing Equipment
NSF/ANSI 5 Water Heaters, Hot Water Supply Boilers, and Heat Recovery 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 Food Equipment and Related Products, Components, and Materials

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[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.

Current edition approved ~~May 1, 2018~~Feb. 1, 2024. Published ~~May 2018~~March 2024. Originally approved in 1984. Last previous edition approved in ~~2013~~2018 as ~~F858 – 07 (2013)~~F858 – 18.~~ε1~~. DOI: ~~10.1520/F0858-18.~~10.1520/F0858-24.

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

[4] Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI ~~48105-9723.~~48105, http://www.nsf.org.

2.4 *Underwriters Laboratories Standard:*[5]
UL 921 Commercial Electric Dishwashers
UL 1453 Electric Booster and Commercial Storage Tank Water Heaters
2.5 *American Society of Sanitary Engineering Standards:*[6]
ASSE 1004 Dishwashers

3. Terminology

3.1 *Definitions:*

3.1.1 *commercial dishwashing machines, n*—machines that uniformly wash, rinse, and ~~hot water~~ 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. 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 machines shall consist of the following ~~principle~~principal parts: base, or legs, or both; wash chamber; rinse chamber; tanks; inspection 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:~~ Capacity (see Specification F861):*

4.4.1 *Group A*—19¾ by 19¾ in. (501.6 by 501.6 mm) (nominal) racks at 162 per hour minimum.

4.4.2 *Group B*—19¾ by 19¾ in. (501.6 by 501.6 mm) (nominal) racks at 180 per hour minimum.

4.4.3 *Group C*—19¾ by 19¾ in. (501.6 by 501.6 mm) (nominal) racks at 194 per hour minimum.

[5] Available from Underwriters ~~Laboratories, Inc.,~~ Laboratories (UL), UL Headquarters, 333 Pfingsten Road, Northbrook, ~~IL 60062.~~IL, 60062, http://www.ul.com.
[6] Available from ~~American Society of Sanitary Engineering, 901 Canterbury, Suite A, Westlake, Ohio 44145.~~ASSE International Chapter of IAPMO, LLC, 18927 Hickory Creek Drive, Suite 220, Mokena, Illinois 60448, http://www.asse-plumbing.org.

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/ANSI 3.

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 B127.

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

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 19¾ by 19¾ in. (501.6 by 501.6 mm) (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/ANSI 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. (1.78 mm) or equivalent die formed 0.059 in. (1.5 mm). Dishwashers shall have an inside working height of not less than 17½ in. (444.5 mm) above the track.

7.2 *Conveyor*—The conveyor shall be of heavy duty construction and of a suitable corrosion-resisting material. It shall be designed to convey racks through the dishwasher automatically. See Specification F861.

7.3 *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.

7.4 *Piping and Fittings*—Water, steam piping, and fittings shall be of corrosion-resisting material (see Specification B43). 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 NSF/ANSI 3 and 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 tubing with fittings. Drains may be joined into a single trunk line requiring only one connection or arranged to permit individual connections to the waste line.

7.5 *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 the supply of water to the dishwasher. The drain valve shall be permanently marked to show "open" and "closed" position and shall be lever-operated, ruggedly designed for foot or hand operation except when drain valve closure is automatic. Fresh water rinse valves shall be reliable and fully automatic and suitable for 210°F (98.9°C) water. The manually operated valves shall be identified.

7.6 *Spray Assemblies*—All spray nozzles and spray arm manifolds shall be corrosion resisting materials (see Specifications A554 and A582/A582M). All prewash and wash spray assemblies shall be removable without the use of tools and shall be easy to clean. Final sanitizing rinse spray assemblies, components, or both shall be removable for deliming, descaling, and similar maintenance.

7.7 *Tank*—The tank shall be constructed of not less than 0.055 in. (1.4 mm) corrosion-resistant steel, or other corrosion resisting material.

7.8 *Overflow*—The dishwashers shall have a readily accessible overflow drain in the tank. The overflow unit, or cover, when provided, shall be removable for cleaning.

7.9 *Scrap Trays (Strainers)*—Scrap trays of corrosion-resistant steel, not less than 0.044 in. (1.1 mm) thick, or other corrosion resisting material shall be provided to prevent insoluble matter and large pieces of food residue from passing into the tank. The ledges on which the scrap trays rest shall be so designed that surfaces beneath the ledges are easily accessible for cleaning when the trays are removed. Any opening around or between scrap trays shall be held to a minimum, and as close as practical to the size of the scrap tray opening.

7.10 *Access Door(s)*—Access door(s) shall be provided for ease of machine clean-out. The door(s) shall be constructed of not less than 0.044 in. (1.1 mm) corrosion-resistant steel, or other corrosion resisting material, and shall be rigid and stiffened as necessary. ~~Door safety catch(es)~~ When vertical sliding doors are provided, door safety catch(es) or equivalent means shall be provided ~~for~~