NSF/ANSI International Standard for Food Equipment —
Commercial cooking, rethermalization, and powered hot food holding and transport equipment

1 General

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.

Reason: At the 2011 annual Joint Committee meeting, the proposed modification was motioned as written to ballot (FE-2010-12).

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.

Reason: Language clarifies undated references. This statement is being added to all NSF Standards.

USEPA Code of Federal Regulations, Title 40, Section 180.940, (40 C.F.R. §180.940) Tolerance exemptions for active and inert ingredients for use in antimicrobial formulations (Food-Contact Surface Sanitizing Solutions)


ANSI/ASSE 1001 – 2002, 2008 Performance Requirements for Atmospheric Type Vacuum Breakers

ANSI/ASSE 1020 – 2004, Performance Requirements for Pressure Vacuum Breaker Assembly

1 American National Standards Institute, 25 West 43rd Street, New York, NY 10036 www.ansi.org

4.6 Beverage equipment

Beverage equipment having brass or bronze components in contact with tea, coffee, or water (as permitted under NSF/ANSI 51) shall not impart a lead (Pb) concentration greater than 15 µg/L when tested in accordance with annex B NSF/ANSI 51.

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3 American Public Health Association, 800 I Street, NW, Washington, DC 20001

4 British Standard, 389 Chiswick High Road, London W4 4AL United Kingdom www.bsi-global.com

5 International Association of Plumbing and Mechanical Officials, 5001 E. Philadelphia St., Ontario, CA 91761 www.iapmo.org

6 International Code Council, 5203 Leesburg Pike, Suite 600; Falls Church, VA 22041 www.iccsafe.org
5 Design and construction

Unless otherwise specified, the interiors of heated compartments, such as those in ovens, steam cookers, pressure cookers, proofing cabinets, rethermalization equipment, hot food transport cabinets, and hot food holding cabinets, shall conform to the splash zone design and construction requirements of this Standard. Food zone material requirements shall apply.

**NOTE** - For floorless walk-in or roll-in equipment, food zone material requirements shall not apply to the floor.

**Reason:** NSF/ANSI 4 requires that proofing cabinets have food zone materials in the heated compartment. Floorless proofers are different because the floor of the enclosure is any surface that the equipment is installed on. The floor is not part of the equipment, and the resulting surface may or may not meet food zone material requirements. Therefore, language has been added to clarify the type of floor for floorless ovens and proofing cabinets. Additional product literature is also proposed as a new Section 8 for NSF/ANSI 4.

5.4 Joints and seams

5.4.7 Walk-in or roll-in equipment without prefabricated floors shall be manufactured so that the seams formed between the walls and floor or base may be closed and sealed upon assembly of the equipment.

**Reason:** Requirements regarding the seams between the walls and floors were added for clarification.

5.13.5 All surfaces on the underside and beneath covers shall be readily removable accessible and easily cleanable.

**Reason:** At the 2011 annual Joint Committee meeting, the proposed modification was motioned as written to ballot (FE-2010-31).

5.25 Enclosed spaces

Enclosed spaces shall be sealed or shall have removable access panels. Removable panels shall be provided where condensations is likely to occur within an enclosed space.
This requirement shall not exclude openings provided in the cavity of a microwave oven to facilitate the movement of air or energy.

Reason: Microwave oven cavities are constructed with sections of punched openings to allow microwave energy to enter the oven cavity. Openings in the cavity may also be provided for the movement of air (convection). While food and moisture can pass through these openings, because of safety considerations, these areas are not accessible to the end user.

5.29 Breakable glass components

5.29.3 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 ANSI/UL 197, or to the impact test within BS857:1967. Glass shall conform to the requirements in NSF/ANSI 51 applicable to the zone in which the glass is used.

Reason: Glass materials requirements were moved to NSF/ANSI 51 & a pointer placed in the FE Family of Standards (FE-2008-14).

5.45 Hot food holding equipment and hot food transport cabinets

5.45.5 Hot food holding cabinets intended solely for the display of foods that are not potentially hazardous shall have a permanently attached label that states: “Not for the storage or display of potentially hazardous foods.” The label shall be clearly visible to the user after installation of the equipment.

Reason: The proposed marking is intended to address heated cabinets intended to hold different types of non-potentially hazardous foods, such as pretzels, cookies, nacho chips, and so forth, to clarify the intended use of such products.

6 Performance

6.1 Enclosed hot food holding equipment and hot food transport cabinets
6.1.1 Performance requirement

Enclosed hot food holding equipment and hot food transport cabinets shall be capable of maintaining an internal air temperature of 150 °F (65 °C) or greater when tested in accordance with 6.1.2. There shall be no stratification in cabinet air temperature greater than 25 °F (14 °C).

NOTE 1 – Hot food holding wells in display cases shall conform to 6.2.1 of this Standard. If the case is also designed for holding hot food in the enclosed air space above the wells, 6.1.1 shall also apply.

NOTE 2 – These requirements shall also apply to ovens designed to hold hot food after cooking is complete.

NOTE 3 – These requirements shall not apply to proofing boxes and proofing cabinets.

NOTE 4 – These requirements shall not apply to heated food holding equipment marked “Not for the storage or display of potentially hazardous foods.” The marking shall be permanent and clearly visible to the user upon installation of the equipment.

Reason: It is proposed that products not intended to hold potentially hazardous foods and marked in accordance with the newly proposed 5.45.5 are exempt from this performance test, similar to the exemption for proofing cabinets.

6.4 Cleaning and sanitization procedures

6.4.3 Acceptance criteria

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

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

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.

Reason: In 2005 the absolute value sign were removed from the calculation. The removal of the absolute value signs resulted in a negative log reduction. The proposed modification will result in a positive number.
8 Product literature

The manual for floorless walk-in or roll-in equipment shall state the equipment is to be installed on flooring materials that are corrosion resistant and cleanable. Flooring materials meeting these requirements may include masonry materials.

Reason: A new section for literature has been added to provide guidance to manufacturers, installers, and the regulatory community.
Annex B
(normative)

Method for conducting in-unit extraction testing of beverage equipment

B.1 Purpose

This annex describes the method for conducting extraction testing of beverage equipment, including coffee makers, espresso machines, and related equipment covered under the scope of NSF/ANSI 4.

The method has been developed for equipment in which beverages are in contact with a fixed system of tanks, tubing, valves, fixtures, and other components before being dispensed for consumption.

While this method is primarily intended for use in determining the extent to which lead (Pb) is extracted from equipment into a beverage product, it may be used to determine the extraction levels of other substances as needed to ensure conformance to the food zone material requirements of NSF/ANSI 51.

B.2 Preparation of exposure water

The exposure water shall have the following characteristics:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>8.0 ± 0.5</td>
</tr>
<tr>
<td>alkalinity</td>
<td>500 ± 25 ppm (as NaHCO₃)</td>
</tr>
<tr>
<td>dissolved inorganic carbon</td>
<td>122 ± 5 ppm</td>
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<tr>
<td>free available chlorine</td>
<td>2 ± 0.5 ppm</td>
</tr>
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</table>

This exposure water shall be prepared by adding 46 g sodium bicarbonate (NaHCO₃), 3 mL of 5% sodium hypochlorite (aq) (NaOCl), and 32 mL of 1.86% hydrochloric acid (HCl) to 50 L of deionized water (ASTM D 1193 Type II reagent water).⁸

Exposure water shall be stored in a vessel and distribution system that will not impart substances to or affect the characteristics of the water. If the exposure water is to be stored for more than 24 h prior to use, the storage container shall be pressurized with nitrogen to 10-15 psi (70-105 kPa).

B.3 Exposure protocol

a) The exposure water storage vessel shall be pressurized to 50 ± 5.0 psi (350 ± 35 kPa) using nitrogen gas. A 125-mL control sample shall be collected from the distribution system.

b) The beverage unit shall be connected to the exposure water storage vessel using only stainless steel valves and fittings and polytetrafluoroethylene (PTFE) tubing.

c) While the beverage unit is operated in accordance with manufacturer’s instructions, the unit shall be purged with a volume of exposure water equal to between 1.0 and 1.5 times the total volumetric capacity of the unit. If there are multiple beverage outlets (e.g., dispensing spouts), it shall be ensured that approximately equal volumes of exposure water are purged from each outlet. Purged water shall be discarded.

d) With the exposure water in contact with all surfaces having contact with beverages under normal idle operating conditions, static conditions shall be maintained for 24 ± 1 h. The equipment shall be operated (including any heating operations) as intended without any water being dispensed. No ingredients or product shall be added during the exposure period.

e) 1.0 L of water, or a volume of water equal to the total volumetric capacity of the unit, whichever is less, shall be dispensed into a clean polyethylene or PTFE container with an airtight lid. If there are multiple beverage outlets (e.g., dispensing spouts), it shall be ensured that approximately equal volumes of extraction water are drawn from each outlet. If the extraction water is to be analyzed for lead and other metals, the sample container shall contain HNO₃ as a preservative.

f) The steps in annex B, sections B.3 c) through B.3 e) shall be repeated two additional times so that there is a composite volume comprised of three samples taken at 24-h intervals.

g) The composite volume shall be stirred with a PTFE or stainless steel stirring rod. A 125-mL sample shall be drawn from the composite volume into polyethylene or PTFE sample bottles containing 1.0 mL of HNO₃.

h) The composite water sample and the control sample shall be analyzed for the concentration of contaminant of concern. The control sample concentration shall be subtracted from the composite sample concentration to determine the contaminant concentration imparted by the beverage unit.

Reason: Per motion at JC meeting in 2010, Annex B from NSF/ANSI 4 has been moved to NSF/ANSI 51 (FE-2010-29).