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
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.

GO BLUE!
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?
  o Clear pass/fail criteria
  o Level of detail
  o Consistent test methods
  o Uniformity across states, counties, cities

• Has your code clearly defined what is desired in a piece of food equipment?
  o 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
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Food Zone</th>
<th>Splash Zone</th>
<th>Nonfood Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>Without Tools</td>
<td>With Tools</td>
<td>With Tools</td>
</tr>
<tr>
<td>Radius</td>
<td>Required</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>Fasteners</td>
<td>Not Permitted</td>
<td>Easily Cleanable</td>
<td>Easily Cleanable</td>
</tr>
<tr>
<td>Exposed Threads</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>Limited</td>
</tr>
<tr>
<td>Seams</td>
<td>Sealed</td>
<td>Sealed</td>
<td>Closed</td>
</tr>
</tbody>
</table>
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
  o Material currently certified to NSF /ANSI 51 for the intended end use
  o Full formulation review by NSF toxicology department
• Lead, arsenic, cadmium or mercury content prohibited as intentional ingredients
• Stainless steel and aluminum alloys
  o Only specific alloys are allowable
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Food Zone</th>
<th>Splash Zone</th>
<th>Nonfood Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nontoxic</strong></td>
<td>Required</td>
<td>No Requirement</td>
<td>No Requirement</td>
</tr>
<tr>
<td><strong>Smooth</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Easily Cleanable</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Corrosion Resistant</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Type of Refrigerator or Freezer</th>
<th>Hrs</th>
<th>Ambient</th>
<th>Media</th>
<th>Max. % Run</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach-in Storage Refrigerator</td>
<td>4</td>
<td>100 °F (38 °C)</td>
<td>Air</td>
<td>70</td>
<td>40 °F (4 °C) Max.</td>
</tr>
<tr>
<td>Reach-in Storage Freezer</td>
<td>4</td>
<td>100 °F (38 °C)</td>
<td>Air</td>
<td>80</td>
<td>0 °F (-18 °C) Max.</td>
</tr>
<tr>
<td>Display Refrigerator</td>
<td>4</td>
<td>86 °F (30 °C)</td>
<td>Air</td>
<td>70</td>
<td>40 °F (4 °C) Max.</td>
</tr>
<tr>
<td>Type I Display Refrigerator</td>
<td>24</td>
<td>75 °F (24 °C)</td>
<td>ASHRAE Test Package</td>
<td>100</td>
<td>41 °F (5 °C) Avg. 43 °F (6 °C) Max.</td>
</tr>
<tr>
<td>Type II Display Refrigerator</td>
<td>24</td>
<td>80 °F (27 °C)</td>
<td>ASHRAE Test Package</td>
<td>100</td>
<td>41 °F(5 °C) Avg. 43 °F(6 °C) Max.</td>
</tr>
<tr>
<td>Buffet/Preparation</td>
<td>4</td>
<td>86 °F (30 °C)</td>
<td>Methocellulose</td>
<td>90</td>
<td>33 °F(1 °C) - 41 °F(5 °C) Box Car Average</td>
</tr>
<tr>
<td>Rapid Pull Down</td>
<td>4</td>
<td>100 °F (38 °C)</td>
<td>Sawdust, water, glycol</td>
<td>100</td>
<td>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.</td>
</tr>
</tbody>
</table>

*Walk-Ins Not Tested*
No-Load Air Temperature Test

Thermocouples

Front View

Side View
Type I and Type II Display Test Simulator Placement

ASHRAE test packages

Front View

Side View
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 80°F.

Ambient temperature typically not to exceed 75°F.

“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?

Derek DeLand, MPH, REHS/RS
Environmental Health Programs Manager, Regulatory Affairs
NSF International
e: ddeland@nsf.org
ph: 734-418-6683