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Mobile food carts

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Foreword

The purpose of this Standard is to establish minimum food protection and sanitation requirements for the materials, design, construction, and performance of mobile food carts.

This edition of the Standard contains the following revision:

**Issue 7**

This revision updated normative references in section 2 and “boilerplate” language in sections 4.4 and 5.22.

This Standard was developed by the NSF Joint Committee on Food Equipment using the consensus process described by the American National Standards Institute.

Suggestions for improvement of this Standard are welcome. This Standard is maintained on a Continuous Maintenance schedule and can be opened for comment at any time. Comments should be sent to Chair, Joint Committee on Food Equipment at standards@nsf.org or, c/o NSF International, Standards Department, P.O. Box 130140, Ann Arbor, Michigan 48113-0140, USA.

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NSF International Standard
for Food Equipment –

Mobile food carts

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 and their related components.

1.2 Scope

This Standard contains requirements for mobile food carts and their related components and materials. This Standard applies to mobile food carts 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.

Food cart components covered under 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.

1.3 Alternate materials, design, and construction

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

1.4 Measurement

Decimal and SI conversions provided parenthetically shall be considered equivalent. Metric conversions and significant figure rounding 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. The most recent published edition of the document shall be used for undated references.

40 C.F.R. §180.940 Tolerance exemptions for active and inert ingredients for use in antimicrobial formulations (Food-Contact Surface Sanitizing Solutions)³

ANSI/ASSE 1001 – 2008. *Atmospheric Type Vacuum Breakers*\(^4\)

ANSI/ASSE 1020 – 2004. Pressure Vacuum Breaker Assembly\(^4\)

ANSI/ASSE 1022 – 2003. Backflow Preventer for Beverage Dispensing Equipment\(^4\)

ANSI/ASSE 1024 – 2004. Dual Check Backflow Preventers\(^4\)

APHA *Standard Methods for the Examination of Water and Wastewater, 22nd Edition*\(^5\)

ASSE 1032 – 2004(R2011). Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type\(^4\)

IAPMO – *Uniform Plumbing Code 2015*\(^6\)

ICC – *International Plumbing Code 2015*\(^7\)


NSF/ANSI 2. Food equipment

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

NSF/ANSI 7. Commercial refrigerators and storage freezers

NSF/ANSI 51. Food equipment materials

NSF/ANSI 170. *Glossary of food equipment terminology*


### 3 Definitions

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

### 4 Materials

The requirements contained in this section are intended to protect food from contamination and ensure that the materials used in the manufacture of food handling and processing equipment resist wear; penetration by vermin; and the effects of foods, heat, cleaning compounds, sanitizers, and other substances that may contact the materials in the intended use environment. Materials used in unexposed non-food zone areas shall be exempt from all requirements in 4.

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\(^4\) ASSE International Office, 18927 Hickory Creek Drive, Suite 220, Mokena, IL 60448 <www.asse-plumbing.org>.

\(^5\) American Public Health Association, 800 I St. NW, Washington, DC 20001 <www.apha.org>.

\(^6\) International Association of Plumbing and Mechanical Officials, 5001 E. Philadelphia St., Ontario, CA 91761 <www.iapmo.org>.

\(^7\) International Code Council, 5203 Leesburg Pike, Suite 600; Falls Church, VA 22041 <www.iccsafe.org>.

\(^8\) ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428 <www.astm.org>.

4.1 Conformance with NSF/ANSI 51

Materials shall conform to the requirements in NSF/ANSI 51 applicable to the zone in which the material is used.

4.2 Solder

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

4.3 Sound dampening material

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

4.4 Sealants

Sealants shall meet the requirements for the zone of intended use and shall only be used as permitted in 5.4.4, 5.5.2 and 5.32.

5 Design and construction

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

5.1 General sanitation

5.1.1 Mobile food carts shall be designed and manufactured to prevent the harborage of vermin and the accumulation of dirt and debris, and to permit the inspection, maintenance, servicing, and cleaning of the equipment and its components.

5.1.2 Mobile food carts 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.

5.1.4 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 other acceptable inspection methods. 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 §180.940³.

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.
5.2 Internal angles and corners, food zone

5.2.1 All internal angles or corners of less than 135° shall be smooth and have radius as set forth below:

5.2.1.1 At the intersection of two planes, which result in one angle or corner, the radius shall not be less than 1/8 in (0.13 in, 3.2 mm).

5.2.1.2 At the intersection of three planes, which result in three angles or corners, the radii for two of the angles or corners shall not be less than 1/8 in (0.13 in, 3.2 mm) and the radius of the third angle or corner shall not be less than 1/4 in (0.25 in, 6.4 mm).

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

5.2.3 For materials other than metal, the radii specified in 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 to or better than the parent material.

5.3 External angles and corners

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

5.4 Joints and seams

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 (see figure 1b).

5.4.4 Sealants shall only be used to seal joints and seams that are structurally sound and are less than 1/8 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 Equipment shall be designed and manufactured so that field joints may be made sanitary with the use of trim strips, welding, soldering, properly designed draw fastening, or other appropriate methods (see figure 2).

5.5 Fasteners

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 that 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. Exposed threads on electrical cord strain relief devices in non-food zone shall be exempt.

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

5.6 Insulation

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

5.7 Reinforcing and framing

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 (see figure 3).

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.

5.8 Inspection and maintenance panels

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

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 channel sections on single panel doors shall be inverted or easily cleanable. Clean-outs shall be provided if channels are not inverted (see figure 3).

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 (see figure 4).

5.9.5 Door gaskets

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.
5.10 Door tracks and guides

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.

5.11 Door closers, handles, knobs, and pulls

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

5.11.2 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.

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

5.12 Hinges

5.12.1 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.

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

5.12.3 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).

5.12.4 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 shall be lift-off style or have a removable pin;
- the diameter of the hinge pin shall be greater than or equal to 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 1/8 in (0.13 in, 3.2 mm).

5.13 Covers

5.13.1 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.
5.13.2 Covers having slotted openings designed to allow serving utensils to remain in the food shall be exempt from 5.13.1. Slotted openings shall be no larger than 1½ x 1 in (38 x 25 mm) and shall be protected by a raised rim of at least 3/16 in (0.19 in, 5.0 mm).

5.13.3 Port openings through a food zone cover shall be flanged upward at least 3/16 in (0.19 in, 5.0 mm) and shall have a cover overlapping the flange.

5.13.4 Hinges and pivots shall conform to 5.12.

5.13.5 Covers shall be readily removable and easily cleanable.

5.13.6 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.

5.13.7 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 1/8 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.

5.14 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 (e.g., cabinet body), the following requirements shall apply:

— the nosing shall be integral with the shelf or unit top; and
— the edge shall be deburred; and
— the nosing and adjoining vertical surface shall be closed or shall have a clearance of at least 3/4 in (0.75 in, 19 mm) or 1/3 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 1/2 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.

5.15 Openings into food zones

Openings into food zones shall be protected to prevent the entry of seepage, condensation, and spills. In areas where liquids may accumulate, top openings into food zones shall be protected by a raised rim that extends at least 3/16 in (0.19 in, 5.0 mm) above the liquid level (see figure 5).

5.16 Entry ports

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

5.17 Louvers

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

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

5.17.3 Louvers shall be deburred and shall have spaces large enough to allow for easy cleaning.
5.17.4 Screening on louvered openings, if provided, shall be 16 mesh (16 strands per 1.0 in [25 mm]) or greater and removable.

5.18 Hardware

Hardware shall be smooth, easily cleanable, and corrosion resistant. Hardware shall not have open seams, recesses, or unnecessary projections.

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.

5.20 Breaker strips

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.

5.21 Equipment mounting

Mobile food carts shall be mounted on casters, rollers, gliders, or wheels to facilitate manual transport. Casters, rollers, gliders and wheels shall conform to 5.22.

5.22 Casters and gliders

5.22.1 Casters and gliders shall conform to NSF/ANSI 2, except that spoked wheels may be used and tread surfaces need not be smooth. Wheels shall not extend into serving areas.

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

5.22.3 Grease fittings shall be acceptable.

5.23 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.

5.24 Counter tray slides

Counter tray slides may be of solid or tubular construction.

5.25 Shelving

5.25.1 Shelving shall be easily cleanable.
5.25.2 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 6).

5.25.3 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 to 5.2 (see figure 7).

5.25.4 Where knockdown 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 knockdown shelving, joints and seams shall be either sealed or accessible for cleaning, and shall be capable of being completely drained.

5.25.5 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 8).

5.25.6 Support brackets and pilasters for readily removable shelving and adjustable shelving shall be readily removable or easily cleanable as installed (see figure 9).

5.26 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.

5.27 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 10).

5.28 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.

5.29 Food and flatware containers and drawers

Containers for dispensing flatware shall be readily removable and easily cleanable. Containers shall be constructed so that flatware can be picked up by handles only, with other portions of the flatware covered and protected from handling.

5.30 Insets

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 5.13.
5.31 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.

5.32 Ice pans and bins
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 1/8 in (0.13 in, 3.2 mm). Solder may be used to affect a required radius.

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

5.32.2 A cover meeting the requirements of 5.13 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.

5.32.3 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 ½ in (2.0 cm) Iron Pipe Size (IPS) or equivalent shall be provided in the ice storage bin. The drain opening shall be located to permit complete draining of the bin.

5.32.4 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."

5.33 Food display cases
Inside walls, ceilings, and floors of food display cases shall conform to splash zone design and construction requirements; however, materials shall conform to food zone material requirements of NSF/ANSI 51, section 4.1. Where sliding doors are used to enclose one or more sides of a display case, they shall be readily removable. Hinged or pivoted-type doors need not be removable if they are easily cleanable.

5.34 Sinks
Food preparation carts shall have at least two sink compartments. Each 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.

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.

5.35 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 shall comply with 4.3.
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 that 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 — Splash backs and aprons for underbar equipment may be sealed to the tops with the use of acceptable fillet material.

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.

5.38 Breakable glass components

5.38.1 Fixtures and devices that, if impacted, may 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 shall conform to the requirements in NSF/ANSI 51 applicable to the zone in which the glass is used.

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.

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 5.16. 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]).

5.40 Cutting boards

If provided, cutting boards shall be readily removable and shall conform to wood-top bakers table, synthetic bakers table and cutting board requirements of NSF/ANSI 2.

5.41 Plumbing connections

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

5.41.2 Water and waste piping and connections shall comply with the ICC International Plumbing Code\(^7\) (IPC), International Code Council (ICC) or the Uniform Plumbing Code\(^6\) (IAPMO/ANSI UPC), International Association of Plumbing and Mechanical Officials (IAPMO).

5.41.3 Waste lines shall not drain into or through a food zone.
5.42 Backflow prevention

5.42.1 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\textsuperscript{4}, Atmospheric Type Vacuum Breakers (for intermittent pressure conditions); or

— a vacuum breaker that conforms to ANSI/ASSE 1020\textsuperscript{4}, Pressure Vacuum Breaker Assembly (for continuous pressure conditions); or

— a backflow prevention device that conforms to ANSI/ASSE 1022\textsuperscript{4}, Backflow Preventer for Beverage Dispensing Equipment; or

— a backflow prevention device that conforms to ANSI/ASSE 1024\textsuperscript{4}, Dual Check Backflow Preventers; or

— a backflow prevention device that conforms to ASSE 1032\textsuperscript{4}, Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type; or

— 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.

5.42.2 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.

5.43 Potable water system

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

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

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

5.43.3 Water storage tanks, if provided, shall have a minimum capacity of 5 gal (18.9 L) each. The storage tank capacity shall be indicated directly on the tank or on the data plate of the cart.

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

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

5.43.6 Water storage tanks shall be readily removable or shall be sloped at least $1/2$ 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 $1/2$ in (13 mm).

5.43.7 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.

5.44 Wastewater holding systems

5.44.1 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 shall not apply if the cart is equipped with an automated system that disables the water supply when the waste holding tank is full.

5.44.2 Interior surfaces of a waste holding tank shall be smooth.

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

5.44.4 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.

5.45 Waste receptacles

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

5.46 Hot food storage and preparation equipment

5.46.1 Cooking equipment, rethermalization equipment, and powered hot food storage equipment, if provided, shall conform to the design and construction requirements of NSF/ANSI 4.

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

5.47 Fuel burning devices

5.47.1 All fuel-burning devices shall be vented.

5.47.2 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.

5.48 Mechanical refrigeration

Mechanical refrigeration equipment, if provided, shall conform to the design and construction requirements of NSF/ANSI 7.

5.49 Food protection

5.49.1 Food service and display areas of food preparation on carts and shall be protected by food shields that conform to NSF/ANSI 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.

5.49.3 Food preparation areas on mobile food carts intended for indoor use only 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.

5.50 Linings

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

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

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

6 Performance

6.1 Cleaning and sanitization procedures

6.1.1 Performance requirement

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 of *Escherichia coli*, shall be performed as specified in Annex A.

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

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

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

and

\[
N_i = \text{Initial inoculum density (CFU/mL)}
\]

\[
N_f = \text{The number of CFU/mL recovered in each sample.}
\]

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 evaluated 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.

— **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.

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.

6.2.3 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 product in open-top cold food holding areas at a temperature not greater than of 41 °F (5 °C).

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 requirements

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).

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 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 following 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) 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 temperature at each thermocouple location shall be 150 °F (65 °C) or greater for the duration of the test. At each 5-min interval, the difference between the temperatures recorded at any two thermocouple locations shall not exceed 25 °F (14 °C).

### 6.5 Hot food holding compartments

#### 6.5.1 Performance requirements

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).

#### 6.5.2 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 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) 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.

### 6.5.3 Acceptance criteria

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

### 6.6 Open-top hot food holding compartments

#### 6.6.1 Performance requirements

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.

#### 6.6.2 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 ± 2 °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 $145 \pm 2 \, ^\circ \text{F} (63 \pm 1 \, ^\circ \text{C})$ water to a level $\frac{3}{4}$ in (19 mm) below the upper rim and topped with a 3 mm (¼ 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 $\pm 1 \, ^\circ \text{F} (\pm 0.5 \, ^\circ \text{C})$. The test shall be started upon verification that the water temperature at all thermocouple locations is 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.

### 6.6.3 Acceptance criteria

The temperature of the medium contained in open-top hot food holding equipment shall be 140 °F (60 °C) or greater throughout the 8-h test period.

### 6.7 Cooking and rethermalization equipment

#### 6.7.1 Performance requirements

Rethermalization equipment shall be capable of elevating product temperature from 40 °F (4 °C) to 165 °F (74 °C) within a period of 120 min.

#### 6.7.2 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 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 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 test may be stopped if the media temperature at any thermocouple location has not reached 165 °F (74 °C) within 120 min.

#### 6.7.3 Acceptance criteria

The time required 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 1a – External corners or angles

Figure 1b – Examples of joints and seams formed by Overlapping sheets of metal
Channel sections shall be shallow and wide enough to be easily cleanable, with cleanout holes.

Figure 3 – Single panel door
Figure 4 – Glass doors

Figure 5 – Openings and rims – food zone
Legs must be closed against underside of top

Corner or flange notched to permit cleaning or closed tight

Sectional removable false bottoms

Channel bracing

Space to facilitate cleaning

Figure 6 – Perforated false bottom

Figure 7 – Diverting shelves

closed – turned up

1.0 in (25 mm) minimum

sealed down

Figure 8 – Interior fixed shelves
Figure 7 – Diverting shelves readily removable or easily cleanable as installed

Rack slides must be readily removable for cleaning or easily cleanable as installed

Figure 9 – Rack slides

Figure 10 – Pipe chases

Clearance for cleaning
Pipe slot in bottom shelf for service lines

Open space
Bottom shelf turned up full width to create pipe chase
Annex A
(normative)

Methods for preparing and analyzing in-place cleaning bacteria surrogate

A.1 Summary

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

A.2 Equipment

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

A.3 Microorganism

_Escherichia coli_ (American Type Culture Collection #11229) shall be obtained from American Type Culture Collection, P. O. Box 1549, Manassas, VA 20108.

A.4 Supplies

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

A.5 Reagents

- Sterile buffered dilution water (SBDW) shall be prepared according to the _Standard Methods for the Examination of Water and Wastewater_ (dilution water: buffered water); and
— Sodium Thiosulfate Solution 10% (Na$_2$S$_2$O$_3$) shall be prepared by adding 100 g reagent grade sodium thiosulfate per 900 mL DI water, and autoclaved for 30 min at 121 ± 1 °C (250 ± 1 °F); and

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

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

— Neutralizer stock solution shall be prepared as follows: 40 gm lecithin, 280 mL Tween 80, and 1.25 mL phosphate buffer shall be mixed together with 1L distilled water. pH shall be adjusted to 7.2. Solution shall be dispensed into 100-mL portions and autoclaved 15 min at 121 ± 1 °C (250 ± 1 °F); and

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

**A.6 Safety precautions and hazards**

A.6.1 Steam sterilized samples and equipment shall be handled with protective gloves when being removed from the autoclave.

A.6.2 Cryogenic culture vials shall be handled with cryoprotective gloves.

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

**A.7 Growth medium**

NOTE 1 — Common bacteriological media 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.

A.7.1 TSB (Tryptic Soy Broth)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>tryptone</td>
<td>1.7 g</td>
</tr>
<tr>
<td>soytone</td>
<td>0.3 g</td>
</tr>
<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>

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).
A.7.2  TSA (Tryptic Soy Agar)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>tryptone</td>
<td>7.5 g</td>
</tr>
<tr>
<td>soytone</td>
<td>2.5 g</td>
</tr>
<tr>
<td>sodium chloride</td>
<td>2.5 g</td>
</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>
</tr>
</tbody>
</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.

A.7.3  Coliform growth media

A.7.3.1  Coliscan™ MF (membrane filter) medium

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).

A.7.3.2  CHROMagar® culture medium

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.

A.8  Culture of *E. coli*

A.8.1  Stock culture preparation

a)  *E. coli* #11229 shall be obtained from ATCC.\(^{12}\)

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 ± 2 °C (37.4 ± 1 °F) 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.

A.8.2  Challenge culture preparation

a)  1 mL of the stock culture shall be transferred to a TSA slant prepared in a French bottle with a surface approximately 75 cm\(^2\) in area. The media shall then be incubated at 36 ± 1 °C (97 ± 1 °F) for 24 h.

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\(^{10}\) Micrology Laboratories, LLC, PO Box 340, Goshen, IN 46527-0340 <www.micrologylabs.com>.

\(^{11}\) Trademark by Dr. A. Rambach; available from multiple sources

\(^{12}\) American Type Culture Collection (ATCC), PO Box 1549, Manassas, VA 20108 <www.atcc.org>.
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.

**A.8.3 Enumeration**

a) For each test sample, one 100-mL and 10-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 used. Test sample shall be plated on ColiScan®/CHROMagar®, inverted, and incubated at 36 ± 1 °C (97 ± 1 °F) 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.

**A.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 used. Test sample shall be plated on ColiScan®/CHROMagar®, inverted, and incubated at 36 ± 1 °C (97 ± 1 °F) for 24 h.

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

**A.8.5 Positive challenge culture control**

a) For the positive challenge control samples, serial dilutions of the samples ($10^0$-$10^4$) shall be made using SBDW. $10^{-4}$ and $10^{-5}$ dilutions shall be aseptically processed using the membrane filter technique. Test sample shall be plated on ColiScan®/CHROMagar®, inverted, and incubated at 36 ± 1 °C (97 ± 1 °F) 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.
Annex B
(normative)

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 6.7 of this Standard.

B.1 Pans

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

B.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 (6mm) deep on top of the sawdust. Slowly add 100% vegetable oil until a layer approximately 1/8 in (3mm) thick is formed on top of the water.

B.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.

B.4 Media storage

Refrigerate the pans and maintain a media temperature of 39 ± 2 °F (4 ± 1 °C) until the start of the test.
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### Food Equipment Joint Committee

#### Annex C\(^3\) (informative)

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1\(^1\)Committee or task group chair

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\(^3\) The information contained in this annex is not part of the American National Standard (ANS) and has not been processed in accordance with ANSI’s requirements for ANS. As such, this annex may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

\(^4\) Food Equipment Joint Committee members on the date of publication - subject to change 1/25/2017
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The following standards established and adopted by NSF as minimum voluntary consensus standards are used internationally:

- Food equipment
- Commercial warewashing equipment
- Commercial cooking, rethermalization, and powered hot food holding and transport equipment
- Water heaters, hot water supply boilers, and heat recovery equipment
- Dispensing freezers
- Commercial refrigerators and freezers
- Commercial powered food preparation equipment
- Automatic ice making equipment
- Refuse processors and processing systems
- Plastics piping system components and related materials
- Manual food and beverage dispensing equipment
- Commercial bulk milk dispensing equipment
- Thermoplastic refuse containers
- Plumbing system components for recreational vehicles
- Vending machines for food and beverages
- Detergent and chemical feeders for commercial spray-type dishwashing machines
- High pressure decorative laminates (HPDL) for surfacing food service equipment
- Dinnerware
- Air curtains for entranceways in food and food service establishments
- Residential wastewater treatment systems
- Non-liquid saturated treatment systems
- Drinking water treatment units – Aesthetic effects
- Drinking water treatment units – Health effects
- Reverse osmosis drinking water treatment systems
- Mobile food carts
- Drinking water treatment chemicals – Health effects
- Drinking water system components – Health effects
- Drinking water distillation systems
- Sustainable carpet assessment
- Special purpose food equipment and devices
- Glossary of food equipment terminology
- Dietary supplements
- Shower filtration systems – Aesthetic effects
- Residential dishwashers
- Ozone generators
- Conformity assessment requirements for certification bodies that certify products pursuant to NSF/ANSI 60: Drinking water treatment chemicals – health effects
- Drainfield trench product sizing for gravity dispersal onsite wastewater treatment and dispersal systems
- Wastewater treatment systems
- Liquid saturated treatment systems
- Chemicals and processes information
- Goldenseal root (Hydrastis canadensis)
- Glossary of drinking water treatment unit terminology
- Sustainability assessment for resilient floor coverings
- Sustainability assessment for commercial furnishings fabric
- Sustainability assessment for wallcovering products
- Sustainability assessment for single ply roofing membranes
- Onsite residential and commercial wastewater treatment systems
- Onsite residential and commercial greywater treatment systems for subsurface discharge
- Greener chemicals and processes information
- Polyethylene pipe and fittings for water-based ground-source “geothermal” heat pump systems
- Polyethylene pipe and fittings for water-based ground-source “geothermal” heat pump systems
- Valves for crosslinked polyethylene (PEX) water distribution tubing systems
- Wastewater treatment systems – Field performance verification
- Good Manufacturing Practices (GMP) for Pharmaceutical Excipients
- Drinking water treatment system components – Lead content
- Drinking water treatment units – Emerging compounds / incidental contaminants
- Sustainability Assessment for Water Treatment Chemical Products
- Residential wastewater effluent filters longevity testing
- Public Drinking Water Equipment Performance – Filtration
- Hygiene requirements for the design of meat and poultry processing equipment
- Hygiene requirements for the design of hand held tools used in meat and poultry processing equipment
- Hygiene requirements for the design of mechanical belt conveyors used in meat and poultry processing equipment

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THE HOPE OF MANKIND rests in the ability of man to define and seek out the environment which will permit him to live with fellow creatures of the earth, in health, in peace, and in mutual respect.