



Standard Specification for Slicing Machines, Food, Electric¹

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

1. Scope

1.1 This specification covers commercial food slicers having electrically driven rotating slicing blades.

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 method 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.*

1.4 *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

F760 Specification for Food Service Equipment Manuals
F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities
D3951 Practice for Commercial Packaging

2.2 NSF International Standards:³

NSF/ANSI Standard No. 8 Commercial Powered Food Preparation Equipment
NSF Listings Food Equipment

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.

2.3 Underwriters Laboratories Standards:⁴

UL 763 Motor-Operated Commercial Food Preparing Machines
UL 969 Marking and Labeling Systems

2.4 ANSI Standard:⁵

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

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 for Subsystems and Equipment

3. Terminology

3.1 Definitions:

3.1.1 *carriage*—device for holding food product that is manually or automatically reciprocated to bring the product in contact with the knife.

3.1.2 *feed chute*—device that can replace or supplement the carriage for the purpose of slicing multiple small cross-sectional food products. This device also includes an end weight or spring to permit slicing of product to within the last one-quarter inch.

3.1.3 *gage plate*—device that determines the thickness of an individual slice of food product.

3.1.4 *gage plate adjuster*—manually operated device (usually a dial or a lever) that is used by the operator to set the gage

⁴ Available from UL LLC, 333 Pfingsten Rd., Northbrook, IL 60062, <http://www.ul.com>.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

⁶ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, or Acquisition Streamlining and Standardization Information System (ASSIST), the official source of all documents listed in the DOD index of specification and standards. The ASSIST can be located at <http://dsp.dla.mil>.

plate. Usual practice is to indicate the thickness by a graduated scale with a 0 (zero) setting to indicate that the gage plate is completely closed.

3.1.5 *sharpener*—device for holding the sharpening and truing stones. The sharpener can be either attached to the slicer or removable from the slicer’s sharpener attachment point. If it is removable, a storage location within the machine structure shall be provided.

4. Classification

4.1 Food slicers covered in this specification are of the following types and classes.

4.2 Types:

4.2.1 *Type I*—Fully automatic (powered carriage):

4.2.1.1 *Style 1*—Gravity product feed.

(1) *Rate 1*—Single carriage speed.

(2) *Rate 2*—Variable or multiple carriage speed.

(3) *Rate 3*—Two-speed carriage.

4.2.1.2 *Style 2*—Powered product feed.

(1) *Rate 1*—Single carriage speed.

(2) *Rate 2*—Variable or multiple carriage speed.

(3) *Rate 3*—Two-speed carriage.

4.2.1.3 *Style 3*—With grouping and shingling-capability discharge conveyor attachment, and stand.

4.2.2 *Type II*—Semiautomatic (manually operated carriage).

(1) *Style 1*—Compact unit.

(2) *Style 2*—Standard size unit.

4.3 Classes:

4.3.1 *Class A*—Bench mounted.

4.3.2 *Class B*—Pedestal mounted.

4.3.3 *Class C*—Stand mounted with casters.

NOTE 1—Classes not applicable to Type I, Style 3.

5. Ordering Information

5.1 Purchasers should select the slicer 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, style, rate, and class of machine required (see 4.2 and 4.3).

5.1.3 Electrical power supply characteristics; voltage, phase, frequency.

5.1.4 Labeling requirements (if different from 6.1.1, 6.1.2, 13.1, and 13.2).

5.1.5 Quantity of slicers to be furnished.

5.1.6 Accessory equipment, spare, and maintenance parts required.

5.1.7 Any special requirements or deviation from this specification.

6. Physical Requirements

6.1 *Design and Manufacture*—The slicer shall meet the then current applicable requirements of NSF/ANSI Standard No. 8 and UL 763.

6.1.1 *Compliance with NSF/ANSI Standard No. 8*—Acceptable evidence of meeting the requirements of NSF/ANSI Standard No. 8 shall be the NSF listing mark on the

slicer and listing in the NSF Official Listing of Food Service Equipment, 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. An alternative is listing by a third party certification body to NSF/ANSI Standard No. 8.

6.1.2 *Compliance with UL 763*—Acceptable evidence of meeting the requirements of UL 763 shall be a UL Listing mark on the slicer, or a certified test report from a recognized independent testing laboratory acceptable to the user. An alternative is Listing by a third-party certification body to UL 763.

6.1.3 *Materials*—Materials used in the construction of food slicers shall comply with the applicable requirements of NSF/ANSI Standard No. 8. Housings shall be of corrosion-resistant, nonporous materials. Aluminum parts contacting food shall be anodized.

6.2 *Sharpening Device*—The slicer shall have a sharpening device included with and attachable to the machine. The sharpening device shall be accessible without lifting or tilting the machine. The sharpening device shall be capable of sharpening the knife to produce product slices that are smooth and free from tears and bruises as required under Section 9.

6.3 *Feet*—Class A slicers shall have three or more nonmetallic, nonskid feet with provisions for attachment to either a bench or a stand.

6.4 *Motor(s)*—The slicer motor(s) shall be of continuous duty type.

6.5 *Assembly and Disassembly*—The slicer shall be simple to disassemble and reassemble for cleaning and sanitizing. The slicer shall not require special tools or equipment to disassemble for cleaning.

6.6 *Ease of Operation*—The slicer, when viewed from the normal operating position, shall have all controls visible and readily accessible.

6.7 *Electrical Devices*—The slicer shall be furnished with a 5-ft (1.52-m) minimum length cord and plug with ground or shall be double insulated. The cord and plug shall be appropriate for the specified electrical characteristics.

6.7.1 The slicer shall be furnished with manually operated controls that open all motor leads. The slicer shall be furnished with a pilot light or equivalent to indicate when the slicer is running.

6.8 *Receiving Tray*—A receiving tray for sliced product shall be furnished with the slicer, either built in or as an accessory.

6.9 *Product Carriage*—The product carriage and any devices for clamping or pushing the product shall hold the product securely in the cutting position. The product carriage shall employ bearings fabricated from cast iron or steel, oilite bearing surfaces or roller bearings. Drive gears shall be gear-grade laminated phenolic or bronze. Parallelism between knife and carriage shall be maintained within plus and minus one degree.

6.9.1 The slicer shall be designed to prevent contact between the slicing knife and the carriage, the gage plate and the spike assembly of the meat grip.

6.10 *Product Feed Limit*—The Type I, Style 2 or Style 3 slicer shall have a meat grip integral with the carriage that secures the end of the product and allows the product to be uniformly sliced to within the last 1 in. (25.4 mm). The Type I, Style 1, or Type II slicer shall have a toothed product pusher plate, integral with the carriage, that permits slicing to within the last ¼ in. (6.4 mm).

6.11 *Product Size, Rate, Thickness, Knife Diameter, and Motor Horsepower*—See **Table 1**.

6.12 *Pedestals and Stands:*

6.12.1 *Class B*—Slicer shall be identical to equivalent Class A slicer, except that it shall be supplied with and have provisions for attachment to a pedestal. The pedestal shall be 34 ± 1 in. (86.4 ± 2.54 cm) high with provisions for securing to the floor.

6.12.2 *Class C*—Slicer shall be identical to equivalent Class A slicer, except that it shall be supplied with and have provisions for attachment to a stand. The stand shall be of stainless steel construction and shall be 34 ± 1 in. (86.4 ± 2.54 cm) in height when assembled with the casters. The stand shall have a flat stainless steel top of at least 16 gauge. The stand shall be listed by NSF. The stand shall be capable of supporting a weight of at least 175 lb (79.4 kg). The casters shall be at least 4 in. (10.16 cm) in diameter. The two casters closest to the operator position, shall swivel and lock. The other two casters shall not swivel.

6.13 *Interchangeability of Items*—All slicers of the same model and 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.

6.13.1 *Exception*—Parts that are designed to be matched only to the original parent slicer and marked accordingly, such as a carriage assembly, do not need to be interchangeable.

6.14 *Slicing Knife*—Knives shall be cutlery grade stainless steel with a hardness, measured ¼ in. (6.4 mm) back of the cutting edge, not less than 56 nor more than 60 on the Rockwell C scale. The knife shall be driven by gears, a steel transmission chain, V-belt, or timing belt. If driven by gears, the teeth shall be machine cut and deburred and securely mounted to the shafts.

6.15 *Carriage Handle*—Carriage handle shall be all metal or, if plastic, shall have a metal insert.

6.16 *Slicer Adjustment Knob*—The shaft for the slicer adjustment knob shall have flats for set screws or both knob and shaft shall have a keyway to prevent rotation or slipping of the knob on the shaft.

6.17 *Bearings*—Bearings for cutting knives, idler gears, and rotating drive shafts shall be of the ball, roller, or sleeve-type, either permanently lubricated or readily accessible for lubrication. Sleeve type bearings shall be a high-grade bearing metal and shall be replaceable. All bearings requiring lubrication shall be readily accessible.

6.18 *Lubrication*—All moving parts that require lubrication shall be provided with a means for lubricating and any lubrication fittings shall be readily accessible.

6.19 *Hazard Protection:*

6.19.1 The slicer shall meet the requirements of UL 763.

TABLE 1 Product Size, Rate, Thickness, Knife Diameter, and Motor Horsepower

Type	Style	Rate	Minimum Product Cross Section, in. (cm)	Minimum Slices Per Minute	Minimum Range Slice Thickness, in. (mm)	Minimum Slicing Knife Diameter, in. (cm)	Minimum Knife Drive Motor HP (KW)
I	1 and 2	1	10¾ × 3 and 7 diameter (27.3 × 7.6 and 17.8)	35	¼ ₈ to ⅝ (0.53 to 15.9)	11¾ (29.8)	⅓ (0.25)
		2	10¾ × 3 and 7 diameter (27.3 × 7.6 and 17.8)	45/80 ^A	¼ ₈ to ⅝ (0.53 to 15.9)	11¾ (29.8)	⅓ (0.25)
	3	3	9½ × 5⅝ × 24 long (24.1 × 14.3 and 61)	48	up to ⅝ ₂ (0 to 4)	12½ (31.75)	⅓ (0.25)
II	1		8½ × 4 and 6 diameter (21.6 × 10.2 and 15.2)	35	¼ ₈ to ⅝ (0.53 to 9.5)	9¾ (24.8)	¼ (0.19)
	2		10¾ × 3 and 7 diameter (27.3 × 7.6 and 17.8)	35	¼ ₈ to ⅝ (0.53 to 15.9)	11¾ (29.8)	¼ (0.19)

^AA 45-slice per minute requirement for product cross section is shown. An 80-slice per minute requirement is based on smaller product cross section and may be met by use of a fence that allows two pieces of product to be sliced simultaneously.

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

6.19.3 *Knife Protection*—The unusable portion of the knife shall be completely guarded in compliance with UL 763 when the slicer is ready for operation. In no case shall less than half of the blade's circumference be guarded. The gage plate adjuster shall be so constructed such that the knife's edge can be completely guarded when not operating.

7. Performance Requirements

7.1 *Slicing Size, Rate, and Uniformity*—The slicer shall uniformly, and with smooth surfaces, free from tears and bruises, slice the following items:

7.1.1 Firm cold and hot soft boneless meat.

7.1.2 Products of moderate resistance, such as mozzarella cheese, and

7.1.3 Firm and ripe vegetables, such as cucumbers and tomatoes.

7.1.4 The gage plate adjuster shall operate the gage plate smoothly and shall be adjusted to indicate zero thickness when the gage plate is set at the closed position.

7.2 *Slicer Knife and Sharpener*—The slicer knife shall function satisfactorily following 300 sharpenings.

7.3 *Carriage Operation:*

7.3.1 *Type I*—The slicer shall be designed to permit manual operation of the carriage if desired or in the event that the powered carriage feature becomes inoperative.

7.3.2 *Type I, Styles 1 and 2, Rates 2 and 3*—The slicer shall have a speed selector to produce the number of slices per minute as specified.

7.3.3 *Type I, Styles 2 and 3*—The slicer shall have a device that advances the product toward the knife an amount equal to the slice thickness on each stroke.

7.3.4 *Type I, Style 3*—The slicer shall have a synchronized discharge conveyor with automatic controls to stop or advance the belt so that the slices are neatly and uniformly stacked, grouped, or shingled. The machine shall have capability for stacking four, five, six, seven, eight, ten, or twelve slices and shall have overlapping capability from 0 to 1½ in. (0 to 3.81 cm). The spacing between stack centers shall be 6½ to 7 in. (16.5 to 17.78 cm). The belt shall be sufficiently wide to receive the largest slices that the machine is designed to cut. The minimum effective length of the conveyor belt shall be 47 in. (119.38 cm). The machine shall be provided with a 32-in. (81.3-cm) high stand. The stand shall have an open base and an all welded construction of 1 in. (2.54 cm) structural steel pipe and 2 by 2 by ¾-in. (5.1 by 5.1 by 0.48-cm) angle iron designed to support adequately a fully loaded machine. One of the legs shall have a stainless steel adjustable foot. The stand shall have provisions for securing the slicer.

7.3.5 *Type II*—The slicer shall have a carriage that operates without binding or interference throughout the length of travel when product is positioned on the carriage but not engaging the blade.

7.4 *Power Switch*—The switch shall be capable of switching the motor locked-rotor load with no mechanical or electrical failure and no burning or pitting of contacts.

7.5 *Size and Weight*—Type II, Style 1 machines shall not exceed 20¾ in. (52.7 cm) in length, 18 in. (45.7 cm) in width, and 14 in. (35.56 cm) in height, nor weigh more than 60 lb (27.22 kg). Type II, Style 2 machines shall not exceed 175 lb (79.38 kg) in weight.

7.6 *Slicer Stand*—The slicer stand shall be capable of supporting the weight of the slicer.

7.7 The slicer shall be capable of operating without leakage of lubricants.

8. Sampling

8.1 When specified in the contract or purchase order, sampling for inspection shall be performed in accordance with ANSI Z1.4, which will supersede implied sampling requirements stated elsewhere in this specification.

9. Test Methods

9.1 *Gage Plate Operation, Slicing Rate, and Uniformity Test:*

9.1.1 *Significance*—The purpose of this test is to determine the ability of the slicer to produce uniform slices of mozzarella cheese, a moderate resistance product, at a temperature of 40 ± 5°F (4.4 ± 2.8°C) and a thickness of ⅛ in. (3.2 mm). Additionally, smooth and consistent operation of the gage plate adjuster is to be verified.

9.1.2 *Procedure*—The slicer, when operated at rated speed, and for a period of at least 5 min, shall produce parallel cheese slices of uniform thickness, free from tears or feathering at either end without using special accessories. At the conclusion of the test, the gage plate adjuster shall operate freely, with no binding, and, with the gage plate closed, the adjuster knob shall return to the zero indication without adjustment.

9.2 *Slicer Knife and Sharpener Test:*

9.2.1 *Significance*—The purpose of this test is to determine the ability of the knife and the sharpening device to function satisfactorily after 300 sharpenings.

9.2.2 *Procedure*—Dull the slicer knife to a point where slices of boiled ham are rough or ragged. Place the slicer sharpening device in operating position and run the slicer through 300 complete sharpening cycles. After sharpening, the slicer shall produce ¼-in. (1.6-mm) thick slices of boiled ham that are smooth, uniform, and free from tears. Product temperature shall be 40 ± 5°F (4.4 ± 2.8°C). Make gage plate adjustment after the 300 sharpening cycles in preparation for the slicing portion of this test.

9.3 *Carriage Operation Test:*

9.3.1 *Significance*—The purpose of this test is to ensure that the carriage functions smoothly without binding or interference.

9.3.2 *Procedure*—Place the slicer on a level, 34-in. (86.4-cm) high table. Type I slicers shall have the powered carriage disengaged during this test. Place a 5-lb (2.27-kg) piece of 6-in. (15.24-cm) nominal diameter longhorn cheese on the carriage in such a manner that it will not contact the gage plate, knife, or knife guard if the slicer is so equipped. Attach a spring scale to the hand grip of the carriage in such a manner that it simulates the center of motion of a typical operator. Push the