NSF/ANSI 8 – Commercial powered food preparation equipment

2 Normative references


ASTM D618-08, Standard Practice for Conditioning Plastics for Testing

U.S. Food and Drug Administration, Food Code 2009

4 Materials

4.3 Gaskets

Gaskets shall be made of resilient rubber, rubber-like materials, or plastics. Gaskets shall conform to NSF/ANSI 51 and shall function at any temperature to which they are exposed in normal operation.

Rationale: Establishes new requirements for gasket materials.

5 Design and construction

5.34 Slicers

5.34.1 Knife

5.34.1.1 The knife shall be of one-piece construction.

5.34.1.2 When carbon steel knives are to be plated, the plating materials shall meet food zone requirements.

5.34.1.3 The requirements in 5.2 and 5.4 shall not apply to the juncture of the knife and hub are exempt from 5.2 and 5.4.

Rationale: Restated in the “positive” in accordance with the format in boilerplate standards.

5.34.1.4 The attachment of the knife to the hub is exempt from 5.5.1.

Rationale: Safety concerns are addressed by permitting fasteners to be used to attach the knife to the hub thereby creating a secure attachment for the knife.

5.34.1.5 The knife sharpener cover shall meet design and construction requirements for a splash zone.

Rationale: Provides splash zone design and construction exemption for the knife sharpener cover.

5.34.2 Slicers shall be designed and manufactured such that liquids from the carriage tray and gauge plate drain onto the receiving tray. Liquids from the carriage tray and gauge plate shall not drain down the front of the base.

Rationale: Establishes new requirements for directing the flow of liquids generated during slicing operations.
5.34.2.1 Where provided on the receiving tray to divert liquid run-off away from slicer controls, including, but not limited to, the power switch and indexing control, raised rims shall be at least $\frac{1}{8}$ in (0.13 in, 3.2 mm) high.

*Rationale: Establishes a new requirement for a raised rim on the receiving tray, if provided, to direct the flow of liquids generated during slicing operations.*

5.34.4 Gripping and stacking devices shall be manufactured so that the assembly is readily removable for cleaning and easily cleanable. The devices are exempt from requirements in 5.2 and 5.4 shall not apply to these devices.

*Rationale: Restated in the “positive” in accordance with the format in boilerplate standards.*

5.34.4 Carriage tray

5.34.4.1 Handles and components of similar function that are attached to the carriage tray shall be:

- readily removable for cleaning; or
- removable for service or replacement; or
- permanently attached. Components attached with fasteners and using a thread-locking material shall be considered as being permanently attached.

5.34.4.2 Mating surfaces of joined components shall be flat, smooth and with no hollow spaces between the joined surfaces.

5.34.4.3 Pockets necessary for attachment hardware shall not exceed $\frac{1}{16}$ in (0.06 in, 1.6 mm) in total (see figure A).

---

**Figure A - Attachment Handle Tolerance.**
5.34.4.4 The heads of fasteners in a splash zone on parts intended to be submerged, power washed and/or placed in a warewashing machine for cleaning, shall be sealed to the component.

5.34.4.4.1 On components that may be removed for service or replacement, fasteners shall be capable of being removed and fastener heads resealed to the component when reattached.

**Rationale:** Establishes new requirements governing how components may be attached to the carriage tray.

5.34.5 Carriage tray joints and seams (at removable and permanently attached components)

5.34.5.1 Joints and seams in a food zone or splash zone shall be sealed and smooth.

5.34.5.2 Joints and seams in a food zone shall not be sealed with sealant or gaskets.

5.34.5.3 Joints and seams at removable components shall be sealed so that the component may be removed and reattached without damaging or destroying the sealing material.

5.34.5.3.1 Gaskets used to seal such a joint or seam, shall be:

- constructed of a compressible material that does not take a permanent set under use conditions; and
- self-locating; and
- compatible with cleaning compounds and sanitizing chemicals.

Gasket material shall meet performance test requirements of 6.2, 6.3 and 6.4.

5.34.5.4 Joints and seams at permanently attached components may be sealed with a film of sealant not exceeding \(\frac{3}{32}\) in (0.094 in, 2.4 mm) in thickness.

5.34.5.4.1 Joints and seams sealed with sealant shall meet performance test requirements of 6.5.

**Rationale:** Establishes new requirements governing joints and seams between the carriage tray and components attached to the carriage tray.

5.34.5.4.2 Sealant shall not be used to effect a required minimum radius of an internal angle.

**Rationale:** Establishes limits governing the use of a sealant.

5.34.6 Power switch, indexing control, electrical components and lifting/tilting mechanisms

5.34.6.1 Slicers shall be designed and manufactured to divert liquids away from the power switch, indexing control, power cord, electrical components and lifting/tilting mechanisms.

5.34.6.2 The power switch and indexing control shall be positioned so that liquids and/or food debris do not drip, drain or flow on them during slicer operation.

5.34.6.3 Flush-mounted power switches and indexing controls that are completely recessed into the slicer base with no portion of the control protruding from the slicer base more than \(\frac{1}{32}\) in (0.03 in, 0.8 mm) are exempt from 5.34.6.1 and 5.34.6.2.

5.34.6.4 Non flush-mounted power switches and indexing controls shall:

- be easily cleanable; and
- meet food zone radius requirements.
5.34.6.5 Gaps between non flush-mounted power switches and indexing controls and the slicer base shall be sealed or of a drip deflecting design to prevent the entry of liquid and/or food debris.

**Rationale:** Establishes new requirements governing how controls are positioned to protect the controls and lifting/tilting mechanisms from liquids and debris generated during slicing operations.

5.34.6.6 Power switches and indexing controls shall meet the requirements of 5.34.4 and 5.34.5.

**Rationale:** Establishes additional requirements for power switches and indexing controls.

5.34.7 The product grip front, handle and slide shall meet the requirements of 5.34.4 and 5.34.5.

**Rationale:** Establishes additional requirements for portions of the product grip classified as a splash zone.

5.34.8 Gauge plate

5.34.8.1 Gauge plates shall be designed and manufactured to divert liquids and/or food debris away from the gauge plate adjustment arm and exposed fasteners at gauge plate attachment points.

5.34.8.2 Exposed fasteners at gauge plate attachment points shall be positioned so that liquids and/or food debris do not drip, drain or flow on them during slicer operation.

5.34.8.3 When the gauge plate adjustment arm:

- penetrates a food zone a boot or similar method shall be used to enclose the gauge plate adjustment arm and penetration through the food zone. The enclosure boot shall remain compressed against and conform to the food zone surface through the full range of adjustment. Exposed portions of the gauge plate adjustment arm assembly shall meet food zone design and construction requirements;

- penetrates a splash zone a boot or similar method may be used to enclose the gauge plate adjustment arm. The resulting gauge plate adjustment arm assembly, with or without an enclosure, shall meet splash zone design and construction requirements. The joint where the gauge plate adjustment arm penetrates the splash zone surface shall be tight-fitting.

5.34.8.3.1 Boot material shall meet performance test requirements of 6.2, 6.3 and 6.4.

**Rationale:** Establishes requirements for gauge plates.

5.34.9 Cleaning, sanitizing and inspection instructions

5.34.9.1 The manufacturer shall provide with each slicer detailed cleaning and sanitizing instructions. The detailed cleaning and sanitizing instructions shall:

- identify all surfaces, components and detachable parts that are to be cleaned and sanitized; and

- include disassembly and reassembly instructions; and

- include step-by-step instructions for cleaning and sanitizing; and

- specify that the sanitizer concentration shall comply with Section 4-501.114, Manual and Mechanical Warewashing Equipment, Chemical Sanitization – Temperature, pH, Concentration, and Hardness of the FDA Food Code; and

- include the statement: If a chemical sanitizer other than chlorine, iodine or quaternary ammonium is used, it shall be applied in accordance with the EPA-registered label use instructions.; and

- include the statement: This machine shall be cleaned and sanitized at intervals to comply with national, state and/or local health codes.; and
- include a clean – sharpen – clean – sanitize procedure each time the knife is sharpened.

5.34.9.2 The manufacturer shall provide with each slicer a laminated card containing cleaning and sanitizing instructions. The laminated card shall be:

- clear, legible and easily readable; and
- suitable for posting near the slicer

5.34.9.3 The manufacturer shall provide instructions for inspecting gaskets and seals located in food and splash zones. The inspection instructions shall include:

- the location of all gaskets and seals located in food and splash zones; and
- recommended interval between inspections (Note: The recommended interval between inspections shall not exceed six months for components that are detached for cleaning and sanitizing and twelve months for all others.); and
- a stipulation that inspections be made by the manufacturer or its authorized service agent; and
- a warning that the slicer be removed from service until repaired by the manufacturer or its authorized service agent if any gasket or seal is found to be damaged, or missing.

5.34.9.4 All cleaning, sanitizing and inspection instructions shall:

- be provided in English and in any other language in which operation instructions are provided.
- include diagrams and/or images as required to illustrate 5.34.9.1 and 5.34.9.3.

Rationale: Establishes new requirements that a manufacturer provide detailed cleaning and sanitizing instructions and a schedule for inspecting gaskets and seals with each slicer.

6 Performance

6.2 Gasket material durability test procedure

6.2.1 Performance requirement

Gasket materials shall retain minimum elastic properties throughout the life of the equipment.

6.2.2 Test method

6.2.2.1 Test specimens shall be selected and prepared in accordance with Table 5.1; Test Specimens of UL 157, Gaskets and Seals.

6.2.2.2 Specimens shall be tested in accordance with Section 6; Accelerated Air Oven Aging Test of UL 157, Gaskets and Seals.

6.2.2.3 Specimens shall be aged at 212°F (100°C) for 70 hours.

6.2.2.4 Aged specimens shall be tested in accordance with Section 5; Tensile Strength and Ultimate Elongation Test of UL 157, Gaskets and Seals.

6.2.3 Acceptance criteria

Test specimens shall retain a minimum tensile strength of 60% of an original, un-aged test specimen.
6.3 Gasket material detergent exposure test procedure

6.3.1 Performance requirement

Gasket materials shall retain minimum elastic properties when subjected to regular cleaning in accordance with the manufacturer's cleaning instructions.

6.3.2 Test method

6.3.2.1 Test specimens shall be selected and prepared in accordance with Table 5.1; Test Specimens of UL 157, Gaskets and Seals.

6.3.2.2 Specimens shall be tested in accordance with Section 16; Detergent/Cleaner Exposure Test of UL 157, Gaskets and Seals.

6.3.2.3 Specimens shall be tested in a solution of 25 grams of Proctor & Gamble Cascade Professional® or equal detergent per 1,000 milliliters of boiling water for 168 hours.

6.3.2.4 Exposed specimens shall be tested in accordance with Section 5; Tensile Strength and Ultimate Elongation Test of UL 157, Gaskets and Seals.

6.3.3 Acceptance criteria

Exposed test specimens shall retain a minimum tensile strength of 50% of an original, unexposed test specimen.

6.4 Gasket material sanitizer exposure test procedure

6.4.1 Performance requirement

Gasket materials shall retain minimum elastic properties when subjected to regular sanitizing in accordance with the manufacturer's sanitizing instructions.

6.4.2 Test method

6.4.2.1 Test specimens shall be selected and prepared in accordance with Table 5.1; Test Specimens of UL 157, Gaskets and Seals.

6.4.2.2 Specimens shall be tested in accordance with Section 16; Detergent/Cleaner Exposure Test of UL 157, Gaskets and Seals.

6.4.2.3 Specimens shall be tested in a solution of quaternary ammonium chloride and boiling water at a concentration of 500 parts per million (ppm) for 168 hours.

6.4.2.4 Exposed specimens shall be tested in accordance with Section 5; Tensile Strength and Ultimate Elongation Test of UL 157, Gaskets and Seals.

6.4.3 Acceptance criteria

Exposed test specimens shall retain a minimum tensile strength of 50% of an original, unexposed test specimen.

Rationale: Sections 6.2, 6.3 and 6.4 establish requirements for durability and exposure testing of gasket materials used to seal carriage tray joints and seams.
6.5 Lap shear test procedure

6.5.1 Performance requirement

Sealant used as a sealing material in a joint and/or seam shall meet minimum bonding requirements to the surfaces of both components forming the joint and/or seam.

6.5.2 Test method

6.5.2.1 Five test specimens for each joint/seam and sealant combination shall be tested. Test specimens shall be assembled using the same substrate materials and sealant as will be used in the production model of the joint and/or seam. The substrate material shall have the same surface finish as will be used in the production model of the joint and/or seam. No mechanical fasteners may be used in this test.

6.5.2.2 Each test specimen shall include two (2) 1 in (25.4 mm) x 4 in (101.6 mm) plates of substrate material. Plates shall be flat and true without burrs or imperfections. The surface of the plates to be tested for bonding strength shall be prepared according to the manufacturer’s instructions. Surface preparation instructions shall be the same as the manufacturer will use in the production model of the joint and/or seam.

6.5.2.3 Test specimens shall be assembled by applying a film of sealant to the bottom ½ in (0.5 in, 12.7 mm) of one of the substrate materials. The sealant shall be \( \frac{3}{32} \) in (0.094 in, 2.4 mm) +/- \( \frac{1}{64} \) in (0.015 in, 0.4 mm) thick. The second plate is placed over the sealant providing a ½ in (0.5 in, 12.7 mm) overlap. A spacer within the thickness tolerance shall be used to control the thickness of the sealant.

6.5.2.4 Unless otherwise specified by the manufacturer, test specimens shall be cured for 7 days at 73°F and 50% relative humidity per ASTM D161-8, Standard Practice for Conditioning Plastics for Testing. The thickness of the cured sealant shall be measured and recorded.

6.5.2.5 Each test specimen shall be tested using a dual pillar Instron load frame with 5kN load cell, or equivalent. Alignment spacers shall be placed inside the grips to align the offset substrate plates. Test specimens shall be pulled at a rate of 0.05 in (1.27 mm) per minute until separation. The force at separation shall be recorded.

6.5.2.6 The force at separation for all five (5) test specimens shall be averaged.
6.5.3 Acceptance criteria

6.5.3.1 The thickness of the cured sealant recorded in 6.5.2.4 shall be within the tolerance specified in 6.5.2.3.

6.5.3.2 At separation, the average force shall not be less than 50 psi (3.52 kilogram per square cm).

Rationale: Establish minimum requirements for bonding when a sealant is to be to seal carriage tray joints and seams.