NSF/ANSI Standard for Food Equipment —

Mobile food carts and food kiosks

1 General

1.1 Purpose

This Standard establishes minimum food protection and sanitation requirements for the materials, design, fabrication, construction, and performance of mobile food carts, indoor food kiosks and their related components.

1.2 Scope

This Standard contains requirements for mobile food carts and their related components. This Standard applies to mobile food carts and indoor food kiosks intended for the preparation and service of food, as well those intended for service of prepackaged food only. This Standard does not apply to food catering trucks or other motor vehicle mounted food service equipment. The requirements in this Standard do not apply to umbrellas, awnings, and similar overhead accessories installed on mobile food carts or indoor food kiosks.

Food cart and indoor food kiosk components covered under the scopes of other NSF or NSF/ANSI Standards or Criteria shall also comply with the requirements therein. This Standard is not intended to restrict new unit design, provided such design meets the minimum specifications described herein.

Reason: The Purpose and Scope were revised to be consistent with NSF/ANSI 2 and to expand the scope of this Standard to include food kiosks.

1.3 Alternate materials, design, and construction

While specific materials, design, and construction may be stipulated in this Standard, units and equipment that incorporate alternate materials, design, or construction may be acceptable when such units and equipment meet the intent of applicable requirements herein.

Reason: Revised to be consistent with the wording in NSF/ANSI 2.

1.4 Measurement

Decimal and SI conversions provided parenthetically shall be considered equivalent. Metric conversions have been made according to IEEE/ASTM SI 10.
2 Normative references

The following documents contain provisions that, through reference, constitute provisions of this NSF/ANSI Standard. At the time this Standard was balloted, the editions listed below were valid. All documents are subject to revision, and parties are encouraged to investigate the possibility of applying the recent editions of the documents indicated below.

APHA Standard Methods for the Examination of Water and Wastewater, 20th Ed.\textsuperscript{1}

Code of Federal Regulations,\textsuperscript{2} Title 24 Title 40, (24 CFR) Parts 170-199 Section 180.940, Food Contact Surface Sanitizing Solution and Drugs


NSF/ANSI 2 – 1996 Food equipment

NSF/ANSI 4 – 2002 Commercial cooking, rethermalization, and powered hot food holding and transport equipment

NSF/ANSI 7 – 2001 Commercial refrigerators and storage freezers

NSF/ANSI 12 – 2002 Automatic ice making equipment

NSF/ANSI 35 – 2005 High pressure decorative laminates for surfacing food service equipment

NSF/ANSI 51 – 2002 Food Equipment Materials

NSF/ANSI 170 – 2005 Glossary of food equipment terminology

NSF C-2 – 1983 Special equipment and devices

3 Definitions

Terms used in this Standard that have special technical meaning are defined in NSF/ANSI 170.

\textit{Reason: Text added to be consistent with the wording in NSF/ANSI 2.}

Terms used in this Standard that have special technical meaning are defined here.

3.1 accessible: Manufactured to be exposed for cleaning and inspection with the use of simple tools.

3.2 cleaning: Physical removal of residues of food and other soiling material.

\textsuperscript{1} American Public Health Association, 800 I St. NW, Washington, DC 20001


\textsuperscript{3} American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428
3.3 closed: Manufactured with no opening exceeding \(\frac{1}{32}\) in (1 mm).

3.4 coating: Inorganic and/or organic layer of material applied to the surface of a substrate.

3.5 corrosion resistant: Capable of maintaining original surface characteristics under prolonged contact with the intended end use environment and exposure to appropriate cleaning compounds and sanitizing solutions.

3.6 cover: Protective device for a horizontal opening.

3.7 door: Protective device for a vertical opening.

3.8 easily cleanable: Manufactured such that food and other soiling material may be removed by manual cleaning methods.

3.9 exposed: Open to view from at least one angle.

3.10 food: Any raw, cooked, or processed edible substance, ice, water, beverage, or ingredient intended for human consumption.

3.11 food zone: Equipment surfaces intended to be in direct contact with food and equipment surfaces that food may contact and then drain, drip, or splash back into food or onto surfaces that are intended to be in direct contact with food.

3.12 frozen dessert: Any frozen or partially frozen combination of two or more of the following: milk or milk products; eggs or egg products; sugar; water; fruit or fruit juices; candy; nut meats; or other safe and wholesome food products, flavors, stabilizers, or colors. The term shall include ice cream, frozen custard, ice milk, milk sherbet, ices, and similar products.

3.13 heated food zone: Food zone surfaces that maintain a minimum temperature of 180 °F (82 °C) during equipment operation.

3.14 in-place cleaning: A method for cleaning and sanitizing equipment surfaces in their assembled form by circulating or passing, by mechanical means, a detergent solution, water rinse, and sanitizing solution onto or over the surfaces.

3.15 mobile food cart: A food service unit intended for manual, non-motorized transport from an area where the unit is serviced to another area where the food is served. This term applies to units intended for the preparation of food, as well as those that are intended for the display and service of prepackaged food in its original container without further preparation.

3.16 nonfood zone: Exposed equipment surfaces other than those in a food or splash zone.

3.17 potentially hazardous food: Any food, natural or synthetic, in a form capable of supporting: the rapid and progressive growth of infectious or toxigenic microorganisms; the growth and toxin production of Clostridium botulinum; or in shell eggs, the growth of Salmonella enteritidis. The term does not include:

- an air-cooled hard-boiled egg with shell intact;
- a food having a water activity \(a_w\) value of 0.85 or less;
- a food having a pH of 4.6 or below when measured at 75 °F (24 °C);
- a food, in an unopened hermetically sealed container, that is commercially processed to achieve and maintain commercial sterility under conditions of no refrigerated storage and distribution; and
3.18 **prepackaged food**: Food that is packaged, wrapped, or otherwise contained as intended for service, prior to display or storage in or on a mobile food cart.

3.19 **readily accessible**: Manufactured to be exposed for cleaning and inspection without the use of tools.

3.20 **readily removable**: Capable of being detached from the parent unit without the use of tools.

3.21 **removable**: Capable of being detached from the parent unit with the use of simple tools.

3.22 **sanitization**: The application of cumulative heat, chemicals, or other approved agents on cleaned surfaces to reduce the population of disease organisms by 99.999% (5 log reduction).

3.23 **sealed**: Manufactured without openings to prevent entry or leakage of liquids.

3.24 **simple tools**: Hand-held tools commonly available to maintenance and cleaning personnel such as screwdrivers, pliers, open-end wrenches, and Allen wrenches.

3.25 **smooth**: A surface free of pits and inclusions with a cleanability equal to or exceeding the following:

- **food zone**: No. 3 (100 grit) finish on stainless steel; and
- **splash and nonfood zone**: commercial grade, hot-rolled steel, free of visible scale.

3.26 **splash zone**: Equipment surfaces, other than those in a food zone, that are subject to splash, spillage, or other food soiling during operation of the equipment.

3.27 **tight fitting**: Having no openings greater than \(\frac{1}{64}\) in (0.4 mm) along an entire seam of joining members.

**food kiosk**: (As used in NSF/ANSI 59) An indoor fixed, prefabricated food service structure having one or more open sides that may be used to prepare, store, and/or sell food. This term applies to units intended to be connected to electricity, plumbing and water, intended for the preparation of food, as well as those that are intended for the display and service of prepackaged food in its original container without further preparation.

*Reason: “Food kiosk” definition added because of expanded scope. It will be incorporated in the NSF/ANSI 170 – Food Equipment Terminology.*

*Reason: More accurately defines food kiosk.*

### 4 Materials

The requirements contained in this section are intended to protect food from contamination and to ensure that the materials used in the construction, manufacture of mobile food carts and food kiosk resist wear, resist penetration by vermin, and resist the effects of foods, cleaning compounds, heat, sanitizers, and other substances that may contact the materials in the intended use environment.

*Reason: Revised to be consistent with NSF/ANSI 2 and to expand to include food kiosk.*
4.1 Zone-specific materials requirements

4.1.1 Food zone

4.1.1.1 Exposed surfaces in a food zone shall be smooth and easily cleanable.

4.1.1.2 Exposed surfaces in a food zone shall be corrosion resistant or rendered corrosion resistant by the application of a coating. Coatings shall conform to the requirements in 4.2.1.

NOTE – Materials that are worked (e.g., bent, sheared, cut, extruded, drawn) during equipment fabrication may require additional treatment following fabrication in order to render them corrosion resistant.

4.1.1.3 Materials in a food zone shall not impart color, taste, or odor to food.

4.1.1.4 Materials in a food zone shall not impart a toxicologically significant quantity of a chemical to food.

4.1.2 Splash zone

4.1.2.1 Exposed surfaces in a splash zone shall be smooth and easily cleanable.

4.1.2.2 Exposed surfaces in a splash zone shall be corrosion resistant or rendered corrosion resistant. Coatings used to render a substrate corrosion resistant shall conform to the requirements in 4.2.1.

NOTE 1 – Materials that are worked (e.g., bent, sheared, cut, extruded, drawn) during equipment fabrication may require additional treatment following fabrication in order to render them corrosion resistant.

NOTE 2 – Splash zone materials requirements shall also apply to drawers and containers intended for the storage of utensils intended for food service and preparation.

4.1.3 Nonfood zone

4.1.3.1 Exposed surfaces in a nonfood zone shall be smooth.

4.1.3.2 Exposed surfaces in a nonfood zone shall be corrosion resistant or rendered corrosion resistant. Coatings used to render a substrate corrosion resistant shall conform to the requirements in 4.2.1.

NOTE – Materials that are worked (e.g., bent, sheared, cut, extruded, drawn) during equipment fabrication may require additional treatment following fabrication in order to render them corrosion resistant.

Reason: The general requirements for food zones, splash zones, and nonfood zones as well as requirements for specific material types are addressed in NSF/ANSI 51. Text revised to be consistent with the wording in NSF/ANSI 2.

4.2 Requirements for specific classes or types of materials

This subsection contains additional requirements that apply to specific classes of materials often found on mobile food carts. Unless otherwise stated, the materials mentioned in this subsection shall also be subject to the requirements of the zone in which they are located.
4.2.1—Coatings

4.2.1.1 Coatings containing lead as an intentional ingredient shall not be used. Coatings with an unintentional lead content (lead impurity) greater than 0.06% shall not be used.

4.2.1.2 Paint and other organic coatings shall not be applied to surfaces intended to be in direct contact with food, except that polytetrafluoroethylene may be used on heated food zone surfaces where the substrate material conforms to the requirements in 4.1.

4.2.1.3 Coatings shall resist cracking and chipping under use conditions.

4.2.1.4 Coatings on heated food zones shall resist damage when exposed to high temperatures.

   *Reason: Coatings are addressed in NSF/ANSI 51.*

4.2.2 Solder

Solder containing lead as an intentional ingredient shall not be used in a food zone or splash zone.

4.2.3 Gaskets

Gaskets shall be made of plastic, rubber, rubber-like materials, or a combination thereof.

   *Reason: Gaskets are addressed in NSF/ANSI 51.*

4.2.4 Sound dampening materials

Sound dampening materials shall meet the requirements of the zone in which they are located except that they are not required to be smooth. Sound dampening materials shall not chip, flake, or blister. Non-hardening sound dampening materials shall not be used in exposed areas. Non-curing sound dampening materials shall not be used in exposed areas.

   *Reason: Text consistent with NSF/ANSI 2.*

4.2.5 Wood

4.2.5.1 Wood, other than wood cutting boards conforming to 5.26, shall not be used in a food zone.

4.2.5.2 Wood, including particle board, used for structural, nondecorative purposes, shall be totally encapsulated, so as not to be exposed. All seams formed by the encapsulating material shall be sealed.

4.2.5.3 Exposed wood used for decorative purposes shall be sanded smooth and sealed with an appropriate sealant. Decorative wood shall not be used on surfaces exposed to excessive moisture or wear.

4.2.6 Brass

Brass shall not be used in a food zone except in valves, housings, and other devices whose exposure is clearly and specifically limited to tea, coffee, and hot or cold water only.

   *Reason: Brass and wood requirements are covered in NSF/ANSI 51.*

4.4 Wood-top bakers tables and cutting boards

Wood-top bakers tables and cutting boards shall conform to the requirements in NSF/ANSI 2.
4.5 High pressure decorative laminates

Laminates shall meet the requirements in NSF/ANSI 35.

Reason: Added to address materials used on counter tops and other equipment in food kiosk.

5 Design and construction

This section contains design and construction requirements for equipment covered under the scope of this Standard.

5.1 General sanitation

5.1.1 Mobile food carts shall be designed and constructed to prevent vermin, dirt, splashes, and spills from entering the equipment and to facilitate the inspection, maintenance, servicing, and cleaning of the equipment and its components. Mobile food carts and food kiosk shall be designed and manufactured to prevent the harborage of vermin and the accumulation of dirt and debris, and to permit inspecting, maintaining, servicing and cleaning of the equipment and its components.

5.1.2 Mobile food carts shall be designed and constructed to minimize the potential for cross contamination. Mobile food carts and food kiosk shall be designed and manufactured so that food may be added, processed, finished, dispensed, removed, and/or served in a sanitary manner.

5.1.3 Food zones shall be readily accessible and easily cleanable or shall be designed for in-place cleaning when a readily accessible design is not feasible. The manufacturer shall provide written instructions for the in-place cleaning and sanitizing of all food zones. The type and concentration of sanitizing agent recommended by the manufacturer shall comply with 21 CFR 178.1010.

5.1.4 Food zones for which in-place cleaning is intended shall be designed and constructed so that cleaning and sanitizing solutions can be circulated or passed throughout the fixed system. The design shall ensure that cleaning and sanitizing solutions contact all food contact surfaces designed for in-place cleaning. The system shall be self-draining or capable of being completely evacuated. Any equipment or appurtenance designed for in-place cleaning shall have a section of the cleaned area accessible for inspection or shall provide for another acceptable inspection method. Food zones for which in-place cleaning is intended shall be designed and manufactured so that cleaning and sanitizing solutions may be circulated or passed throughout the fixed system. The design shall ensure that cleaning and sanitizing solutions contact all food contact surfaces. The system shall be self-draining or capable of being completely evacuated. Equipment and appurtenances designed for in-place cleaning shall have a section of the cleaned area accessible for inspection or shall provide for another acceptable inspection method. The manufacturer shall provide written instructions for the cleaning and sanitizing of all food zone surfaces for which in-place cleaning is intended. The type and concentration of sanitizing agent recommended in the instructions by the manufacturer shall comply with 40 CFR, section 180.940.

5.1.5 Splash zone surfaces shall be accessible and easily cleanable.

5.1.6 Non-food zone surfaces shall be accessible and cleanable.

5.1.7 Unexposed non-food zone surfaces shall be accessible or closed.

Reason: 5.1 has been updated to add food kiosk and be consistent with NSF/ANSI 2.
5.2 Internal angles and corners, food zone

5.2.1 Internal angles of 135° or less in a food zone shall be smooth and have minimum continuous radii of \( \frac{1}{8} \) in (3 mm).

5.2.2 When a corner with three internal angles of 135° or less is formed in a food zone, two of the angles shall be smooth and have a minimum continuous radius of \( \frac{1}{8} \) in (3 mm). The third angle shall be smooth and have a minimum continuous radius of \( \frac{1}{4} \) in (6 mm).

5.2.3 Solder or other fillet material shall not be used to effect a required minimum radius in a food zone except on the underside of roll-type covers. For internal angles formed by materials other than metals, the required radius may be effected by using parent material or other material demonstrated to be bonded to, and as effective as, the parent material.

5.2.1 All internal angles or corners of less than 135° in a food zone shall be smooth and have radii as set forth below:

5.2.1.1 The radius shall not be less than \( \frac{1}{8} \) in (0.13 in, 3.2 mm).

5.2.1.2 For metals, solder or other fillet material shall not be used to effect the required minimum radius of an internal angle or corner.

5.2.1.3 For materials other than metal, the radii specified in items 5.2.1.1 and 5.2.1.2 shall be effected using parent material or a material proven to be bonded and otherwise equal or better than the parent material.

5.2.1.4 Lesser radii may be used when necessary to ensure the proper functioning of equipment components such as sealing ring grooves. Greater radii shall be provided when necessary to allow for adequate cleaning, maintenance and product flow.

5.3 External angles and corners

Exposed external angles and corners in a food zone shall be sealed and smooth (see figure 1).

*Reason: Consistent with NSF/ANSI 2.*

5.4 Soldering

Solder shall be securely bonded to the metal so that it will not crack or chip, and the resulting surface shall be smooth. Flux and catalytic material shall be removed.

*Reason: To be consistent with NSF/ANSI 2 this section has been moved to under 5.4 Joints and seams*

5.5 Joints and seams

5.5.1 Permanent joints and seams in a food zone shall be sealed and smooth.

5.5.2 Permanent joints and seams in a splash zone shall be sealed and smooth.

5.5.3 Permanent joints and seams in a nonfood zone shall be closed.

5.5.4 Sealants shall be used only on structurally sound joints and seams less than \( \frac{1}{4} \) in (3 mm) wide. Sealants may be used to fill spaces around collars, grommets, and service connections.
5.4.1 Permanent joints and seams in a food or splash zone shall be sealed and smooth.

5.4.2 Permanent joints and seams in a nonfood zone shall be closed. Welded joints and seams in a nonfood zone shall be deburred.

5.4.3 Joints formed by overlapping sheets of material shall not create upwardly facing horizontal ledges.

5.4.4 Sealants shall only be used to seal joints and seams that are structurally sound and are less than ¼ in (0.13 in, 3.2 mm) wide before sealing. Sealants may be used to fill spaces around collars, grommets, and service connections.

5.4.5 Solder and other fillet material shall be securely bonded to its substrate. All flux and catalytic materials shall be removed.

5.4.6 Food kiosk shall be designed and manufactured such that field joints may be made sanitary with the use of trim strips, welding, soldering, properly designed draw fastening, or other appropriate methods.

Reason: 5.4 has been updated to be consistent with NSF/ANSI 2.

5.6 Fasteners

5.6.1 Fasteners shall not be used in a food zone.

5.6.2 Fasteners in a splash zone or nonfood zone shall not have deep recesses in the head. Examples of fasteners meeting this requirement include slot-head and Phillips-head screws and flush-break pop rivets. Nonflush-break pop rivets shall be capped or filled with a food-grade material.

5.6.3 Allen screws shall not be used in a splash zone. Allen screws may be used in a nonfood zone provided the heads are capped or filled with a food grade material.

5.6.4 Fasteners shall be tight fitting to the surface.

5.6.5 There shall be no more than one split-lock washer, flat-lock washer, internal-tooth lock washer, or self-tightening locking assembly used with each fastener. External-tooth lock washers shall not be used.

5.6.6 There shall be no exposed threads, projecting screws, or studs. This requirement shall not apply to nonfood zones provided there are no more than 2½ exposed threads and no greater than ¼ in (6 mm) of exposed length.

5.5.1 Fasteners shall not be used in a food zone.

5.5.2 Fasteners shall be easily cleanable. Fasteners meeting this requirement include, but are not limited to, slot-head and Phillips-head screws, hex head fasteners, and flush-break pop rivets. Hex key screws and non flush-break pop rivets may be used in a splash zone or a nonfood zone provided the heads are capped or filled.

5.5.3 Fasteners shall be tight fitting to the surface except as permitted in 5.5.4.

5.5.4 No more than one locking washer and one flat washer shall be used per fastener head. The diameter of the washer adjacent to the fastening surface shall not be less than the diameter of the washer under the fastener head. External-tooth lock washers shall not be used.
5.5.5 There shall be no exposed threads, projecting screws, or studs in a food or splash zone. There shall be no more than 2.5 exposed threads or ¼ in (0.25 in, 6.4 mm) of exposed threads, whichever is less, in a nonfood zone.

5.5.6 The sharp point of a fastener shall not be exposed.

Reason: 5.5 has been updated to be consistent with NSF/ANSI 2.

5.6 Insulation

Insulated spaces in the food and splash zones shall be sealed. Insulated spaces in the nonfood zone shall be closed.

Reason: Formerly 5.27. Relocated here to be more consistent with NSF/ANSI 2 and is consistent with NSF/ANSI 2.

5.7 Reinforcing and framing

Exposed reinforcing and framing members and gussets shall be easily cleanable and designed to prevent harborage for vermin. Reinforcing and framing members and gussets shall not form ledges where debris may accumulate. Vertical channels that form hollow sections shall be closed at each end, open at each end, or readily accessible along the entire channel. All other hollow sections shall be closed at each end.

5.7.1 Exposed reinforcing and framing members and gussets shall be easily cleanable. Reinforcing and framing members shall be designed and manufactured to prevent the harborage of vermin.

5.7.2 Horizontal surfaces of reinforcing and framing members and gussets shall not be located where debris may accumulate.

5.7.3 Vertical channels that form hollow sections shall be closed at each end, open at each end, or readily accessible along the entire channel. All other hollow sections shall be closed at each end.

Reason: 5.7 has been updated to be consistent with NSF/ANSI 2.

5.8 Inspection and maintenance panels

Where necessary for equipment inspection and maintenance, removable panels of adequate size shall be provided. Each panel shall be sized to facilitate removal and replacement by one person.

Reason: 5.8 has been updated to be consistent with NSF/ANSI 2.

5.9 Linings

Bottoms or gutters of linings in fixtures requiring drainage shall be self-draining.

Reason: Moved to end of boilerplate to be consistent with NSF/ANSI 2.

5.9 Doors

5.9.1 Doors shall be sized to fit their openings and shall close properly.

5.9.2 Sliding doors shall slide freely and shall be readily removable.

5.9.3 Exposed C-channel sections on single panel doors shall be shallow and wide enough to be easily cleanable and shall have clean-out holes inverted or easily cleanable. Clean-outs shall be provided if channels are not inverted (see figure 2).
5.10.4 Insulated sections of double panel doors shall be sealed.

5.10.5 Door hinges shall meet the requirements in 5.12.

5.9.4 Exposed edges of glass doors shall be protected by tight fitting channels, stripping materials, or other means such as rounding the edges of tempered glass to protect against chipping. The glass shall conform to the requirements of 5.38.3 Breakable glass components.

5.9.5 Door gaskets shall be easily cleanable and shall be removable for replacement.

5.9.5.1 Exposed surfaces of door gaskets shall be easily cleanable. Hollow sections of door gaskets shall be sealed.

5.9.5.2 Gaskets shall be capable of being removed and reinstalled by hand or with the use of simple tools. Staples, pop rivets, nails, adhesives, and other similar items that cannot be reattached easily shall not be used to secure door gaskets.

5.9.5.3 Retaining grooves and other devices for holding readily removable gaskets shall be easily cleanable.

Reason: 5.9 has been updated to be consistent with NSF/ANSI 2.

5.10 Door tracks and guides

5.11.1 Door tracks and guides shall be easily cleanable. The width at the top of a door channel track shall be greater than the depth of the track.

5.11.2 Door tracks and guides shall:

  — have clear open slots continuously or at intervals along their entire length; or
  — have clean-out holes at each end; or
  — terminate at least ½ in (13 mm) from the framing at each end; or
  — be integral with the equipment surface and have no square corners.

Lower guides for overhead door suspensions that are integral with the equipment surface and channel-type bottom tracks equipped with readily removable T-strips are exempt from this requirement.

5.10.1 Door tracks and guides shall be easily cleanable. Channel tracks shall not have a depth greater than the width of the channel top.

5.10.2 Tracks and guides shall:

  — have clear open slots continuously or at intervals along their entire lengths; or
  — have clean-out holes at each end; or
  — terminate at least ½ in (0.50 in, 13 mm) short of framing at each end; or
  — be integral with the equipment surface and have no square corners.

This shall not apply to lower guides for overhead door suspension that are integral with the equipment surface and channel-type bottom tracks equipped with readily removable strips.

Reason: 5.10 has been updated to be consistent with NSF/ANSI 2.

5.11 Hinges
5.12.1 Hinges located in a food or splash zone shall be easily cleanable while in place or shall be designed to be disassembled without the use of tools for routine cleaning.

5.12.2 Continuous hinges shall not be used in a food zone or splash zone except as permitted in 5.12.3 and 5.12.4.

5.12.3 Continuous hinges on splash zone doors and covers weighing 80 lb (36 kg) or more shall have no more than two movable knuckles per hinge and shall have sealed joints and seams on the hinge body (except for seams at the pivot knuckle joint).

5.12.4 Continuous hinges on splash zone doors and covers weighing less than 80 lb (36 kg) shall conform to the requirements in 5.12.3 or each of the following:

- the hinge pin shall be readily removable;
- the diameter of the hinge pin shall be greater than or equal to \( \frac{3}{16} \) in (5 mm); and
- mating surfaces of the hinge (such as the joint between a knuckle and leaf) shall be closed or separated by at least \( \frac{1}{8} \) in (3 mm).

5.11.1 Hinges located in a food zone shall be easily cleanable while in place or shall be designed to be disassembled, without the use of tools, for routine cleaning. Hinges located in a splash zone shall be easily cleanable while in place or shall be designed to be disassembled (with or without the use of tools) for routine cleaning.

5.11.2 Continuous hinges shall not be used in a food zone.

5.11.3 Hinges on splash zone doors and covers weighing 80 lb (36 kg) or more shall have no more than five knuckles in total per hinge set and shall have sealed joints and seams on the hinge body (except for seams at the pivot joint).

5.11.4 Hinges on splash zone doors and covers weighing less than 80 lb (36 kg) shall conform to the requirements in 5.11.3 or each of the following:

- the hinge shall be lift-off style or have a removable pin;
- the diameter of the hinge pin shall be greater than or equal to \( \frac{3}{16} \) in (0.19 in, 5.0 mm); and
- mating surfaces of the hinge (such as the joint between a knuckle and leaf) shall be closed or separated by at least \( \frac{1}{8} \) in (0.13 in, 3.2 mm).

5.11.5 Fixed pin hinges may be used on covered pitchers if the hinge is offset and protected from splash and spillage.

Reason: 5.11 has been updated to be consistent with NSF/ANSI 2. 5.11.5 not applicable to mobile food carts or food kiosk

5.12 Covers

5.12.1 Covers protecting a food zone shall overlap the opening and shall be sloped to provide drainage from the cover surface. Inset covers for stackable pans are exempt from the slope requirement. Areas of handles and knobs of covers are not required to be sloped.
5.12.2 Covers having slotted openings designed to allow serving utensils to remain in the food shall be exempt from 5.12.1. Slotted openings shall be no larger than 1½ in x 1 in (38 mm x 25 mm) and shall be protected by a raised rim of at least ⅛ in (0.19 in, 5.0 mm).

5.12.3 Port openings through a food zone cover shall be flanged upward at least ⅛ in (0.19 in, 5.0 mm) and shall have a cover overlapping the flange.

5.12.4 Hinges and pivots shall conform to 5.11.

5.12.5 Covers shall be readily removable and easily cleanable.

5.12.6 Sliding covers and hinged covers protecting a food zone shall be designed and manufactured to prevent accumulation of liquid or debris on the covers and contamination of the food zone during opening or closing.

5.12.7 Hood mountings for covered pitchers shall be accessible.

Reason: Not applicable to mobile food carts or food kiosk

5.12.8 All internal corners and angles of roll covers, tilt covers, and other similar covers that are less than 135° shall have a minimum smooth radius of ⅛ in (0.13 in, 3.2 mm). Solder or other fillet material may be used to provide a minimum radius on the underside of roll-type covers.

Reason: 5.13 Covers has been moved from 5.16 & is worded to be consistent with NSF/ANSI 2.

5.13 Exposed Edges and nosings

If a shelf or unit top is reinforced by forming its edge into a structural shape (nosing) and there is an adjoining vertical surface (i.e., cabinet body), then the following requirements shall apply:

- the nosing shall be continuous integral with the shelf or unit top; and
- the edge shall be smooth in areas that fingers may contact during use or cleaning deburred; and
- the nosing and adjoining vertical surface shall be closed or shall have a clearance of at least ⅜ in (0.75 in, 19 mm) or ⅜ of the nosing’s vertical dimension, whichever is greater.

If the profile edge is turned in to form a channel-like configuration, the return (horizontal) shall not exceed ½ in (0.50 in, 13 mm) and shall be angled downward at least 5° from the horizontal plane. This requirement does not apply to readily removable or knockdown shelves.

Reason: 5.14 has been updated to be consistent with NSF/ANSI 2.

5.14 Field joints

Mobile food carts shall be designed such that field joints may be made sanitary with the use of trim strips, welding, soldering, properly designed draw fastening, or other appropriate methods.

Reason: This requirement is now part of 5.4.5, which is consistent with NSF/ANSI 2.

5.14 Openings to food zones

Openings to food zones shall be protected to prevent the entry of seepage, condensation, and spills from entering the food zone. In areas where liquids may accumulate, top openings to food zones shall be protected by a raised rim that extends at least ⅛ in (0.19 in, 5.0 mm) above the flood liquid level (see
Reason: 5.12 has been updated to be consistent with NSF/ANSI 2.

5.16 Covers

5.16.1 Covers protecting a food zone shall have a flange that overlaps the opening and shall be sloped to allow drainage from the cover surface. Inset covers on stackable pans are not required to be sloped.

5.16.2 Covers shall be designed with sufficient clearance to prevent contact with food.

5.16.3 Covers shall be readily removable.

5.16.4 Port openings through a food-zone cover shall be flanged upward at least $\frac{3}{16}$ in (5 mm) and shall have a cover that overlaps the flange. Slots in a cover designed to allow serving utensils to remain in the food shall be no larger than $1\frac{1}{2}$ in (38 mm) by 1 in (25 mm). The slots shall be flanged upward at least $\frac{3}{16}$ in (5 mm), but a cover is not required for the slot.

5.16.5 Hinged or sliding covers shall be designed to preclude the accumulation of liquid and debris on their surfaces and the contamination of food zones during opening and closing.

5.16.6 Lid assemblies shall be free of cracks, crevices, and openings and shall be designed to facilitate cleaning and sanitizing.

5.16.7 Hood mountings shall be readily accessible.

5.15 Louvers

5.15.1 Louvers that may be subject to overhead splashes, spills, and drips shall be of a deflecting design or shall be readily removable and the space immediately behind the louver easily cleanable.

5.15.2 If electrical safety requirements prohibit the use of readily removable louvers, then such louvers need only be removable.

5.15.3 Louvers shall be deburred and shall have spaces large enough to allow for easy cleaning.

5.15.4 Screening on louvered openings, if provided, shall be 16 mesh (16 strands per 1.0 in [25 mm]) or greater and removable.

Reason: Text has been updated to be consistent with NSF/ANSI 2.

5.18 Hardware

Hardware shall be smooth, easily cleanable, replaceable, and have an integral or plated finish and corrosion resistant. Hardware shall not have open seams, recesses, or unnecessary projections.

Reason: 5.16 has been updated to be consistent with NSF/ANSI 2.

5.18 Pipe chases

Pipe chases for gas, steam, electrical, and plumbing lines shall be constructed with removable access panels where possible. Pipe chases shall be designed to eliminate vermin harborage (see figure 8).

Reason: Text has been added to be consistent with NSF/ANSI 2.

5.17 Entry ports
Entry ports through which piping, thermometers, rotary shafts, equipment, or other functional parts enter into a food zone shall be closed and sealed at the point of entry or shall be protected by a deflecting apron.

Reason: Moved to end of boilerplate to be consistent with NSF/ANSI 2.

5.17 Hardware

Hardware shall be smooth, easily cleanable, replaceable, and have an integral or plated finish and corrosion resistant. Hardware shall not have open seams, recesses, or unnecessary projections.

Reason: 5.17 has been updated to be consistent with NSF/ANSI 2.

5.17 Door closers, handles knobs, and pulls

5.17.1 Exposed surfaces shall meet the design and construction requirements of the zone of the intended use.

5.17.2 Door closers, handles, knobs and pulls shall meet at least one of the following:
- be easily cleanable as installed on the equipment; or
- be removable for cleaning.

5.17.3 If locking features are provided, the keyway and lock are exempt from 5.11.2.

5.19 Latches and catches

Latches and catches shall be easily cleanable while in place or shall be designed to be removable for cleaning. Openings that are functionally necessary are exempt from cleanability requirements.

Reason: 5.19 Handles and pulls & 5.20 Latches and catches added because these items might be found on carts and food kiosk. Worded consistent with NSF/ANSI 2.

5.20 Breaker strips

Breaker strips shall be securely fastened around the entire perimeter and fabricated to minimize accumulations of spillage, condensation, and foreign matter. They shall have smooth, easily cleanable surfaces without sharp or rough edges.

Breaker strips shall:
- be securely fastened around the entire perimeter with closed seams; and
- be designed and manufactured to minimize accumulations of spillage, condensation, and foreign matter; and
- have smooth, easily cleanable surfaces without sharp or rough edges.

In a food or splash zone, the seam between a breaker strip and capping shall be sealed.

5.21 Equipment mounting

5.21.1 Mobile food carts shall be mounted on casters, rollers, gliders, or wheels to facilitate manual
transport. Casters, rollers, gliders and wheels shall conform to 5.24 5.23.

5.21.2 Equipment mounting in food kiosk

5.21.2.1 Floor-mounted equipment shall be designed and manufactured to be:
- portable; or
- mobile; or
- sealed to the floor; or
- elevated on legs that provide a minimum unobstructed clearance beneath the unit of 6.0 in (150 mm); or
- elevated on legs that provide a minimum unobstructed clearance beneath the unit of 4.0 in (100 mm) provided that no part of the floor under the equipment is more than 6.0 in (150 mm) from the point of cleaning access.

5.21.2.2 Counter-mounted equipment shall be designed and manufactured to be:
- portable; or
- sealed to the counter; or
- elevated on legs that provide a minimum unobstructed clearance beneath the unit of 4.0 in (100 mm); or
- elevated on legs that provide a minimum unobstructed clearance beneath the unit of 3.0 in (75 mm) provided that no part of the counter top under the unit is more than 20 in (50 cm) from the point of cleaning access; or
- elevated on legs that provide a minimum unobstructed clearance beneath the unit of 2.0 in (50 mm) provided that no part of the counter top under the unit is more than 3 in (50 cm) from the point of cleaning access.

5.21.3 Kick plates on floor-mounted equipment shall be removable.

Reason: Text has been added to be consistent with NSF/ANSI 2.

5.22 Legs and feet

5.22.1 Legs and feet shall be fastened to the body of the equipment and shaped at their floor or counter contacts to minimize the accumulation of dirt and the harborage of vermin.

5.22.2 Legs and feet shall be sufficiently rigid to support the equipment with a minimum of cross bracing.

5.22.3 If the outer dimension of a leg exceeds the outer dimension of its foot by ½ in (0.50 in, 13 mm) or more in the same plane, then the foot shall extend 1.0 in (25 mm) below the leg at the minimum adjustment.

5.22.4 Hollow sections between leg and foot shall be closed. Legs and feet shall have no exposed threads at the maximum adjustment.

5.22.5 Gussets shall be assembled to the equipment and shall be easily cleanable and designed to prevent vermin harborage. The resultant assembly shall have no recessed areas.
5.21 5.23 Casters, rollers, gliders, wheels, and wheel housings

5.21.1 Casters, rollers, and gliders shall be easily cleanable and shall conform to NSF Criteria C-2 NSF/ANSI 2, except that spoked wheels may be used and tread surfaces need not be smooth. Wheels shall not extend into serving areas.

5.21.2 Wheel housings shall be provided where necessary to prevent contamination of food and splash zones. Wheel housings shall be fabricated to minimize the retention of moisture and debris and to facilitate permit cleaning and maintenance.

Reason: Section updated to reference NSF/ANSI 2. Consistent with trends to changes of boilerplate language.

5.22 5.24 Open display stands and brackets

Open display stands, with or without crossrails, shall be of solid or tubular construction. Tubing in stands shall be seamless or shall have welded seams. Brackets shall be smooth, easily cleanable, and fabricated to support the intended end use.

5.25 Counter tray slides

Counter tray slides may be of solid or tubular construction.

Reason: Added this requirement because food kiosk might have tray slides. Worded to be consistent with NSF/ANSI 2.

5.26 Shelving

5.26.1 Shelving shall be easily cleanable.

5.26.2 Readily removable shelves shall be sized to permit handling by one person. Shelves used as readily removable false bottoms shall have flanged corners that are closed or are sufficiently notched to permit cleaning (see figure 4).

5.26.3 Diverting shelves intended to prevent seepage or retain splashes and spills shall have sealed corners and seams. The back and end edges shall be turned up a minimum of 1.0 in (25 mm), and the corners and seams shall be sealed. Shelf surfaces exposed to unpackaged foods shall conform with 5.2 (see figure 5).

5.26.4 Where knock-down shelving is provided with a solid shelf, the seam between the leg and shelf shall be equal to or above the flood level of the shelf. If pressure cleaning is recommended for knock-down shelving, joints and seams shall be either sealed or accessible for cleaning and shall be capable of being completely drained.

5.27.5 The back and end edges of fixed interior shelving shall:

- be turned upward a minimum of 1.0 in (25 mm) and form a closed seam along an adjacent back and side panel; or
- be spaced at least 1.0 in (25 mm) from an adjacent back or side panel; or
- form sealed seams with an adjacent back or side panel (see figure 6).
5.26.6 Support brackets and pilasters

Support brackets and pilasters for readily removable shelving and adjustable shelving shall be readily removable or easily cleanable as installed (see figure 7).

Reason: Section on shelving added to address shelving in food kiosk. Worded consistent with NSF/ANSI 2.

5.27 Counter steps and platforms

Counter steps and platforms shall not be closed or hollow. Foot rests and rails shall have open space between the lower edge and the floor.

Reason: Added to address food kiosk and worded consistent with NSF/ANSI 2.

5.28 Pipe chases

Pipe chases for gas, steam, electrical, and plumbing lines shall be constructed with removable access panels where possible. Pipe chases shall be designed to eliminate vermin harborage (see figure 8).

Reason: Text has been added to be consistent with NSF/ANSI 2.

5.29 Enclosed spaces

Enclosed spaces shall be sealed or shall have removable access panels. Removable panels shall be provided where condensation is likely to occur within an enclosed space.

Reason: Requirement from NSF/ANSI 2, which could apply to both carts and food kiosk.

5.30 Bins, drawers, and containers

5.30.1 Bins, containers, drawers, and drawer carriages shall be readily removable for cleaning.

NOTE – Drawer tracks and slides need not be readily removable provided they are readily accessible for cleaning.

5.30.2 Food bins, containers, and drawers shall be smooth and shall conform to the minimum internal radius requirements in 5.2.

5.30.3 Food ingredient bins and containers shall be located in a totally enclosed space or shall be equipped with tight-fitting covers.

5.30.4 Food zone requirements shall apply to food containers and drawers. Food zone design requirements shall apply to flatware containers. Fillet material and solder shall not be used to fill or cove the angles or corners.

5.30.5 Drawers and drawer pan assemblies shall be readily removable for cleaning. Joints and seams between drawer pan assemblies and drawer slides shall be closed and recessed areas shall be minimized (see figure 9).

NOTE – Drawer tracks and slides need not be readily removable provided they are easily cleanable as installed.

5.30.6 Containers used for dispensing flatware shall be readily removable for cleaning and shall comply with food zone requirements. Containers shall be constructed so flatware can be picked up by handles only, with other portions of the flatware covered and protected from handling.
5.24 5.31 Insets

Insets and similar receptacles for unpackaged moist food and beverages shall be readily removable and easily cleanable. Each receptacle shall be of open-mouth design and shall have a cover. Insets and similar receptacles for unpackaged moist foods shall be readily removable. They shall be easily cleanable and be capable of being drained. They shall have an open-mouth type design. They shall have covers that conform to the requirements of 5.12.

Reason: Revised to be consistent with Food and flatware containers and drawers in NSF/ANSI 2.

5.25 Flatware dispensers

Containers for dispensing flatware shall be readily removable and easily cleanable. They shall be constructed so that flatware may be picked up by its handles only while other portions of the flatware remain covered and protected from handling.

Reason: Flatware dispensers was relocated to 5.29, which is consistent with the format of NSF/ANSI 2.

5.32 Bins

Bins shall be readily removable for cleaning. Bins for food ingredients shall be located in a totally enclosed space or shall be equipped with tight-fitting covers.

Reason: Bins were covered under 5.23. Now to be consistent with NSF/ANSI 2 it is a separate section and worded consistently with NSF/ANSI 2.

5.33 Ice pans and bins

Ice pans and bins intended to hold ice for human consumption or food contact shall meet the requirements of NSF/ANSI 2.

Joints and seams in ice pans and bins shall be sealed and smooth. Solder and other sealants may be used for sealing structurally sound seams. All internal angles shall have a minimum radius of \( \frac{1}{8} \) in (0.133, 3.2 mm). Solder may be used to effect a required radius.

5.33.1 Drains shall not discharge into or through ice pans or bins.

5.33.2 A cover meeting the requirements of 5.12 shall be required. When top openings into ice pans and bins are subject to overhead contamination from drink dispensers or water stations, they shall be protected during use and holding. Self-closing doors, operational shields, or dispensing head lockouts shall be considered as meeting this requirement.

5.33.3 Drop-in cold plates, carbonator tanks, bottle holders, beverage tubing, service lines, and similar devices (except bin level controls) are not acceptable in potable ice pans or bins. Cold plates, when installed in potable ice bins, shall be constructed integrally with the bin, and the resultant seam shall comply with 5.4. Sealing compounds shall meet the food zone requirements in NSF/ANSI 51 and are acceptable for sealing structurally sound seams. A drain of not less than \( \frac{1}{2} \) in (2.0 cm) or equal, shall be provided in the ice storage bin. The drain opening shall be located to permit complete draining of the bin.

5.33.4 Ice pans and bins not intended for the storage of ice intended for human consumption shall be provided with a permanent label stating: "This ice pan (or bin) is not intended to store ice for human consumption.

Reason: Bins were covered under 5.23. Now to be consistent with NSF/ANSI 2 it is a separate section and worded consistently with NSF/ANSI 2.
consumption.

Reason: Consistent with boilerplate language.

5.33.5 Ice bins shall not drain into the wastewater holding system as described in 5.48 on mobile food carts. Ice bins on mobile food carts shall drain into an alternative reservoir.

Reason: An ice bin should not be permitted to drain into the wastewater holding systems described in 5.48.

5.34 Dipper wells

5.34.1 Dipper wells shall be equipped for running water and conform to applicable sections of NSF/ANSI 2. Joints and seams shall be sealed and smooth. The top of the well shall be at least 16 in² (100 cm²), and interior angles shall have radii of at least \( \frac{1}{8} \) in (0.13 in, 3.2 mm). Separating partitions of dipper wells shall be readily removable for cleaning. Overflow standpipes shall be readily accessible for brushing and cleaning.

5.34.2 Dipper wells intended for field installation in the food zone shall be designed to be readily removable.

5.34.3 Dipper wells that are installed in the food zone at the point of manufacture shall conform with 5.2.

Reason: Added because food kiosk may have dipper wells, particularly an ice cream food kiosk.

5.35 Sound dampening

Sound dampening materials, if used, shall be applied in a manner that prevents dirt or debris from collecting and adhering. The surface shall be nonabsorbent and comply with 4.3.

Reason: This section was added to be consistent with NSF/ANSI 2.

5.36 Backsplashes

If provided, backsplashes shall be formed integral with the tops or formed separately and integrally welded. Turned back flanges at top of splash backs may be flat (at 90° [1.5 rad] to vertical) provided the horizontal distance is not greater than 1.75 in (44.5 mm). If the horizontal distance is greater than 1.75 in (44.5 mm), the turn back shall be at a 45° (0.8 rad) angle.

NOTE – Backsplash and aprons for underbar equipment may be sealed to the tops with the use of acceptable fillet material.

Reason: A food kiosk could have a splash back, so the requirement was added as consistent with NSF/ANSI 2. Moved to be consistent with NSF/ANSI 2.

5.34 Sound dampening

Sound dampening materials, if used, shall be applied in a manner that prevents dirt or debris from collecting and adhering. The surface shall be nonabsorbent and comply with 4.3.

Reason: This section was added to be consistent with NSF/ANSI 2.

5.37 Tops of counters, tables, and back bars
Tops, if exposed, shall have all seams welded and smooth. Field joints shall conform to 5.4.6.

**Reason:** This addresses a component that may be part of a food kiosk and was worded consistent with NSF/ANSI 2.

### 5.38 Breakable glass components

5.38.1 Fixtures and devices that, if broken impacted, may shatter break and contaminate food shall be protected by guards. This requirement shall not apply to view ports and windows constructed of heat tempered glass.

5.38.2 Light bulbs that have been plastic coated or otherwise treated to resist shattering shall have a permanent label affixed near the bulb indicating that the lamp has been treated to resist shattering and must be replaced with a similarly treated lamp.

5.38.3 Glass, other than light fixtures, that may be subject to contact during use and routine maintenance and cleaning shall conform to the impact test in ANSI Z97.1 or to the impact test within UL 197.

**Reason:** Added requirement consistent with NSF/ANSI 2.

### 5.39 Light fixtures

5.39.1 Light fixtures shall meet the construction and materials requirements for the zone of intended use.

5.39.2 Glass components of light fixtures shall conform to the requirements of 5.38 of this Standard.

5.39.3 Fixtures shall allow for bulb replacement that conforms to the original lamp requirements of the fixture.

5.39.4 Vent or louvered openings on light fixtures shall conform to the requirements of 5.15. Vent or louvered openings into an otherwise closed space shall be protected with screening of not less than 16 mesh (16 strands per 1.0 in [25 mm]).

**Reason:** Text added to be consistent with NSF/ANSI 2.

### 5.40 Cutting boards

If provided, cutting boards shall be readily removable and shall conform to the requirements of NSF/ANSI 2.

### 5.27 Insulation

5.27.1 Insulation shall be installed so as to prevent it from separating, settling, or becoming compacted under use conditions.

5.27.2 Insulated space shall be free of voids and shall be closed and sealed to protect it from condensation, spills, and seepage.

**Reason:** Relocated to 5.6.

### 5.28 Ventilation openings

Areas housing compressors or other electrical equipment that may be subjected to spills, splashes, or overhead drips shall be protected by louvers or other drip deflecting devices.
Reason: This section was deleted because it is covered under louvers.

5.29 Louvers

Louvers shall be free of sharp edges and burrs and shall have spaces large enough to allow for easy cleaning. Louvers that may be subject to splashes, spills and overhead drips shall be of drip deflecting design or be readily removable and the space behind the louver easily cleanable.

NOTE – If electrical safety requirements prohibit the use of readily removable louvers on compressor compartments, then such louvers need only be removable.

Reason: Requirements now located in Section 5.16.

5.40 Linings

Bottoms or gutters of linings in fixtures requiring drainage shall be self-draining.

Reason: Language moved to be consistent with NSF/ANSI 2 boilerplate

5.41 Entry ports

Entry ports through which piping, thermometers, rotary shafts, equipment, or other functional parts enter into a food zone shall be closed and sealed at the point of entry or shall be protected by a deflecting apron.

Reason: Language moved from 5.17 to be consistent with NSF/ANSI 2 boilerplate

5.30 5.42 Waste receptacles

Waste receptacles shall be smooth, nonabsorbent, and easily cleanable. Seams on waste receptacles shall be sealed.

5.31 5.43 Data plate

A permanent-type data plate shall be affixed to each mobile food cart and food kiosk. At a minimum, the data plate shall include the following information:

– manufacturer's name and address;
– model number or designation;
– type of food cart or food kiosk (the data plate shall indicate whether the cart or food kiosk is intended for service of prepackaged food only or if the cart or food kiosk is also intended for the preparation of food. It shall also indicate whether or not the cart or food kiosk is intended for potentially hazardous foods.);
– type of heating, if applicable;
– type of refrigeration, if applicable;
– end use limitation, if intended for indoor use only;
– capacity of potable water tank(s), if applicable; and
– capacity of waste holding system, if applicable.
5.32 5.44 Hot food storage and preparation equipment

5.32.1 5.44.1 Cooking equipment, rethermalization equipment, and powered hot food storage equipment, if provided, shall conform to the design and construction requirements of NSF/ANSI 4, except that cooking equipment, rethermalization equipment, and powered hot food storage equipment on mobile food carts shall conform to the performance requirements of this Standard.

Reason: Because food kiosk can only be located indoors, any hot or cold holding equipment on those will only need to comply with NSF/ANSI 4 or NSF/ANSI 7. Hot and cold holding equipment on mobile food carts will still need to meet the design and construction requirements in 4 or 7 but will, however, need to meet the performance tests in this Standard which address issues such as outdoor environments, because carts can be operated outdoors.

5.32.2 5.44.2 Burners shall be designed, fabricated, and installed to minimize areas that are not easily cleanable.

5.33 5.45 Fuel burning devices

5.33.1 5.45.1 All fuel-burning devices shall be vented.

5.33.2 5.45.2 Fuel tanks and containers shall be securely mounted in an area outside of a food zone. Liquefied petroleum gas (LPG) tanks shall be mounted vertically. Natural gas tanks may be mounted horizontally or vertically.

5.34 5.46 Mechanical refrigeration

5.46.1 Mechanical refrigeration equipment, if provided, shall conform to the applicable design and construction requirements of NSF/ANSI 7, except that mechanical refrigeration on mobile food carts shall conform to the performance requirements of this Standard. Mechanical refrigeration on food kiosks shall conform to the performance requirements of NSF/ANSI 7.

5.46.2 Non-mechanically refrigerated storage compartments shall not be used on food kiosk. Non-mechanically refrigerated storage compartments on mobile food carts shall meet the performance requirements of this Standard.

Reason: Food kiosk shall only utilize mechanical refrigeration and that shall meet NSF/ANSI 7. Refrigeration on carts may be non-mechanical but must meet performance requirements in this Standard.

5.35 5.43 Ice pans and bins

5.35.1 Joints and seams in ice pans and bins shall be sealed and smooth. Solder and other sealants may be used for sealing structurally sound seams. All internal angles shall have a minimum radius of ¼ in (3 mm). Solder may be used to effect a required radius.

5.35.2 Drains shall not discharge into or through ice pans and bins.

5.35.3 Ice storage bins shall have a drain, with a minimum inner diameter of ½ in IPS, or equivalent, located to facilitate complete draining of the bin.

5.35.4 Cold plates installed in potable ice bins shall be integral with the bin and any resulting seam shall comply with 5.5.1. Drop-in cold plates, carbonator tanks, bottle holders, beverage tubing, service lines, and similar devices (except bin-level controls) shall not be present in potable ice bins.
Reason: Language moved to 5.33.

5.36 5.47 Potable water supply systems

The requirements of this section apply to mobile food carts having potable water systems.

A food preparation cart or food kiosk shall have a potable water supply system that supplies hot and cold potable water and conforms to the requirements in 5.47.

5.47.1 Source

5.47.1.1 Food preparation carts shall be designed to be connected to a continuous supply of potable water and/or supplied with potable water by means of a storage tank.

5.47.1.2 A food preparation food kiosk shall be designed to be permanently connected to a continuous supply of potable water.

5.36.1 5.47.1.3 Potable water shall be supplied under pressure or by gravity to a mixing faucet.

5.36.2 5.47.1.4 Water inlets shall be protected from contamination and designed to preclude attachment to a nonpotable service connection.

Reason: This section was updated to include all water supply requirements in one section. Potable water supply is only required on food prep/handling carts and food kiosk and thus water requirements are only necessary for these types of units. Because a food kiosk is not mobile, they shall be designed to be permanently connect to a continuous supply.

5.47.2 Backflow prevention

5.36.3 5.47.2.1 A mobile food cart, food kiosk, or other equipment intended to be connected to a water supply system under pressure shall be equipped with provided with protection against backflow by an air gap, or an approved vacuum breaker, or other device proven by test to be adequate in preventing backflow other method proved effective by test. A mobile food cart or food kiosk lacking such a device shall include the following statement in its installation instructions and on a label permanently affixed to the unit: “This equipment is to be installed with adequate backflow protection to comply with applicable Federal, state, or local codes.”

5.47.2.2 Check valves

Check valves shall meet the requirements of ANSI/ASSE 1024.

5.47.2.2.1 Each double check valve assembly shall have the following permanent markings plainly visible on the body:
5.47.2.2 If check valves are used for the protection of the water supply system, a screen at least 100 mesh (minimum 100 strands per 1.0 in (25 mm) shall be installed in the supply line immediately upstream from the check valves. Screens shall be accessible and removable for cleaning or replacement.

5.47.2 Plumbing connections

5.47.2.1 Water and waste piping and fittings attached to the equipment shall comply with the material requirements for the applicable zones.

5.47.2.2 Water and waste piping and connections shall comply with the International Plumbing Code 2003, International Code Council (ICC) or the Uniform Plumbing Code 2003, International Association of Plumbing and Mechanical Officials (IAPMO).

5.47.2.3 Waste lines shall not drain into or through a food zone.

5.47.2.4 Backflow prevention

5.47.2.4.1 Units intended to be connected to a water supply system under pressure shall have one of the following:

- a vacuum breaker that conforms to ANSI/ASSE 1001. *Atmospheric Type Vacuum Breakers* (for intermittent pressure conditions); or

- a vacuum breaker that conforms to ANSI/ASSE 1020. *Vacuum Breakers, Antisiphon, Pressure Type* (for continuous pressure conditions);

- a backflow prevention device that conforms to ANSI/ASSE 1022. *Backflow Preventer for Carbonated Beverage Machines*;

- a backflow prevention device that conforms to ANSI/ASSE 1024. *Dual Check Valve Type Backflow Preventers*;

- a backflow prevention device that conforms to ASSE 1032. *Dual Check Valve Type Backflow Preventer for Carbonated Beverage Dispensers/ Post Mix Type*;

- a statement in the installation instruction and on a label permanently affixed to the equipment that clearly indicates that the equipment is to be installed with adequate backflow protection to comply with applicable federal, state, and local codes.

5.47.2.4.2 A screen of at least 100 mesh (minimum 100 strands per inch) shall be installed immediately upstream of all check valve type backflow preventers used for water supply protection. The screen shall be accessible and removable for cleaning or replacement.

*Reason: Language consistent with NSF/ANSI 2.*

5.47.3 Mobile food cart water storage tanks

5.47.3.1 Water storage tanks, if provided, on food preparation carts shall have a minimum
The storage tank capacity shall be indicated directly on the tank or on the data plate of the cart.

Note: The actual size of the water storage tank on a mobile food cart should be based on the conditions of its intended use. The public health authority having jurisdiction may establish additional requirements as necessary for a particular operation with consideration of factors such as menu, food volume, and proximity to other services.

5.36.5 5.47.3.2 The interior of each water storage tank shall be smooth and free of recesses and crevices.

5.36.6 5.47.3.3 At least one fill connection shall be located at the highest point of each water storage tank.

5.36.7 5.47.3.4 Water storage tanks shall be readily removable or shall be sloped at least ½ in per ft (42 mm per m) to a drain located at the lowest point in the tank to allow for draining and flushing. The drain shall have a minimum diameter of ½ in (13 mm).

5.36.8 5.47.3.5 Tanks that supply water by gravity shall be adequately vented to allow for flow. Vent openings shall be protected against the entry of dust and insects.

5.47.4 Hot water

Water heaters shall conform to the requirements of NSF/ANSI 5.

Note: The actual size of the water heater on a mobile food cart should be based on the conditions of its intended use. The public health authority having jurisdiction may establish additional requirements as necessary for a particular operation with consideration of factors such as menu, food volume, number of fixtures, and proximity to other services.

Reason: Added requirement because previously the standard only stated that food preparation carts had to be provided with hot and cold potable water. However, it did not address how the water was to be heated. The Task Group for Mobile Food Carts and Food kiosk agreed at their Feb 02 meeting that a size should not be specified but that instead a note should be added to address sizing requirements.

5.37 5.48 Mobile food carts wastewater holding systems

5.37.1 5.48.1 Mobile food carts having a potable water system shall also have a waste holding tank(s) with a minimum capacity of 7.5 gal (28.4 L) or at least 15% greater than the total capacity of the water storage tank(s), whichever is greater. The capacity of the waste tank shall be displayed on the tank or the data plate.

NOTE – The minimum waste holding tank capacity shall not apply if the cart is equipped with an automated system that disables the water supply when the waste holding tank is full.

5.37.2 5.48.2 Interior surfaces of a waste holding tank shall be smooth.

5.48.3 The minimum depth of a waste holding tank shall be 3 in (75 mm).

5.37.4 5.48.4 The bottoms of permanently mounted tanks shall be sloped at least ½ in per ft (42 mm per m) to a drain. The drain shall have a minimum diameter of 1 in (25 mm) and shall be equipped with a shut-off valve.

5.48.4 Food kiosk having a potable water system shall be designed to be permanently connected to a municipal sewer system or approved on-site septic system. Waste holding tanks may be acceptable to local jurisdictions and if provided shall meet the requirements of this section.
Reason: Language moved to 5.47.1.5.

Reason: Added to address the waste systems for food kiosk.

5.48.5 Ice bins shall not drain into the wastewater holding system as described in this section on mobile food carts. Ice bins on mobile food carts shall drain into an alternative reservoir.

Reason: An ice bin should not be permitted to drain into the wastewater holding systems.

5.38 Additional design and construction requirements for food preparation mobile food carts

This section establishes additional requirements for mobile food carts used for the preparation or packaging of food before it is served.

Reason: The Task Group suggested that this and following sections be better organized. Sections below will state whether or not the item is required on food prep carts and food kiosk or if it is just a general requirement for all carts and food kiosk, so the above section heading is not needed.

5.38.1 5.49 Food protection

5.38.1.1 5.49.1 Food service and display areas of food preparation on carts and food kiosk shall be protected by food shields that conform to NSF/ANSI 2. Food display and food preparation areas exposed to the public on mobile food carts intended for indoor use only and food preparation areas on food kiosk shall be protected by food shields that conform to NSF/ANSI 2, and the data plate shall have a statement indicating that it is for indoor use only.

Reason: Expanded requirements to address food kiosk. Added “exposed to public” because a shield would not be necessary unless food is exposed to the public. More clearly communicates the intent that both types of equipment need this statement. Data plate requirement deleted due to being covered in 5.43 end use requirement.

5.38.1.2 5.49.2 Food preparation areas on mobile food carts intended for outdoor use shall be designed to be fully enclosed when the areas are not being accessed for food preparation. Food kiosk shall be for indoor use only.

Reason: Food kiosk should be intended for indoor use only because if they were located outside, most regulators would consider them a fixed food establishment and they would have to meet all of the requirements of a regular food service restaurant.

5.38.1.3 5.49.3 Food preparation areas exposed to the public on mobile food carts intended for indoor use only and food preparation areas on food kiosk shall be protected by food shields that conform to NSF/ANSI 2, and the cart’s data plate shall have a statement indicating that it is for indoor use only.

Reason: Redundant with 5.49.1.

5.38.2 5.50 Sinks

5.50.1 Carts

Food preparation carts shall have at least two sink compartments. Each sink compartment shall be at least 5½ in (139 mm) wide and have a minimum horizontal cross sectional area of 50 in² (.032 m²) at the water line. Each sink shall have a minimum depth of 4 in (100 mm). Sinks shall also conform to the requirements of NSF/ANSI 2, except for 5.39.4. Sinks on mobile food carts shall be exempt from backsplash requirements.
NOTE – The minimum sink requirements in this section are suitable for most mobile food cart applications. The actual number, size, location, design, and separation of sinks and hand washing facilities on a mobile food cart should be based on the conditions of its intended use. The public health authority having jurisdiction may establish additional requirements as necessary for a particular operation with consideration of factors such as menu, food volume, and proximity to other services.

5.50.2 Food kiosks

Food kiosks used for food preparation shall have at least two a minimum of a three compartment sinks in addition to one. One sink shall be designated solely for the purposes of handwashing. Sinks shall conform to the requirements of NSF/ANSI 2; except for 5.39.4.

NOTE – The minimum sink requirements in this section are suitable for most food kiosk applications. The actual number, size, location, design, and separation of sinks and hand washing facilities on a food kiosk should be based on the conditions of its intended use. The public health authority having jurisdiction may establish additional requirements as necessary for a particular operation with consideration of factors such as menu, food volume, and proximity to other services.

Reason: 5.50 – Sinks was expanded to cover food kiosk. A statement was added to clarify that one sink is supposed to be used for handwashing only. Sink depth is now covered in NSF/ANSI 2. Both food kiosk and carts shall have a minimum of three sinks and that the note will remain as written to indicate the regulatory requirements may differ from requirements in this Standard.

5.38.3 Potable water

A food preparation cart shall have a potable water system that supplies hot and cold potable water and that conforms to the requirements in 5.36.

Reason: Language relocated to 5.47.

5.38.4 Waste holding system

Food preparation carts shall be equipped with a waste holding system that conforms to the requirements in 5.37.

6 Performance

6.1 In-place cleaning and sanitization procedures

6.1.1 Performance requirement

In-place cleaning and sanitization procedures recommended by the manufacturer shall effectively clean and sanitize product contact surfaces of the mobile food carts.

Cleaning and sanitization procedures recommended by the manufacturer shall effectively clean and sanitize food contact surfaces.

NOTE – This requirement applies to manual cleaning and sanitizing procedures and to in-place cleaning and sanitizing procedures recommended by the manufacturer.

6.1.2 Test method

Microbiological methods for stock culture preparation, and enumeration/analysis *Escherichia coli* shall be performed as specified in annex B.
6.1.2.1 Materials

- *Escherichia coli* (American Type Culture Collection\(^4\) #11229) and water suspension containing at least 1 x 10^6 CFU/mL (not to exceed 1 x 10^7 CFU/mL);
- sterile, buffered deionized water (SBDW);
- Chromocult\(^5\) Coliform Agar;
- 0.45 micron-pore sterilized, gridded filters; and
- test tubes, petri dishes, etc.

6.1.2.1 The equipment shall be filled with the *E. coli* suspension.

6.1.2.2 Procedure

6.1.2.2.1 Portions of the equipment intended for in-place cleaning shall be filled with the *E. coli* suspension.

The challenge suspension shall be prepared as follows:

a) Reference stock cultures are obtained from lyophilized vials available from ATCC. Reconstitute culture according to instructions and pass to Nutrient Broth (prepared in accordance with AOAC methods). Incubate at 95 °F (35 °C) for 24 h. Streak Nutrient Agar (AOAC) slant in screw cap tube with 24 h broth and incubate at 95 °F (35 °C) for 24 h. This working stock culture may be maintained at 34-41 °F (1–5 °C) for up to one month, at which time culture must be passed to a fresh slant. Discard stock culture after 12 months/passes and reconstitute a new vial.

b) From the working stock culture slant, transfer inoculum to 10 mL Nutrient Broth (AOAC) and incubate at 95 °F (35 °C) for 24 h.

c) Transfer 1 mL from 24-h broth culture to a slant of Nutrient Agar (AOAC) approximately 75 cm\(^2\) in area. Incubate at 95 °F (35 °C) for 24 h.

d) Wash cells from slant surface with 99 mL of SBDW and transfer suspension to a sterile dilution bottle. Estimate the concentration of bacterial cells using an absorbance curve (420 nm). This calibrated suspension must be made up fresh on the day of the test.

e) Adjust the suspension with sterile buffered distilled water to obtain the required *E. coli* density.

6.1.2.2.2 The equipment shall be operated so that food contact surfaces intended for in-place cleaning are exposed to the *E. coli* suspension. The equipment shall then be cleaned and sanitized according to the manufacturer’s instructions and refilled with SBDW. The SBDW shall be dispensed and five 100 mL samples shall be collected at intervals from the start of the dispensing until the unit is empty. When adequate sample volumes cannot be realized, additional SBDW shall be added accordingly. The equipment shall then be operated so that food contact surfaces intended for in-place cleaning are exposed to the SBDW. Sufficient SBDW shall then be dispensed. The challenge organisms present in each sample shall be collected and enumerated using the Standard Total Coliform Membrane Filter Procedure in accordance with APHA’s Standard Methods for the Examination of Water and Wastewater.

6.1.2.2 The equipment shall be operated so that food contact surfaces are exposed to the *E. coli* suspension.

\(^4\) ATCC, 12301 Parklawn Dr., Rockville, MD 20852
\(^5\) EM Science, 480 S. Democrat Rd., Gibbstown, NJ 08027
suspension. The equipment shall then be cleaned in place according to the manufacturer's instructions and refilled with SBDW. The SBDW shall be dispensed and five 100 mL samples shall be collected at intervals from the start of the dispensing until the unit is empty. When adequate sample volumes cannot be realized, additional SBDW shall be added accordingly. The equipment shall then be operated so that food contact surfaces intended for in-place cleaning are exposed to the SBDW. Sufficient SBDW shall then be dispensed. The challenge organisms present in each sample shall be collected and enumerated using the Standard Total Coliform Membrane Filter Procedure in accordance with APHA’s Standard Methods for the Examination of Water and Wastewater.

### 6.1.3 Acceptance criteria

For each sample, $R$ shall be greater than or equal to 6.0, where:

$$R = \log_{10} \left( \frac{N_f}{N_i} \right)$$

and

$N_i =$ initial inoculum density (CFU/mL)

$N_f =$ the number of CFU/mL recovered in each sample

Note: If $N_f < 1$, the samples shall be considered acceptable.

### 6.2 Cold food storage compartments

#### 6.2.1 Performance requirement

Mobile food carts shall be capable of maintaining an air temperature of 40 °F (4 °C) or less in all cold food storage compartment interiors. This requirement applies to enclosed cold food storage compartments, including those that are not mechanically refrigerated. This requirement does not apply to cold food storage compartments on carts intended solely for the service of prepackaged frozen desserts.

#### 6.2.2 Test method

**NOTE** – Testing in accordance with this method is not required for refrigerators in conformance with the performance requirements in NSF/ANSI 7.

A “no-load” test shall be conducted to evaluate the ability of a mobile food cart to maintain an air temperature of 40 °F (4 °C) or less in all cold food storage compartment interiors. Prior to the start of the test, compartments shall be allowed to establish thermal equilibrium according to the manufacturer’s instructions. The test shall be conducted within a test chamber maintained under the following conditions for the duration of the test:

- ambient temperature of 100 ± 3 °F (38 ± 2 °C); and
- no vertical temperature gradient exceeding 1.5 °F per ft (2.5 °C per m).

Air temperatures within each empty compartment shall be monitored using remote temperature sensing devices (thermocouples) accurate to ± 1 °F (± 0.5 °C). The thermocouples shall be positioned as close as possible to the following locations:

- **Thermocouple #1**: (when facing the front of the unit) 5 ± 0.25 in (127 ± 6 mm) from the left interior wall, 2 ± 0.25 in (51 ± 6 mm) above the bottom horizontal plane of the overhead cooling unit, (for units in which the evaporator is not suspended from the ceiling, the thermocouple shall be placed 5 ± 0.25 in [127 ± 6 mm] down from the ceiling) and centered front-to-back.
6.2.3 Acceptance criteria

The temperature at each thermocouple location within each cold food storage compartment shall not exceed 40 °F (4 °C) for the duration of the test.

6.3 Open-top cold food holding equipment

6.3.1 Performance requirement

Mobile food carts shall be capable of maintaining food product in open-top cold food holding areas at a temperatures not greater than of 41 °F (5 °C) or less.

6.3.2 Test method

A test shall be conducted to evaluate the ability of open-top, cold food holding equipment to maintain the temperature of a test medium (water) at 41 °F (5 °C) or less. The test shall be conducted in a test chamber in which the following conditions are maintained for the duration of the test:

- ambient temperature of 100 ± 3 °F (38 ± 2 °C); and
- no vertical temperature gradient exceeding 1.5 °F per ft (2.5 °C per m).

The test unit shall be loaded with uncovered containers filled with 37 ± 2°F (3 ± 1 °C) water to a level ½ in (13 mm) below the upper rim. The containers shall be stainless steel pans, unless alternate type containers are provided as a component of the food cart. The water temperature shall be monitored at the center of each pan approximately 1 in (25 mm) below the water surface using a remote sensing device (thermocouple) accurate to ± 1 °F (± 0.5 °C). Prior to initiating the test period, the temperature of the water in each pan shall be 37 ± 2°F (3 ± 1 °C). The water temperature shall be recorded every 30 min over an 8-h test period.

6.3.3 Acceptance criteria

The temperature of the medium contained in open-top cold food holding equipment shall not exceed 41 °F (5 °C) for the duration of the test.
6.4 Hot food holding compartments

6.4.1 Performance requirement

Mobile food carts shall be capable of maintaining an internal air temperature of 150 °F (65 °C) or greater in all enclosed hot food holding compartments. There shall be no thermal stratification in cabinet air temperature greater than 25 °F (14 °C) within a heated compartment.

6.4.2 Test method

A “no-load” test shall be conducted to evaluate the ability of enclosed hot food storage compartments to maintain an adequate internal temperature without excessive thermal stratification. Prior to the start of the test, compartments shall be allowed to establish thermal equilibrium according to the manufacturer’s instructions. The test shall be conducted evaluated within a test chamber maintained under the following conditions for the duration of the test:

- ambient temperature of 40 ± 3 °F (4 ± 2 °C); and
- no vertical temperature gradient exceeding 1.5 °F per ft (2.5 °C per m).

The equipment shall be preheated in accordance with the manufacturer’s operating instructions or shall be allowed to cycle on and off at least 2 full cycles.

Air temperatures within each empty compartment shall be monitored using remote temperature sensing devices (thermocouples) accurate to ± 1 °F (± 0.5 °C). The thermocouples shall be positioned as close as possible to the follow locations:

- **Thermocouple #1:** (when facing the front of the unit) 5 ± 0.25 in (127 ± 6 mm) from the left interior wall, 5 ± 0.25 in (127 ± 6 mm) below down from the ceiling and centered front-to-back.

- **Thermocouple #2:** centered front-to-back, centered top-to-bottom, centered left-to-right.

- **Thermocouple #3:** (when facing the unit) 5 ± 0.25 in (127 ± 6 mm) from the right interior wall, 5 ± 0.25 in (127 ± 6 mm) above the internal floor of the unit, and centered front-to-back. Each thermocouple shall be at least 0.50 in (13 mm) from any heat conducting surface.

If interior spatial constraints prohibit the placement of thermocouples as specified above, alternate locations shall be selected to comply with the intent of the Standard.

**NOTE** – The intent is for the thermocouples to form a diagonal in the unit while being centered front to back.

The thermocouples shall be in thermal contact with the center of a 1.6 oz (45 g) cylindrical brass slug with a diameter and height of ¾ in (0.75 in, 19 mm). The brass slugs shall be placed at least ½ in (0.50 in, 13 mm) from any heat conducting surface.

The temperature at each thermocouple location shall be recorded at 5-min intervals over a period of 8 h.
6.4.3 Acceptance criteria

The air temperature at each thermocouple location shall be 150 °F (65 °C) or greater during the 8-h for the duration of the test period. At each recording 5-min interval, the difference in air between the temperatures recorded at any two thermocouple locations to another shall not exceed 25 °F (14 °C).

6.1.2 Test method

6.5 Open-top hot food holding equipment

6.5.1 Performance requirement

Mobile food carts shall be capable of maintaining food in open-top hot food holding areas at a temperature of 140 °F (60 °C) or greater. This requirement applies to all non-enclosed hot food holding equipment such as bains-marie, steam tables, heat lamps, and similar equipment.

6.5.2 Test method

A test shall be conducted to evaluate the ability of open-top hot food holding equipment to maintain the temperature of a test medium (water) at 140 °F (60 °C) or greater. The test shall be conducted in a test chamber in which the following conditions are maintained for the duration of the test:

- ambient temperature of 40 ± 3 °F (4 ± 1 °C); and
- no vertical temperature gradient exceeding 1.5 °F per ft (2.5 °C per m).

The test unit shall be preheated in accordance with the manufacturer’s operating instructions before loading the unit.

The test unit shall be loaded to the maximum capacity recommended by the manufacturer. If a unit is comprised of multiple, identical hot food holding wells that are individually heated and have separate controls, only a single well shall be loaded and tested. The remaining identical wells shall be kept empty and shall not be operational during the test.

The food display area shall be loaded with uncovered containers filled with 145 ± 2 °F (63 ± 1 °C) water to a level ¾ in (19 mm) below the upper rim and topped with a 3 mm (⅛ in) layer of vegetable oil to prevent evaporation. The containers shall be stainless steel pans, unless alternate type containers are provided as a component of the food cart.

The water temperature in each pan shall be monitored at the center of the pan, 1 in (25 mm) below the water surface using a remote sensing device (thermocouple) accurate to ± 1 °F (± 0.5 °C). Prior to initiating the test period the test shall be started upon verification that the water temperature at all thermocouple locations is the temperature of the water in each pan shall be between 140 - 145 °F (60 - 63 °C). The temperatures at each thermocouple location shall be recorded every 30 min over an 8-h test period.

6.5.3 Acceptance criteria

The temperature of the medium contained in open-top hot food holding equipment shall be not less than 140 °F (60 °C) or greater throughout the 8-h test duration period.

6.6 Cooking and rethermalization equipment

6.6.1 Performance requirement
Cooking and rethermalization equipment shall be capable of elevating the product temperature of food from 40 °F (4 °C) to 165 °F (74 °C) within a period of 120 min.

**Reason:** Temperature changed to be consistent with NSF/ANSI 4 - Rethermalization test.

### 6.6.2 Test method

A test shall be conducted to evaluate the ability of cooking and rethermalization equipment on a mobile food cart to adequately elevate the temperature of a test media. The test shall determine the time required to elevate the internal temperature of a reproducible test medium from 40 °F (4 °C) to 165 °F (74 °C). The test shall be conducted within a test chamber in which the test media is maintained under the following conditions:

- ambient temperature of 40 ± 3 °F (4 ± 1 °C), and
- no temperature gradient exceeding 1.5 °F per ft (2.5 °C per m).

The temperature of the unit shall be allowed to stabilize in the test chamber prior to loading the unit. Covered pans of media prepared in accordance with Annex A shall be loaded into the unit. The size and number of pans used shall be in accordance with the manufacturer’s loading instructions. The test media shall be 38 ± 2 °F (4 ± 1 °C) when loaded in the test unit. The media temperature in each pan shall be recorded at 5-min intervals starting at the point at which the media in the respective pan reaches 41°F (5 °C). The media temperature in each pan shall be recorded for 120 min or until the temperature reaches 165 °F (74 °C), whichever occurs first. The test may be stopped if the media temperature at any thermocouple location has not reached 165 °F (74 °C) within 120 min.

### 6.6.3 Acceptance criteria

The time required to elevate for the media temperature at each thermocouple location to rise from 41°F (5 °C) to 165 °F (74 °C) shall not exceed 120 min.
Figure 1 – External corners or angles

Channel sections shall be shallow and wide enough to be easily cleanable, with cleanout holes.

Figure 2 – Single panel door
Figure 3 – Openings and rims – food zone

Figure 4 – Perforated false bottom
Figure 5 – Diverting shelves

Figure 6 – Interior fixed shelves

Figure 7 – Rack slides
clearance for cleaning

pipe slot in bottom shelf for service lines

open space

bottom shelf turned up full width to create pipe chase

Figure 8 – Pipe chases

drawers bins and drawer carriages shall be readily removable for cleaning

readily removable drawer pan assembly

no recesses

fabricated drawer pan assembly

Figure 9 – Drawers
Annex A

Test media preparation for cooking and rethermalization equipment

This procedure shall be used to prepare pans of media used in the evaluation of the temperature performance of cooking and rethermalization equipment in accordance with 6.6 of this Standard.

A.1 Pans

The pans used shall be of the size, type, and number recommended in the manufacturer’s operating instructions.

A.2 Media preparation

Add pine sawdust to a height of approximately 1 in (25 mm) below the upper rim of each pan. Slowly add water until the sawdust is saturated and there is a layer of water approximately ¼ in (6 mm) deep on top of the sawdust. Slowly add 100% vegetable oil until a layer approximately ⅛ in (3 mm) thick is formed on top of the water.

A.3 Thermocouple placement

Carefully insert a thermocouple accurate to ± 1 °F (± 0.5 °C) in the geometric center of each pan of media. Cover each pan with a tight-fitting cover.

A.4 Media storage

Refrigerate the pans and maintain a media temperature of 39 ± 2 °F (4 ± 1 °C) until the start of the test.
Annex B

B.1 Summary

E. coli is used as the test organisms for the in-place cleaning test. Presented in this annex are the methods used for suspension preparation, controls and analysis of the challenge organism.

B.2 Equipment

- autoclave, 250 ± 1 °F (121 ± 1 °C);
- incubator, 97 ± 1 °F (36 ± 1 °C);
- refrigerator, 41 ± 3 ºF (5 ± 3 °C);
- water bath 122 ± 1 °F (50 ± 1 °C);
- freezer;
- vortex mixer;
- pH meter;
- colony counter;
- filtration units, autoclavable glass or plastic filtration units;
- sterile filtration apparatus;
- analytical balance;
- bunsen burner;
- blunt tipped forceps;
- hot plate; and
- pipettor.

B.3 Microorganism

Escherichia coli (American Type Culture Collection6 #11229) shall be obtained from: American Type Culture Collection.

B.4 Supplies

- Petri dishes, 50 x 9 mm; sterile;
- pipette tips, 1000 µL and 100 µL; sterile;
- disposable sterile 250 mL polypropylene container;
- test tubes, 16 x 125 mm;
- sterile inoculating loop;
- sterile 0.45 µm mixed cellulose esters membrane filters;
- french squares bottles (250 mL); and
- autoclavable containers capable of holding up to 10 L.

B.5 Reagents

6 ATCC, 12301 Parklawn Dr., Rockville, MD 20852
Sterile buffered dilution water (SBDW) shall be prepared according to the APHA, *Standard Methods for the Examination of Water and Wastewater*, twentieth edition\(^7\) (dilution water: buffered water);

- Sodium Thiosulfate Solution 10% (NaS\(_2\)O\(_3\)). Prepare by adding 100 g reagent grade sodium thiosulfate per 900 mL DI water, and autoclave for 30 min at 250 ± 1 °F (121 ± 1 °C);

- Sodium Hydroxide (NaOH) Solution. 1N shall be used to adjust pH of reagents;

- Hydrochloric Acid (HCl) Solution. 5 N shall be used to adjust pH of reagents;

- Neutralizer stock solution. Mix 40 gm lecithin, 280 mL Tween 80, and 1.25 mL phosphate buffer together with 1L distilled water. Adjust pH to 7.2. Dispense into 100 mL portions and autoclave 15 min at 250 ± 1 °F (121 ± 1 °C); and

- Phosphate buffer solution shall be prepared according to the *Standard Methods for the Examination of Water and Wastewater* (dilution water: buffered water).

### B.6 Safety precautions and hazards

**B.6.1** Steam sterilized samples and equipment are to be handled with protective gloves when being removed from the autoclave.

**B.6.2** Cryogenic culture vials are to be handled with cryoprotective gloves.

**B.6.3** All microbiological samples and contaminated test supplies are to be steam sterilized to 250 ± 1 °F (121 ± 1 °C) at 15 psi for a minimum of 20 min prior to being discarded.

### B.7 Growth medium

**NOTE 1** – Common bacteriological mediums may be purchased from bacteriological medium manufacturers and prepared according to the manufacturer’s instructions.

**NOTE 2** – The quality of the growth media shall be monitored by examining growth promotion and sterility prior to use.

**B.7.1 TSB (Tryptic Soy Broth)**

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<th>Amount</th>
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</thead>
<tbody>
<tr>
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<td>soytone</td>
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<tr>
<td>dextrose</td>
<td>0.25 g</td>
</tr>
<tr>
<td>sodium chloride</td>
<td>0.5 g</td>
</tr>
<tr>
<td>dipotassium phosphate</td>
<td>0.25 g</td>
</tr>
<tr>
<td>DI water</td>
<td>100 mL</td>
</tr>
<tr>
<td>pH</td>
<td>7.3 ± 0.2</td>
</tr>
</tbody>
</table>

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\(^7\) American Public Health Association (APHA), 800 I Street, NW, Washington, DC 20001
TSB shall be dissolved by boiling and adjusted to final pH. 8-mL aliquots shall be dispensed into 16 x 150 mm test tubes. TSB shall be autoclaved at 121 ± 1 °C (250 ± 1 °F) at 15 psi for 20 min. Cooled broth shall be stored at 5 ± 1 °C (41 ± 1 °F).

### B.7.2 TSA (Tryptic Soy Agar)

<table>
<thead>
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</thead>
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<tr>
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</tr>
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</tr>
<tr>
<td>bacto-agar</td>
<td>7.5 g</td>
</tr>
<tr>
<td>DI water</td>
<td>500 mL</td>
</tr>
<tr>
<td>pH</td>
<td>7.3 ± 0.2</td>
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</table>

TSA shall be dissolved by boiling, adjusted to final pH, and autoclaved at 121 ± 1 °C (250 ± 1 °F) at 15 psi for 20 min. Tempered media shall be poured into sterile petri dishes. Agar plates shall be stored at 5 ± 1 °C (41 ± 1 °F). Plates shall be allowed to come to room temperature before use.

### B.7.3 Coliform growth media

#### B.7.3.1 Coliscan® MF

Broth shall be purchased from the manufacturer. Broth shall be dispensed in 1.75 to 2 mL quantities into lower section of 50 x 9 mm sterile plastic petri dishes with pad. Broth shall be stored at 5 ± 1 °C (41 ± 1 °F).

#### B.7.3.2 CHROMagar®

Agar shall be prepared according to manufacturer's directions. It shall be brought to a boil and cooled to 45 ± 1 °C (113 ± 1 °F). Agar shall be dispensed in 4 to 5 mL quantities into lower section of 50 x 9 mm sterile plastic petri dishes.

### B.8 Culture of *E. coli*

#### B.8.1 Stock culture preparation

a) *E. coli* #11229 shall be obtained from ATCC.

b) Stock culture shall be rehydrated with TSB and maintained in TSB. The culture shall then be incubated at 36 ± 1 °C (97 ± 1 °F).

c) This working stock culture may be maintained at 3°C ± 2°C for up to one month, at which time the culture shall be passed to a new TSB tube. Working stock culture shall be discarded after 12 months/passages and a new vial reconstituted from ATCC.

#### B.8.2 Challenge culture preparation

a) 1 ml of the stock culture shall then be transferred to a TSA slant prepared in a French bottle with a surface approximately 75 cm² in area. The media shall then be incubated at 97 ± 1 °F (36 ± 1 °C) for 24 h.

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8 Micrology Laboratories, 1303 Eisenhower Dr., S. Goshen, IN 46526-5360

9 Trademark by Dr. A. Rambach: Available from multiple sources
b) Cells shall be washed from agar surface with 5 ml of SBDW. Agar surface shall be scraped with sterile disposable loops.

c) 0.5 mL of *E. coli* culture suspension shall be pipetted into 4 L of SBDW. This will give a density of 1 to 5\(\times\)10^6 colony forming units (CFU) per mL.

**B.8.3 Enumeration**

a) For each test sample, 100 mL, and 10mL sample shall be aseptically processed using the membrane filter technique. A mixed cellulose ester membrane with a pore size of 0.45 µm shall be utilized. Test sample shall be plated on ColiScan® or CHROMagar®, invert, and incubate at 97 ± 1 °F (36 ± 1 °C) for 24 h.

b) After incubation, plates containing 20 – 200 distinct colony forming units (CFU) shall be enumerated using a Colony Counter. Results shall be expressed as the number of CFU/100 mL.

**B.8.4 Negative control**

a) For the negative control samples, a 100 mL sample shall be aseptically processed using the membrane filter technique. A mixed cellulose ester membrane with a pore size of 0.45 µm shall be utilized. Test sample shall be plated on ColiScan® or CHROMagar®, invert, and incubate at 97 ± 1 °F (36 ± 1 °C) for 24 h.

b) After incubation, plates containing 20 – 200 distinct colony forming units (CFU) shall be enumerated using a Colony Counter. Results shall be expressed as the number of CFU/100 mL.

**B.8.5 Positive challenge culture control**

a) For the positive challenge control samples, make serial dilutions of the samples (10^0–10^-4) using SBDW. Aseptically process 10^-4 and 10^-5 dilutions using the membrane filter technique. Test sample shall be plated ColiScan® or CHROMagar®, invert, and incubate at 97 ± 1 °F (36 ± 1 °C) for 24 h.

b) After incubation, plates containing 20 – 200 distinct colony forming units (CFU) shall be enumerated using a Colony Counter. Results shall be expressed as the number of CFU/100 mL.