ANSI/NSF International Standard
for Food Equipment —

Commercial refrigerators and freezers

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 most recent editions of the documents indicated below.

ANSI Z97.1-2004, Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings1

ANSI/ASHRAE 72 -2005, Method of Testing Commercial Refrigerators and Freezers2

ANSI/UL 471-2006, Standard for Commercial Refrigerators and Freezers3


ASHRAE Refrigeration Handbook2

ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process, Vol. 01.064

ASTM A924/A924M, Specification for General Requirements Steel Sheet, Metallic-Coated by the Hot Dip Process, Vol. 01.064


NSF/ANSI 2-2005a. Food equipment

NSF/ANSI 51-2005. Food equipment materials

NSF/ANSI 170-2005. Glossary of food equipment terminology

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1 American National Standards Institute, 23 West 23rd Street, New York, NY 10036 www.ansi.org


3 Underwriters Laboratories, Inc., 33 Pfingsten Road, Northbrook, IL 60062 www.ul.com

4 ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428 www.astm.org

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

This section contains general requirements that apply to all equipment covered within the scope of this Standard.

5.2 External angles and corners

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

5.3.6 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 \( \frac{1}{4} \) in (0.25 in, 6.4 mm) of exposed threads, whichever is less, in a non-food zone. Exposed threads on electrical cord strain relief devices in a nonfood zone shall be exempt.

5.5 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), 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 \( \frac{3}{4} \) in (0.75 in, 19 mm) or \( \frac{1}{3} \) 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 \( \frac{1}{2} \) 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 shelves or knockdown shelves (See figure 2).

5.6 Reinforcing and framing

5.6.1 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 23).

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. If channels are not inverted, clean-outs shall be provided and designed to be easily cleanable. Clean-outs shall be provided if channels are not inverted (see figure 34).

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 in 5.30.3 (see figure 45).

5.14  Openings into food zones

5.14.1  Openings into food zones shall be equipped with covers, doors, or other means effective in protecting stored food from contamination.

5.14.2  In areas where liquids may accumulate, top openings into food zones shall be protected by a raised rim that extends at least $\frac{3}{16}$ in (0.19 in, 5.0 mm) above the flood level (see figure 56).

5.21  Shelving

5.21.1  Shelving and shelf support systems shall be easily cleanable and shall not provide harborage for vermin.

5.21.2  Shelving shall be readily removable.

5.21.3  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 67).

5.24  Equipment mounting

5.24.1  Floor-mounted units 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 of 6.0 in (150 mm) beneath the unit; 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.

5.24.2  Counter-mounted equipment shall be designed and manufactured to be:

- portable; or
- sealed to the counter; or
5.25 Legs and feet

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

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

5.25.3 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 at least 1.0 in (25 mm) below the leg at the minimum adjustment (See figure 7a8b).

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

5.25.5 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 (See figure 7b8).

5.30 Breakable glass components

5.30.1 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.

5.30.2 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.

5.30.3 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.

8.2 Prefabricated walk-in and roll-in refrigerators and freezers used for the storage of food in the original sealed package

The materials, design, and construction requirements in this section apply to prefabricated walk-in and roll-in refrigerators and freezers used to store food in the original sealed package. The interiors of these units shall meet the splash zone requirements of this Standard except as noted in this section. Therefore,
minimum radius requirements that apply to other prefabricated walk-in and roll-in refrigerators and storage freezers are not applicable to this equipment.

8.2.11 Pallet racks, shelf standards, and equipment designed to hold one or more loads of palletized product, are not required to meet the requirements of 5.18.

8.2.12 Temperature indicating devices

8.2.12.1 Each refrigerated storage compartment and cabinet shall have at least one securely mounted temperature indicating device that clearly displays the air temperature in the compartment.

8.2.12.2 The temperature display of a temperature indicating device shall be visible immediately upon opening a door to the refrigerated compartment or shall be visible from the equipment exterior without opening a door to each compartment. The sensing element of the device shall be easily cleanable and located to reflect the temperature in the warmest part of the food storage compartment.

8.2.12.3 Temperature indicating devices shall be removable.

8.2.12.4 Temperature indicating devices shall be accurate to ± 2 °F (± 1 °C) and shall be graduated in increments no greater than 2 °F (1 °C) in the intended range of compartment temperatures.

Reason: This section was inadvertently left out when the different types of refrigerators were separated in the standard.

9.9 Shelving

In addition to the applicable requirements specified in 5.21:

9.9.1 Shelving in self-service display refrigerators shall be removable or readily removable.

9.9.2 Shelving for self-service display refrigerators shall be exempt from the requirements of NSF/ANSI 51, section 5.2.26.1.2, if made with a minimum G60 galvanized steel. Galvanized steel shelves may be coated for appearance.

9.9.3 Shelving and shelf support systems shall be easily cleanable and shall not provide harborage for vermin.

NOTE – This requirement shall not preclude the use of hollow shelf standards in display refrigerators as permitted in 9.6.

Reason: The reference section number in NSF/ANSI 51 has been updated per the new version of 51.
Figure 1 – External corners or angles

THISaic NOT THIS

Inverted Hat Channel Bracing

Channel Bracing

Angle Bracing

Figure 2 – Reinforcing and Framing Members
Under Tops and Shelving
Channel sections shall be shallow and wide enough to be easily cleanable, with cleanout holes.

Figure 3 – Single panel door

Tight Fitting

Gasket or Binding

Framing Member

Single Pane Glass (Double Pane Optional)

Figure 4 – Glass Doors
Figure 5 – Openings and rims – food zone

Figure 6 – Perforated false bottom
Leg must be closed against underside of the top

Figure 7a– Example of Leg and Foot

When $X$ exceeds $Y$ by $\frac{1}{2}$ in (0.50 in, 13 mm) or greater then $Z$ must be 1.0 in (25 mm) below the leg at the minimum adjustment

Figure 7b– Legs and Feet