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An American National Standard

Standard Specification for Mixing Machines, Food, Electric[1]

This standard is issued under the fixed designation F952; 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 vertical electric food mixing machines in the size range (as expressed by bowl capacity) from 5 to 140 qt. These machines shall be adaptable for mixing, whipping, and beating food products. This specification does not include special purpose machines that are intended solely for mixing dough.

1.2 This specification also covers optional construction features and attachments that enhance the mixing, beating, or whipping capabilities of the machine. This specification does not cover ancillary equipment that can be driven by the attachment hub.

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 The following precautionary caveat pertains only to the test methods portion, Section 9, 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.*

1.5 *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 *ASTM Standards:*[2]

D3951 Practice for Commercial Packaging

F760 Specification for Food Service Equipment Manuals

F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

2.2 *NSF/ANSI Standards:*[3]

NSF/ANSI No. 2 Food Equipment

NSF/ANSI No. 8 Commercial Powered Food Preparation Equipment

2.3 *Underwriters Laboratories Standards:* [4]

ANSI/UL 763 Motor-Operated Commercial Food Preparing Machines

ANSI/UL 969 Marking and Labeling Systems

2.4 *ANSI Standards:* [5]

ANSI Z1.4 Sampling Procedures and Tables for Inspection by Attributes

ANSI S1.13 Methods for Measurement of Sound Pressure Levels

2.5 *Military Standards:* [6]

MIL-STD-1399/300 Interface Standard for Shipboard Systems, Section 300A, Electric Power, Alternating Current

MIL-STD-167/1 Mechanical Vibration of Shipboard Equipment (Type I—Environmental and Type II—Internally Excited)

MIL-STD-461 Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *agitators, n*—these devices attach to the vertical shaft that protrudes downward from the mixer and converts the planetary rotation into the desired action on the foodstuffs within the bowl.

[1] This specification is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.04 on Mechanical Preparation 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 NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, http://www.nsf.org.

[4] Available from comm2000, 1414 Brook Dr., Downers Grove, IL 60515.

[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 Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.

3.1.2 *attachment hub, n*—the device that locks ancillary devices, such as a vegetable slicer or a chopping end, into an industry standard #12 tapered hub (#10 tapered hub for Size 5 machines) and provides a rotating square drive. This is mounted above the bowl on the front of the mixer.

3.1.3 *bowl guard, n*—the barrier, assembled over the bowl area, intended to reduce the user's access to the hazards that exist in the bowl during machine operation.

4. Classification

4.1 Food mixers covered in this specification are the following types:

4.1.1 *Type I,* bench-mounted mixer:

Size	Bowl Capacity, qt, min/max	Agitator r/min		Motor Horsepower Rating, min
		Lowest Speed, less than	Highest Speed, greater than	
5	5/7	150	500	⅙
12	12/15	120	300	⅓
20	20/25	120	300	½

4.1.2 *Type II,* floor-mounted mixer:

Size	Bowl Capacity, qt, min/max	Agitator r/min		Motor Horsepower Rating, min
		Lowest Speed, less than	Highest Speed, greater than	
20	20/25	120	300	½
30	30/36	100	300	¾
40	40/45	100	300	1¼
60	60/70	80	280	1½
80	80/90	80	280	3
140	140/160	55	260	5

4.1.3 *Classes:*

4.1.3.1 *Class 1*—Painted finish.

4.1.3.2 *Class 2*—Nonpainted finish. All nonwearing surfaces to be either polished aluminum, plated carbon steel, or stainless steel.

5. Ordering Information

5.1 Purchasers should select the mixer and any preferred options and include the following information in the purchasing document:

5.1.1 Title, number, and date of this specification,

5.1.2 Type, size, and class of mixer required (see 4.1),

5.1.3 Electrical power supply characteristics; voltage, phase, frequency (see 6.5 and 6.7),

5.1.4 Bowls, agitators, accessory equipment, options, mixer guard, spare parts, and maintenance parts required,

5.1.5 Labeling requirements (if different than Section 13),

5.1.6 Quantity of mixers to be furnished, and

5.1.7 Any special requirements or deviations from this specification.

5.1.8 When Federal/Military procurement is required, review and implement the applicable supplementary requirements (see S1 through S9).

5.1.9 When specified, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed in this specification and the requirements have been met. When specified, a copy of the test results shall be furnished.

6. Physical Requirements

6.1 *Design and Manufacture*—The mixer shall meet the then current applicable requirements of NSF/ANSI No. 8 and ANSI/UL 763. Accessories, such as agitators, bowl trucks, bowls, tables, extensions, adapters, splash covers, and storage stands shall meet the applicable requirements of NSF/ANSI No. 2 or NSF/ANSI No. 8 at the time of purchase. Optional accessories, component parts, assemblies, and spare parts shall be identical to the extent necessary to insure interchangeability between mixers.

6.1.1 *Compliance with NSF/ANSI No. 8*—Acceptable evidence of the mixer meeting the requirements of NSF/ANSI No. 8 shall be the NSF listing mark on the finished product and listing in the manufacturer's product listings on the NSF website, nsf.org, or a certified test report from a recognized independent testing laboratory acceptable to the user, or a certificate issued by NSF under its special one time contract evaluation/certification service.

6.1.2 *Compliance with ANSI/UL 763*—Acceptable evidence of meeting the requirements of ANSI/UL 763 shall be a UL Listing mark on the mixer, or a certified test report from a recognized independent testing laboratory acceptable to the user.

6.2 *Drive Mechanism*—The mixer shall be driven by an electric motor, through a reduction system, to the planetary/beater shaft system. The entire drive system shall be enclosed within the mixer itself. All constituent active parts within the drive system shall be replaceable. All mixers shall be equipped with an internal clutch, shock absorber, or belt drive to minimize the shock of starting or shifting gears of the mixer. Size 60 and larger gear drive speed selection mixers shall either be equipped with a shift interlock switch that will automatically disconnect power to the main drive motor if the operator attempts to shift speeds without first shutting off the motor or be designed to permit speed changes during operation.

6.3 *Speed Selector*—A speed selector shall be provided to change agitator speed. Either continuously variable or discrete speed selection is acceptable. A means to provide the user with reference marks for speed repeatability is required. In no case shall less than three distinct speeds be available on gear box equipped mixers or three distinct markings be available on continuously variable transmissions.

6.4 *Beater Shaft*—The beater shaft shall be vertically mounted and shall be held securely in place. Agitators shall fit securely and shall be capable of being removed or replaced without tools. The beater shaft shall be connected to planetary gearing to provide two separate rotating motions of the agitator simultaneously.

6.5 *Motor(s)*—Minimum horsepower rating for the main drive motor of the mixer shall meet the requirements of 4.1.1 or 4.1.2, as appropriate. If an auxiliary motor is used to perform another function (such as, bowl lifts), it shall be internally interconnected within the mixer to provide a single electrical point connection. Size 5 through 30 mixers shall be available for operation on a 120/60/1 line. Size 60 and larger mixers shall be available for operation on a 208/60/3 line. Other voltage availabilities are at the discretion of the manufacturer. Mixers

with three phase motors shall be provided with a plate, label, or decal showing the direction of rotation. In all cases, the main drive motor shall be rated for continuous duty.

6.6 *Power Supply*—The mixer may either be provided with a power supply cord or designed for permanent electrical connection. Power supply cords shall be a minimum 5-ft (1.52-m) length and provided with a grounding type attachment plug. Mixer housings designed for permanent electrical connection shall be provided with an appropriate hole sized for conduit connection.

6.7 *Electrical Specifications*—Nominal electrical specifications are as follows: 120/60/1, 208/60/1, 240/60/1, 208/60/3, 240/60/3, and 480/60/3.

6.8 *Mixing Bowls*—Bowls shall meet the requirements of NSF/ANSI No. 8. Bowl requirements should be stated in the purchasing document. The bowl shall be equipped with two handles. If the bowl is metallic, the minimum wall thickness for bowls of 60-qt (56.8-L) capacity or less is 0.0625 in. (1.6 mm). For bowls of larger than 60-qt (56.8-L) capacity, the minimum metallic thickness is 0.0781 in. (2 mm). The minimum thickness at any point of the bowl after forming shall be no less than 0.050 in. (1.27 mm) for bowls of 60 qt (56.8 L) or less capacity and not less than 0.062 in. (1.58 mm) for bowls over 60-qt (56.8-L) capacity. All bowls shall be equipped with a durable metallic means of attachment to the bowl yoke. Bowls of 60-qt (56.8-L) capacity or greater shall be reinforced at the points of attachment to the bowl yoke. Bowls of nonmetallic construction shall have equivalent durability to metallic bowls. Metal bowls shall be made from stainless steel.

6.9 *Agitators*—Mixers meeting this specification must be available with batter beater, sweet dough beater, dough hook, pastry knife, wing whip, and wire whip suitable for use with the bowl size(s) specified. Stainless steel must be used on the wires of whips.

6.10 *Bowl Lift*—The mixer shall be provided with a mechanism for raising and lowering the bowl. Mixers of 60-qt (56.8-L) capacity or more shall be equipped with a powered bowl lift. Size 40 and smaller mixers shall have a manually operated lift mechanism with a positive stop at the extremities of the travel. In all cases, a stop shall be provided to prevent the agitator from contacting the bowl when proper bowls and agitators are used together.

6.11 *Bowl Support*—The bowl support shall have three lug positions matching lugs on the bowl. All mixers shall have a positive bowl locking mechanism to prevent bowl motion under heavy loads.

6.12 *Base*—The base shall be constructed of materials that are consistent with the need for rigidity and durability. For Size 12 and larger machines, means shall be provided for bolting the mixer to a stand (Type I) or to the floor (Type II).

6.13 *Timer*—Size 60 and larger mixers shall be provided with a 15-min timer. The timer shall stop the mixer drive motor upon operating for the preset time. The timer or mixer design shall include an override position to permit continuous operation. Mixers less than size 60 shall be available with an optional timer to provide the functions stated above.

6.14 *Attachment Hub*—Size 60 and smaller mixers shall be provided with an attachment hub for operating vegetable and cheese slicing, meat chopping, dicing, or equivalent attachments. This attachment hub shall be capable of at least 350 rpm. This requirement can be met by the manufacturer with an ancillary speed increaser attachment of aluminum construction.

6.15 *Bowl Truck*—Type II mixers shall have optionally available a bowl truck whose use is compatible with the base design of the mixer. The bowl truck shall be durably constructed and designed to hold the bowl above the point of attachment to the bowl support when the support is at its lowest position.

6.16 *Other Optional Equipment:*

6.16.1 *Mixing Bowl Extension*—Shall be optionally available for size 60 and 80 mixers and made of the same material as the bowl.

6.16.2 *Bowl Adapters*—Size 20 and larger mixers shall be optionally available with bowl adapters to use the next smaller size bowl and agitators.

6.16.3 *Splash Covers*—Shall be optionally available for size 60 and larger mixers.

6.16.4 *Table*—Shall be optionally available for Type I, Size 20. When specified, the table shall be 24 in. (610 mm) high with a horizontal surface of 30 by 24 in. (762 by 610 mm). A full-size shelf under the top surface shall be provided for ancillary equipment storage. It shall be of stainless steel construction, able to support a load of 250 lb (113.4 kg).

6.17 *Lubrication*—All wearing parts of the mixer shall be provided with a means for lubrication or be permanently lubricated and sealed. Oil seals shall contain the lubricant. Gear housings shall have provisions for lubrication and shall allow lubricant to circulate around gears if applicable.

6.18 *Finishing*—All exterior surfaces of the mixer and attachments described within this specification shall be finished to the requirements of NSF/ANSI No. 8.

6.19 *Workmanship*—All components and assemblies of the mixer shall be free of dirt and other extraneous materials, burrs, slivers, tool and grind marks, dents, and cracks. Castings, molded parts, and stampings shall be free of voids, sand pits, blow holes, and sprues. External surfaces shall be free of sharp edges and corners. All sheet metals used in the fabrication of the mixing machine shall be free from kinks and unspecified dents. Forming and welding shall not cause damage to the metal and shall be done neatly and accurately. Corners shall be square and true and all bends of a major nature shall be of uniform size and shape.

6.20 *Hazard Protection:*

6.20.1 The mixer shall meet the requirements of ANSI/UL 763.

6.20.2 *Switch Guard*—The ON/OFF control shall be guarded or fabricated in such a manner as to prevent unplanned activation.

6.20.3 *Controls Location*—The controls for the mixer shall be located such that they are easily visible and easily manipulated by the operator when standing in a comfortable operating position.