Designation: F860 – 24

An American National Standard

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

This standard is issued under the fixed designation F860; 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 multiple tank, automatic rackless conveyor type, commercial dishwashing machines.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI values given in parentheses are provided for information only.

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]

A29/A29M Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought

A102 Specification for Ferrovanadium

A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Withdrawn 2014)[3]

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 (Metric) B0075_B0075M

B127 Specification for Nickel-Copper Alloy Plate, Sheet, and Strip

F760 Specification for Food Service Equipment Manuals

F1920 Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines

2.2 *Federal Regulation:*[4]

OSHA Title 29

2.3 *American National Standards:*[5]

ANSI S1.4 Specification for Sound Level Meters

ANSI S1.13 Methods for the Measurement of Sound Pressure Levels

2.4 *National Electrical Manufacturers Association Standards:*[6]

NEMA ICS Industrial Controls and Systems

NEMA MG-1 Motor and Generators

2.5 *National Fire Protection Association Standard:*[7]

NFPA No. 70 National Electrical Code

2.6 *NSF International Standards, Criteria, and Listings:*[8]

NSF/ANSI 3 Commercial Warewashing Equipment

NSF 5 Commercial Hot Water Generating Equipment

NSF 29 Detergent/Chemical Feeders For Commercial Spray Type Dishwashing Machines

NSF Food Equipment and Related Products, Components, and Materials

2.7 *Underwriters Laboratories Standard:*[9]

UL 921 Commercial Electric Dishwashers

[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] The last approved version of this historical standard is referenced on www.astm.org.

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

[5] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[6] Available from National Electrical Manufacturers Association (NEMA), 1300 N. 17th St., Suite 900, Arlington, VA 22209, http://www.nema.org.

[7] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

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

[9] Available from Underwriters Laboratories (UL), UL Headquarters, 333 Pfingsten Road, Northbrook, IL, 60062, http://www.ul.com.

UL 1453 Electric Booster and Commercial Storage Tank Water Heaters

2.8 *American Society of Sanitary Engineering Standards:*[10]

ASSE 1004 Performance Requirements for Commercial Dishwashing Machines

3. Terminology

3.1 *Definitions:*

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 pre-scraped items and sanitizing multiple use eating and drinking utensils. These machines shall automatically convey 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 principal parts: legs, wash chamber, rinse chamber, tanks, inspection doors, spray assemblies, pump motors, controls, piping, valves, conveying mechanism, heating equipment, and accessories.

4. Classification

4.1 *General*—Dishwashing machines shall be of the following types, styles, classes, and 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)*—Low pressure steam 20 to 35 psi (137.8 to 241.3 kPa) flowing pressure at point of machine connection.

4.3.1.1 Class A—Injectors.

4.3.1.2 Class B—Heat exchange coils.

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*—Minimum conveyor width 22.5 in. (571.5 mm) with an operating capacity of 5000 dishes per hour minimum.

4.4.2 *Group B*—Minimum conveyor width 26.5 in. (673.1 mm) with an operating capacity of 8700 dishes per hour minimum.

4.4.3 *Group C*—Minimum conveyor width 31 in. (787 mm) with an operating capacity of 11 800 dishes 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 Length of load and unload sections (see 4.4),

5.1.4 Noise level requirements, if other than specified (see 11.2),

5.1.5 When a service-supply valve is required (see 7.5),

5.1.6 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 7.14),

5.1.7 Electrical power supply characteristics (current, voltage, phase, frequency) (see Section 8),

5.1.8 When a detergent feeder is required (see 7.15),

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

5.1.10 Accessory equipment, such as end cowls with vent opening, or 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 Manufacturing 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 performance or maintainability of individual component(s) 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 dish machine rinse system shall conform to NSF/ANSI 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

[10] Available from ASSE International Chapter of IAPMO, LLC, 18927 Hickory Creek Drive, Suite 220, Mokena, IL 60448, http://www.asse-plumbing.org.