Principles of Food Safety

Equipment Design

Hygiene Standards for a Safer Foodservice Environment
Who is NSF?

Founded in 1944, at the University of Michigan's School of Public Health

WHO WE SERVE

PRIVATE SECTOR
- Food
- Water
- Health Sciences
- ISO
- Sustainability
- Consumer Products

PUBLIC SECTOR
- International
- Federal
- State & Local
- Public Health

CONSUMERS

43 Number of NSF business units

OUR MISSION
To protect and improve human health and the environment.

WHAT WE DO

- TESTING
- INSPECTION
- CERTIFICATION
- TRAINING
- CONSULTING
- STANDARDS DEVELOPMENT

WHO IS NSF?

NSF IS A WORLD HEALTH ORGANIZATION COLLABORATING CENTER

WE ARE A NOT-FOR-PROFIT CORPORATION

WITH FOR-PROFIT SUBSIDIARIES
What we Do...

NSF has over **70 years** of public health expertise

**70+** internationally recognized accreditations, including ANSI, IAS, OSHA, and the Standards Council of Canada (SCC)

NSF offers services in **167** countries. We have **49** offices, **11** labs, **26** partner offices in **35** countries.

NSF employs **2,100** people worldwide, including microbiologists, toxicologists, engineers, chemists, environmental/public health professionals and certification specialists.

**83,000** companies served.

**BUSINESS-TO-BUSINESS**

NSF has certified **492,000** products, and tests **24,000** products annually.

**165,000** audits are conducted annually. **1,800** field auditors working worldwide.

**NSF BY THE NUMBERS**

as of **JUNE 2015**
NSF Around the Globe
Core Business Units

- Food Safety
- Sustainability
- Consumer Products
- Water Quality
- Health Sciences
- ISR
The NSF Global Food Division provides expertise and accredited services across all supply chain sectors, from agriculture, produce, processing, distribution and dairy, to seafood, fish meal, retail and restaurants.
Commercial Food Equipment
Why is Equipment Design Critical?

• In 2010, salmonella outbreaks occurred in various states across the U.S.
• In the course of the investigation, cross-contamination was linked to deli slicers
• Several cleanability issues surfaced including maintenance intervals and procedures
• **BUT** a key factor was the equipment design:
  – Failing sealants and gaskets
  – Hollow spaces retaining liquids
Examples of Unsanitary Equipment Design

- Ring
- Guard
- Handle
- Mount
1. Cleanable
2. Made of Compatible Materials
3. Accessible for Inspection, Maintenance, Cleaning
4. No Product or Liquid Collection
5. Hollow Areas Should be Sealed
6. No Niches
7. Sanitary Operational Performance
8. Hygienic Design of Maintenance Enclosures
9. Compatibility with Other Plant Systems
10. Validated Cleaning and Sanitizing Protocols
International Hygiene Standards

• Guidelines and Standards for commercial foodservice and food processing equipment:
  – NSF International
  – 3A
  – AMI
  – EHEDG
  – ISO

• Establish *minimum* food protection and sanitation requirements for:
  – Materials
  – Performance
  – Design and Construction
• NSF 2 - Food Equipment
• NSF 3 - Commercial Warewashing Equipment
• NSF 4 - Commercial Cooking, Rethermalization and Powered Hot Food Holding and Transport Equipment
• NSF 5 - Water Heaters, Hot Water Supply Boilers, and Heat Recovery Equipment
• NSF 6 - Dispensing Freezers
• NSF 7 - Commercial Refrigerators and Freezers
• NSF 8 - Commercial Powered Food Preparation Equipment
• NSF 12 - Automatic Ice Making Equipment
• NSF 13 - Refuse Processors and Processing Systems
• NSF 18 - Manual Food and Beverage Dispensing Equipment
• NSF 20 - Commercial Bulk Milk Dispensing
• NSF 21 - Thermoplastic Refuse Containers
• NSF 25 - Vending Machines For Food and Beverages
• NSF 29 - Detergent and Chemical Feeders for Commercial Spray-Type Dishwashing Machines
• NSF 35 - High Pressure Decorative Laminates for Surfacing Food Service Equipment
• NSF 36 – Dinnerware
• NSF 37 - Air Curtains for Entranceways in Food and Food Service Establishments
• NSF 51 - Food Equipment Materials
• NSF 52 - Supplemental Flooring
• NSF 59 - Mobile Food Carts
• NSF 169 - Special Purpose Food Equipment and Devices
• **Purpose:**
  – Establishes *minimum* food protection and sanitation requirements for food handling and processing equipment

• **Requirements:**
  – Address material safety, design and construction, performance
  – Requirements vary by zone
    • Food zone, splash zone, nonfood zone
• **Food Zone:**
  – Equipment surfaces intended to be in direct contact with food (Direct)
  – Equipment surfaces that food or condensate may contact and then drain, drip, or splash back into food or onto surfaces that are intended to be in direct contact with food (Non-direct)

• **Splash Zone:**
  – Equipment surfaces, that are subject to splash, spillage, or other food soiling during operation of the equipment.
Understanding Food Zones

- **Nonfood Zone**
  - Exposed equipment surfaces other than those in a food or splash zone.

- **Unexposed Nonfood Zone**
  - Enclosed areas that are unexposed under normal use conditions. Included in this definition are areas that are inaccessible or are designed to be accessed only for maintenance and/or service through means including but not limited to covers, panels, or doors that are removable, readily removable, sliding, or hinged.
Identifying Food Zones

- Food Zone
- Splash Zone
- Non-Food Zone
Examples of Food Zone – Direct Contact

Cutting Board and Knife - Direct

Stainless Steel Prep Table - Direct

Food zones shall be readily accessible and easily cleanable
Examples of Splash Zone

Shelving Used for Dry Good Storage – Splash

Cabinet Surfaces - Splash

Splash zones shall accessible and easily cleanable
**Surface Requirements**

**Smooth:** Free of pits, pinholes, cracks, crevices, inclusions, rough edges, and other surface imperfections detectable by visual and tactile inspection.

**Textured:** Having a surface onto which a pattern has been established to obtain a desired visual or tactile effect and which may hinder the removal of soil from the surface during cleaning.

**Porous:** Having holes or openings rendering the surface permeable to fluids.
Material Requirements

- **General Material Requirements:**
  - Materials shall be smooth and easily cleanable.
  - Materials shall be corrosion resistant.

- **NSF/ANSI 51:**
  - Requirements for materials used in construction of commercial food equipment, intended to ensure that the composition and surface finish of food equipment materials are such that a material will not adulterate food nor render food equipment difficult to clean and sanitize.
• Coatings may be used to achieve corrosion resistance.
  – Organic coatings may not be used on food zone surfaces that are designed in purpose to be subject to cutting and chopping actions.
  – Coated surfaces used in direct food contact shall have substrate materials that are nontoxic.
Material Requirements - Wood

- Wood shall not be used in a food zone except as permitted for cutting boards and bakers tables.
- Wood used for structural purposes shall be totally encapsulated as not to be exposed.
- Wood used for decorative purposes shall be sanded smooth and sealed with a sealant. Decorative wood shall not be exposed to moisture or wear.
Two plane intersections:
• ° angle of intersection or;
• minimum radius

Ensures Cleanability, Prevents Long-term pooling, collection of liquid and debris
The Basics: Design Requirements

• Fasteners:
  – Fasteners shall not be used in a food zone.
  – Easily cleanable fasteners may be used in splash and nonfood zones.
  – Fasteners shall be tight fitting to the surface.
Joints and Seams

• Permanent joints and seams in a food or splash zone shall be sealed and smooth.
• Permanent joints and seams in a nonfood zone shall be closed.
• Joints formed by overlapping sheets of material shall not create upwardly facing horizontal ledges.
NSF Expertise and Services
Feasibility Assessment

- Review product drawings for glaring non-compliances
- Evaluate components in consideration
- Review proposed materials
- Educate on standards
- Performance testing
- Evaluate prototype(s) at every step
- Material testing, toxicology reviews
- Identify all the components necessary to get the product certified
- Dedicated Account Manager
- Verify your component/material suppliers
- Annual compliance monitoring

NSF Certified
Certification Process

1. Application
2. Physical Evaluation
3. Material Verification
4. Performance Testing
5. Facility Inspection
6. Certification Granted
7. Annual Renewal

Happens in Parallel
Finding Certified Equipment

• Search NSF Public Listings: [www.nsf.org](http://www.nsf.org)
• Search by Equipment Type, Country, Standard, Brand
• Look for the NSF Mark on Equipment
Benefits of NSF Certification

• Eliminates concerns about material safety and hygienic design
• Ensures equipment is easily cleanable = saving time and labor.
• Improves consistency in the design and performance of equipment dispensing your products
• Minimizes waste, spoilage, leakage, etc.
• Reduces risk of food borne illness due to sanitation issues
• Provides brand protection and assurance of product quality
• Serves as a global brand specification
Questions?

Thank you.