How Refrigeration Units Are Tested and Certified and Why It Matters

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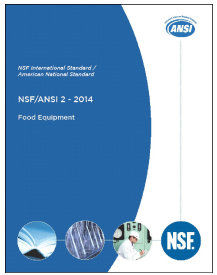
Agenda

Who We Are

NSF's Mission and History

Standards and Certification

Overview



NSF 2: Food Equipment Design

NSF 51: Food Equipment Materials

NSF 7: Refrigeration

Our Foundation

In 1944,

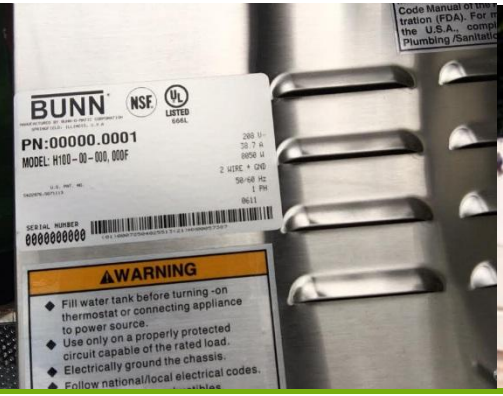
NSF was founded as the National Sanitation Foundation in the University of Michigan's School of Public Health.

Today,

we are now *NSF International*, with corporate headquarters in Ann Arbor, MI, USA, and 75 office and partner locations worldwide.

Our Mission

NSF International is a global, independent,
non-profit, public health and safety organization.





Our mission and focus has always been
protecting and improving human health.

About NSF International Standards and Certifications

NSF STANDARDS DEVELOPMENT

Manufacturers

- Food equipment
- Chemicals
- Nonfood compounds
- Water distribution and treatment
- Recreational water equipment

Regulators

- USDA
- EPA
- FDA
- CPHC
- HC
- International, national, state and local government agencies

End Users

- Industry QA/QC
- Equipment specifiers
- Architects
- Academia/educators
- Consumer groups

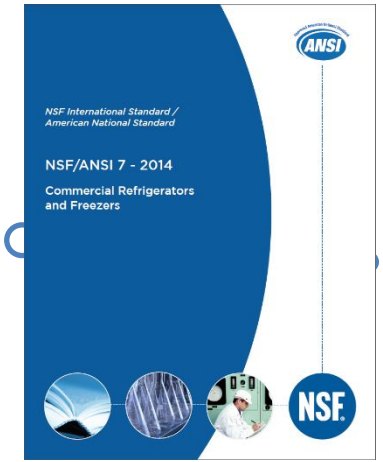
CPHC

Requirements of a Standard

Design

Materials

Performance



21 Food Equipment Standards

- NSF/ANSI 2: Food Equipment
- NSF/ANSI 3: Commercial Warewashing Equipment
- NSF/ANSI 4: Cooking and Hot Food Holding Equipment
- NSF/ANSI 5: Water Heaters
- NSF/ANSI 6: Dispensing Freezers
- NSF/ANSI 7: Commercial Refrigerators and Freezers
- NSF/ANSI 8: Commercial Powered Food Preparation Equipment
- NSF/ANSI 12: Automatic Ice Making Equipment
- NSF/ANSI 13: Refuse Processors
- NSF/ANSI 18: Manual Food and Beverage Dispensing Equipment
- NSF/ANSI 20: Commercial Bulk Milk Dispensing Equipment
- NSF/ANSI 21: Thermoplastic Refuse Containers
- NSF/ANSI 25: Vending Machines for Food and Beverages
- NSF/ANSI 29: Detergent and Chemical Feeders for Dishwashing Machines
- NSF/ANSI 35: High Pressure Decorative Laminates
- NSF/ANSI 37: Air Curtains for Entranceways in Food Establishments
- NSF/ANSI 51: Food Equipment Materials
- NSF/ANSI 52: Supplemental Flooring
- NSF/ANSI 59: Mobile Food Carts

POINTS TO PONDER

- If we have a code, why do we need standards?
  - Clear pass/fail criteria
  - Level of detail
  - Consistent test methods
  - Uniformity across states, counties, cities
- Has your code clearly defined what is desired in a piece of food equipment?
  - What does it mean to be “commercial grade”?
- Do health departments actually verify what is required in FDA Food Code sections 4-1 and 4-2 and if so, how do they do it?

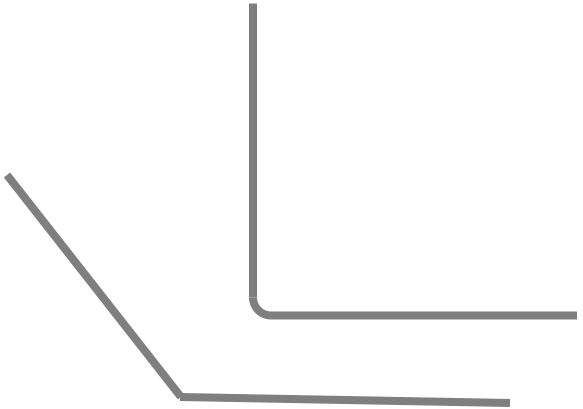
NSF/ANSI 2

Design & Construction Requirements

Internal Angles and Corners, Food Zone

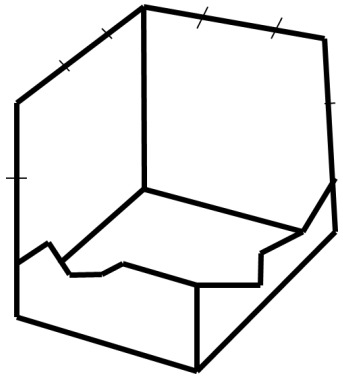
Two plane intersections:

- Greater than 135° angle or;
- ⅛ inch minimum radius



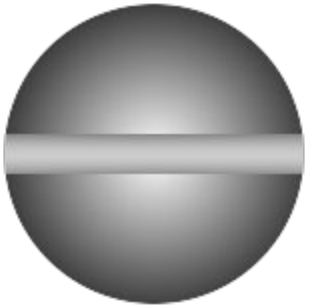
Three Plane Intersection (Corner)

- Two angles not less than ⅛ inch radius
- Third angle not less than ¼ inch radius

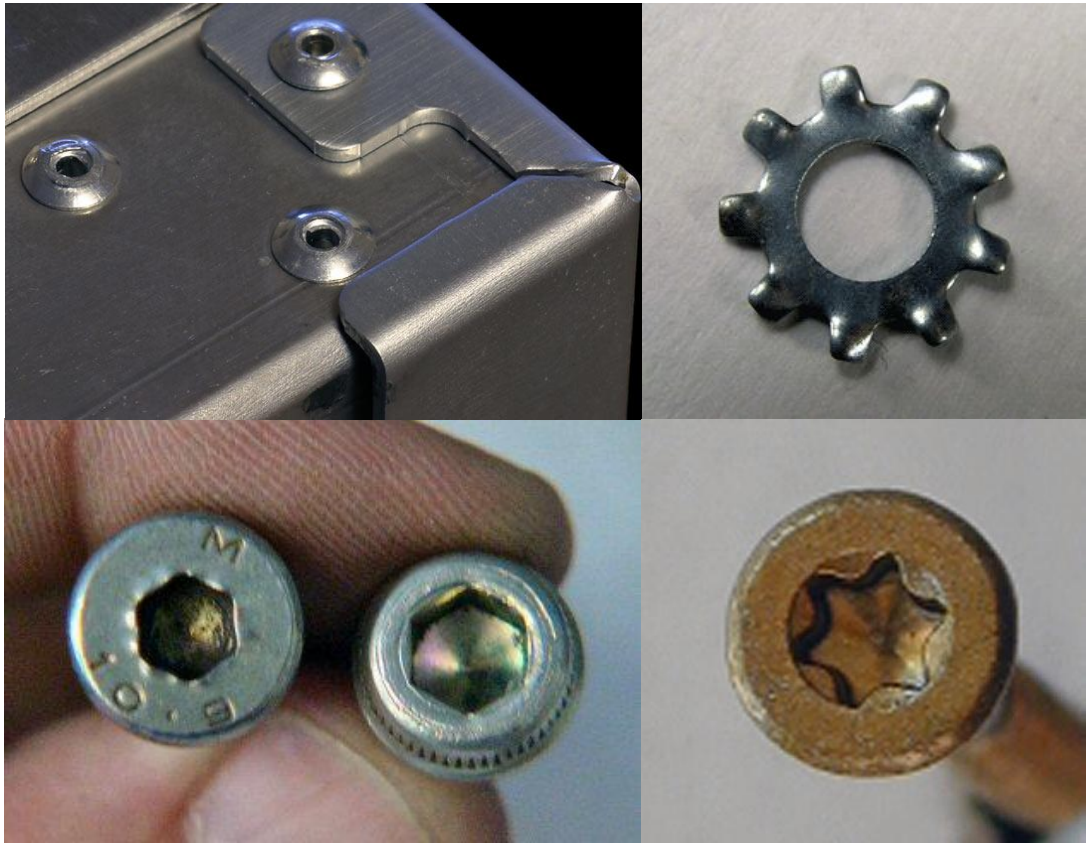


Easily Cleanable Fasteners

- Not allowed in Food Zone, only in Splash and Nonfood Zones



Unacceptable Fasteners



Basic Design and Construction Requirements (NSF/ANSI 2)

Zone / Requirement	Food Zone	Splash Zone	Nonfood Zone
Accessibility	Without Tools	With Tools	With Tools
Radius	Required	Not Required	Not Required
Fasteners	Not Permitted	Easily Cleanable	Easily Cleanable
Exposed Threads	Not Permitted	Not Permitted	Limited
Seams	Sealed	Sealed	Closed

FASTENER AND RADIUS ISSUES IN A FOOD ZONE

NSF/ANSI 51

Food Equipment Materials

MATERIAL FORMULATION VERIFICATION AND ACCEPTANCE

- Direct food contact area must be non-toxic
  - Material currently certified to NSF /ANSI 51 for the intended end use
  - Full formulation review by NSF toxicology department
- Lead, arsenic, cadmium or mercury content prohibited as intentional ingredients
- Stainless steel and aluminum alloys
  - Only specific alloys are allowable

Basic Material Requirement Summary (NSF/ANSI 51)

Zone / Requirement	Food Zone	Splash Zone	Nonfood Zone
Nontoxic	Required	No Requirement	No Requirement
Smooth	Yes	Yes	Yes
Easily Cleanable	Yes	Yes	Yes
Corrosion Resistant	Yes	Yes	Yes

NSF/ANSI 7

Commercial Refrigerators and Freezers

Refrigerated Storage Needs – Plan Review

ISSUE: Is there enough ***storage*** proposed? (FC 4-301.11)

POTENTIAL PROBLEMS:

1) Overstocked units
   - Poor air flow ⟹ in-unit temp issues
   - Poor stock rotation
2) Cooling issues

ITEMS TO CONSIDER:

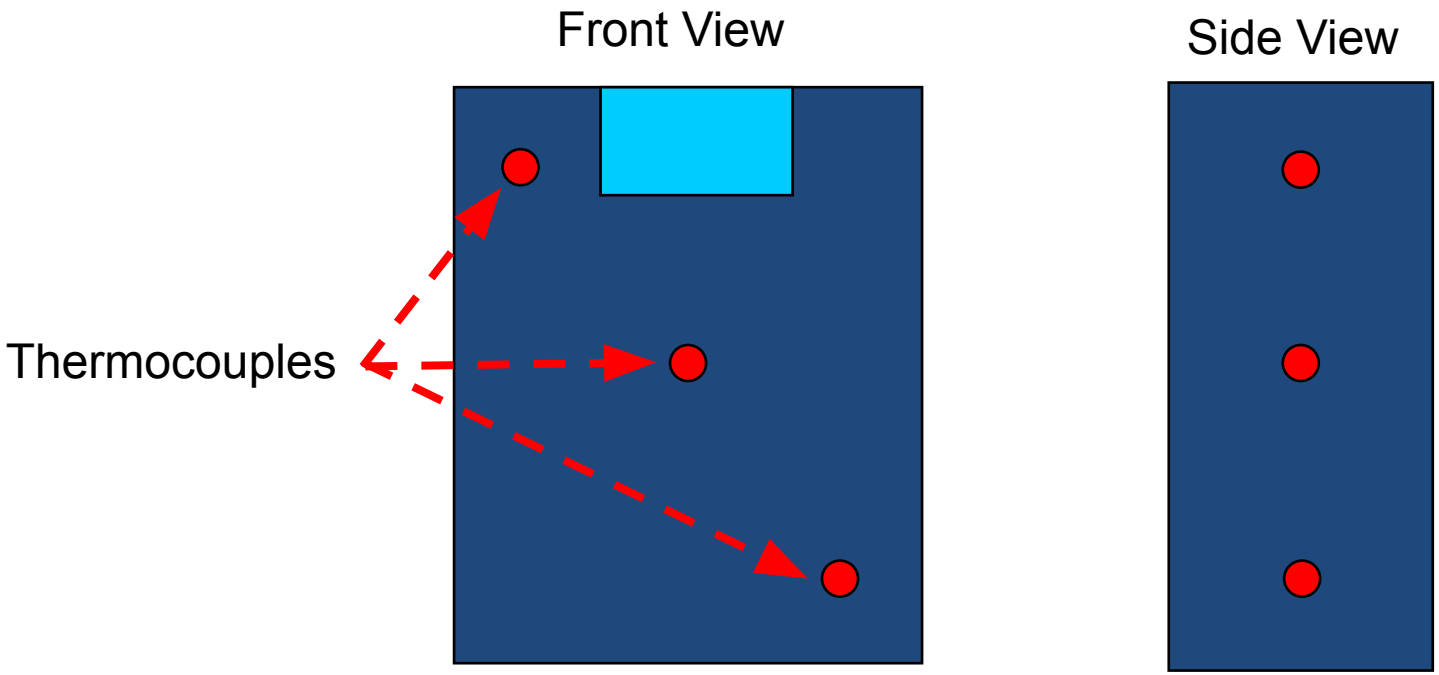
1) Not all refrigerators count toward ***storage*** capacity
   - Prep cooler, buffet units, and blast chillers should not be considered
2) Some units have specific limitations such as beverage only units

Temperature Performance

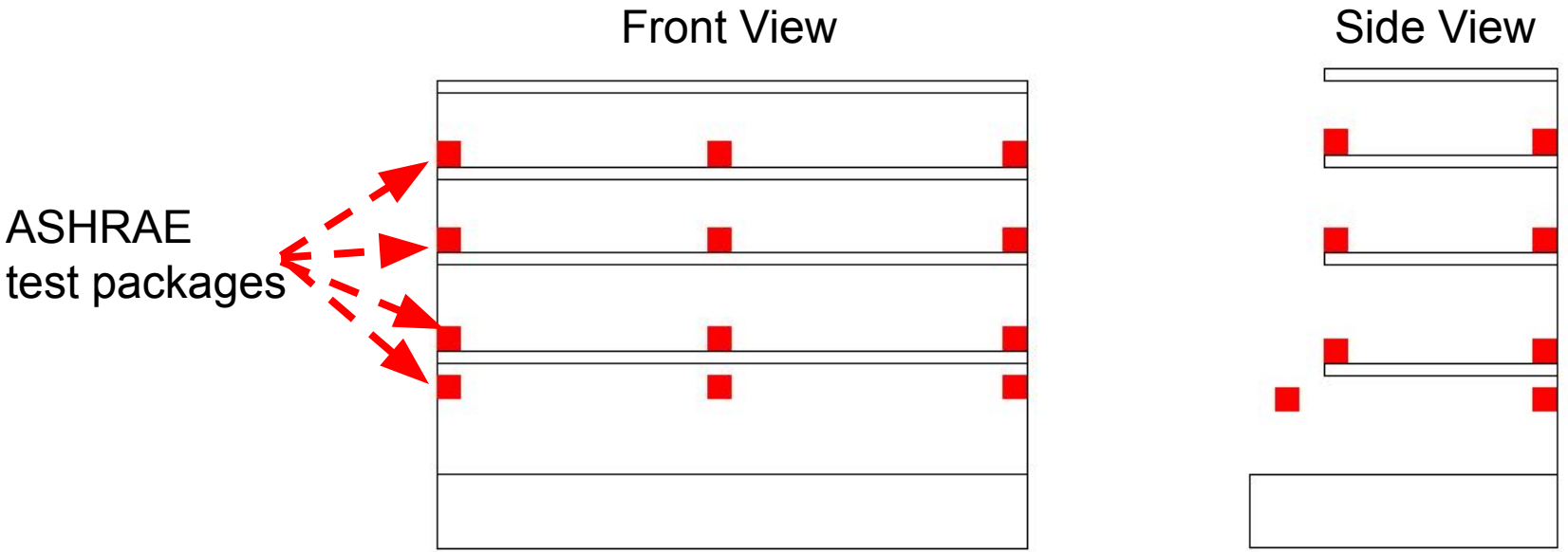
Type of Refrigerator or Freezer	Hrs	Ambient	Media	Max. % Run	Temperature
Reach-in Storage Refrigerator	4	100 °F (38 °C)	Air	70	40 °F (4 °C) Max.
Reach-in Storage Freezer	4	100 °F (38 °C)	Air	80	0 °F (-18 °C) Max.
Display Refrigerator	4	86 °F (30 °C)	Air	70	40 °F (4 °C) Max.
Type I Display Refrigerator	24	75 °F (24 °C)	ASHRAE Test Package	100	41 °F (5 °C) Avg. 43 °F (6 °C) Max.
Type II Display Refrigerator	24	80 °F (27 °C)	ASHRAE Test Package	100	41 °F(5 °C) Avg. 43 °F(6 °C) Max.
Buffet/Preparation	4	86 °F (30 °C)	Methocellulose	90	33 °F(1 °C) - 41 °F(5 °C) Box Car Average
Rapid Pull Down	4	100 °F (38 °C)	Sawdust, water, glycol	100	135 °F (60 °C) to 40 °F (4 °C) within a period of 4 h or in the time specified by the manufacturer, whichever is less.

*Walk-Ins Not Tested

No-Load Air Temperature Test



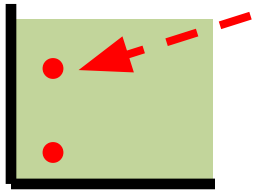
Type I and Type II Display Test Simulator Placement



Open Top Buffet/Preparation Test

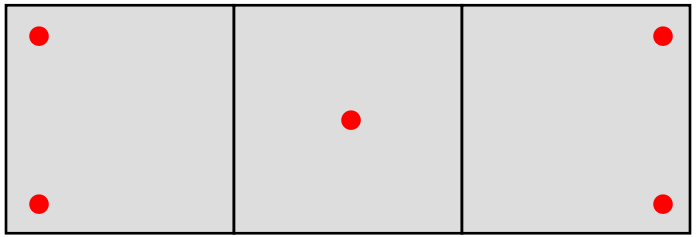
"Food" in 4" deep pans filled to ½" from the top (uncovered)

Side View



Thermocouples:
1 inch below surface
1/8 inch from bottom of pan
All within 1/2 inch of sidewall

Top View



10 total thermocouples

Equipment Labeling

"Equipment intended for use in rooms having an ambient temperature of 86˚F or less."

Ambient temperature typically not to exceed 80ºF.

Ambient temperature typically not to exceed 75ºF.

"This equipment is intended for the storage and display of non-potentially hazardous, bottled or canned products only." *(Must also appear in product literature)*

"This equipment is intended for the storage and display of packaged products only."

All Must Be Clearly Visible to the User After Installation

Summary Take Away Points

- Requirements for design (radius, fasteners, etc.), materials (non-toxic, etc.) and performance vary based upon the proposed use.
- Information boxes/labels can give a clue if a unit is being used for its intended purpose – and intended use has an impact on plan review
- Standards and certified products are valuable food safety tools – use them!
- NSF and EH regulators have a +75-year partnership & we encourage you to be involved in shaping the NSF standards.

QUESTIONS?

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