NSF International

NSF 350 Water Reuse Certification

June 27, 2018

Today's Agenda

Brief history of NSF & the Wastewater program

Overview of different standards

NSF 350 Water Reuse - Certification process

A Historical Perspective

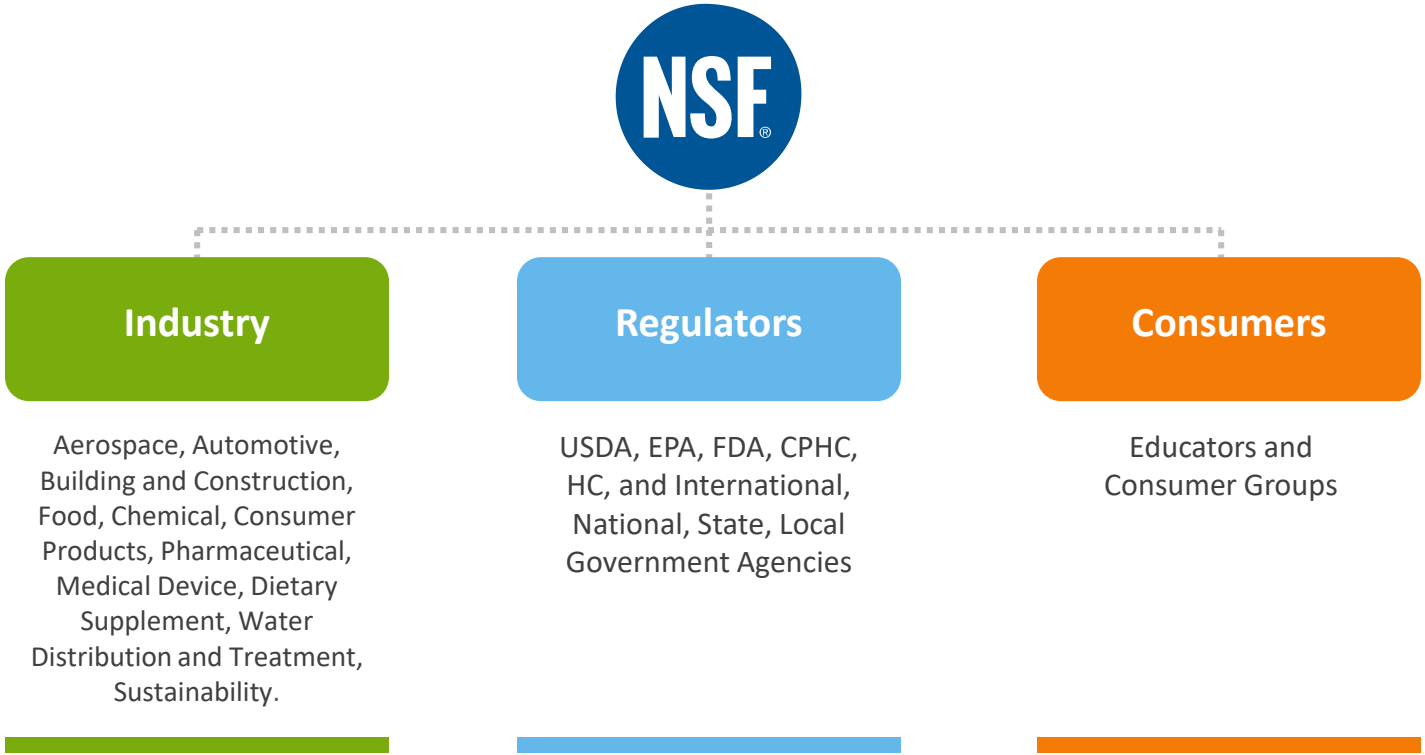
Americans began dining out in the late 1930's

Inconsistent rules and regulations arose, varying from town to town, state to state. Hence…

State health officials monitored food service establishments for sanitation using a variety of criteria.

A need for uniform national standards; NSF brings regulators, industry, consumers and public health officials together.

Bringing Industry, Regulatory and Consumers Together



Today, NSF is a Global Leader in Public Health and Safety

Developer of over **90** national consensus standards

Steadfast ties with key associations and government agencies.

NSF works closely with international, federal, state and local regulators : FDA, USDA, EPA , U.S. Government & Legislature

Pan American Health Organization/World Health Organization Collaborating Center on Food Safety, Water Quality and Indoor Environment

Service provider to thousands of organizations in **168 countries**

NSF Core Business Units

NSF overview of Water Standards

NSF Global Water Services

NSF developed many public health standards adopted by the U.S. EPA to protect drinking water; and standards promoting pool/spa safety.

NSF tests and certifies products to these and other industry standards.

Plumbing Products
NSF/ANSI 14 and 61-Section 9; NSF/ANSI 372; UPC®; IPC®; ICC; ASTM; ASSE; ASME

Filtration Products
NSF/ANSI 42, 44, 53, 55, 58, 62, 177, 401 and 419; NSF Protocols P231, P248 and P477

Municipal Water Products
NSF/ANSI 60, 61 and 419

Onsite Wastewater Treatment and Reuse Devices
NSF/ANSI 40, 41, 46, 245 and 350

Recreational Water Safety
NSF/ANSI 50: *Pumps, drains, pool covers, filters and pool chemicals*

Building Water Health
NSF/ANSI 444 *(in development)*
NSF Protocols: P376, P453 and P459

NSF Wastewater Program History

1970 Onsite WW STD 40 → 1978 Compost Toilets STD 41 → 1997 Septic Tank Effluent Filters STD 46 → 2002 Disinfection Devices STD 46 → 2003 Waco, TX Test Facility Opened → 2007 STD 245 Nitrogen Reduction Standard → 2007 UV devices added STD 46 → 2009 Ozone devices added STD 46 → 2010 Wastewater Field Performance STD 360 → 2011 Water Reuse STD 350

Before

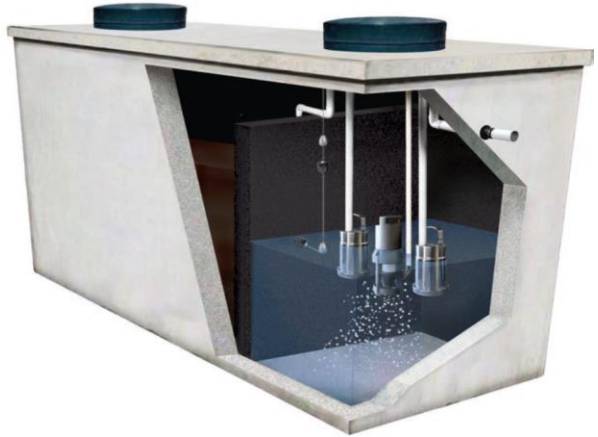
After

Now

NSF International – Wastewater Certification process

Wastewater Standards

- NSF/ANSI 40
  - Residential onsite systems
    - Rated capacities between 400 & 1500 gallons per day (1514-5678 liters)
- NSF/ANSI 41
  - Non-liquid treatment systems
    - Ex. Composting toilets
- NSF/ANSI 46
  - Components and devices
    - Grinder pumps, septic tank effluent filters, chlorination devices, ozone devices and UV disinfection devices
- NSF/ANSI 245
  - Nitrogen reduction
    - Rated capacities between 400 & 1500 gallons per day (1514-5678 liters)
- NSF/ANSI 350
  - Onsite water reuse
    - Material, design, construction and performance requirements
    - Categories include: Greywater systems (laundry, bathing or both), Wastewater Systems, and Commercial systems

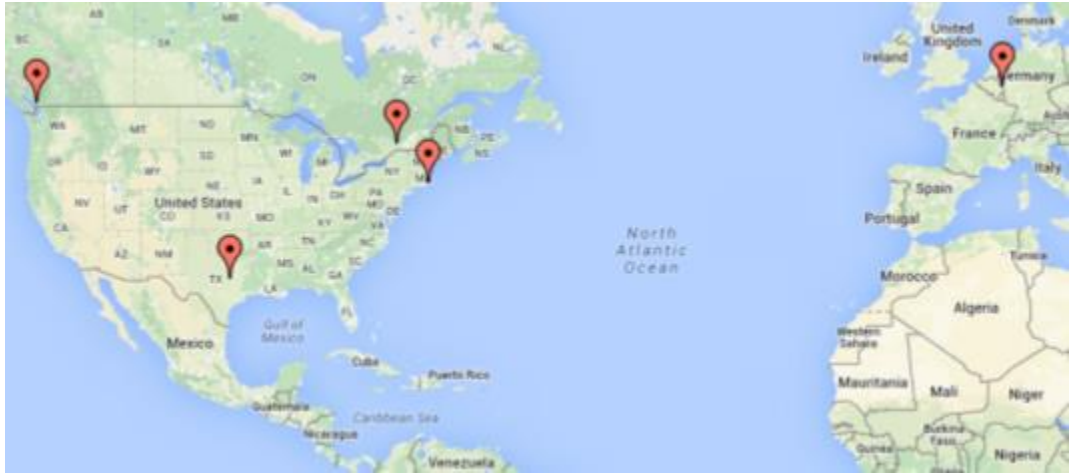


Product Testing

- Test Facilities
  - Actual diverted wastewater
- Laboratory Facilities
  - Simulated wastewater
  - General assessments
- Field Evaluations
  - Individual installations

Current Test Facilities

- Waco, Texas
- Buzzards Bay, Massachusetts
- Vancouver, British Columbia
- Lindsay, Ontario
- Aachen, Germany



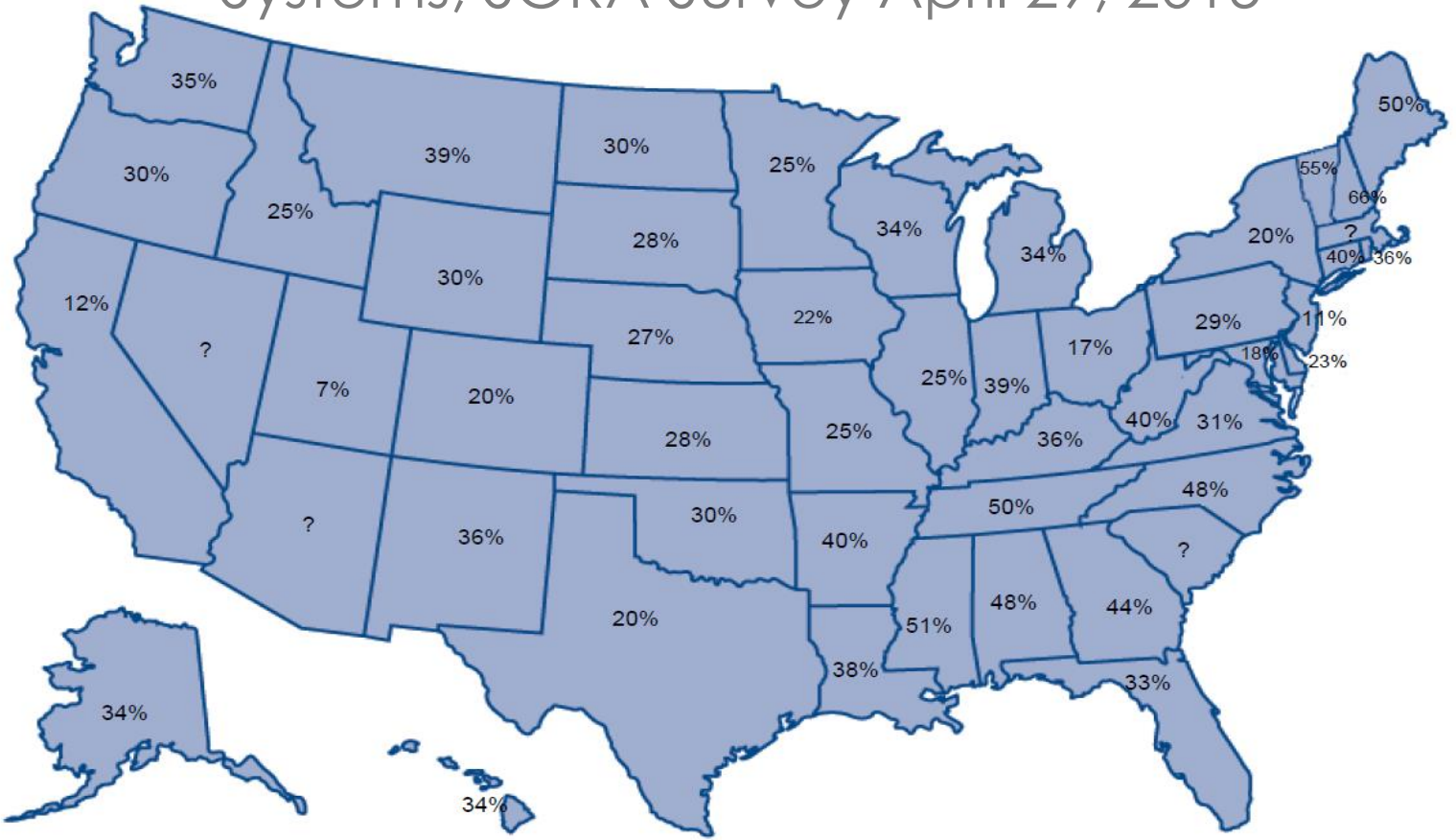
Relevant NSF/ANSI Standards

- Residential system evaluations
  - Standards 40, 245 and 350
  - Standard 46 disinfection devices
  - CAN/BNQ 3680-600

Current NSF/ANSI Onsite Wastewater Standards

- Standard 40 (2017a): Complete residential treatment system with a capacity of 400 to 1500 gpd; $CBOD_5$ and TSS reduction.
- Standard 245 (2017): Complete residential treatment system with a capacity of 400 to 1500 gpd; Nitrogen reduction.

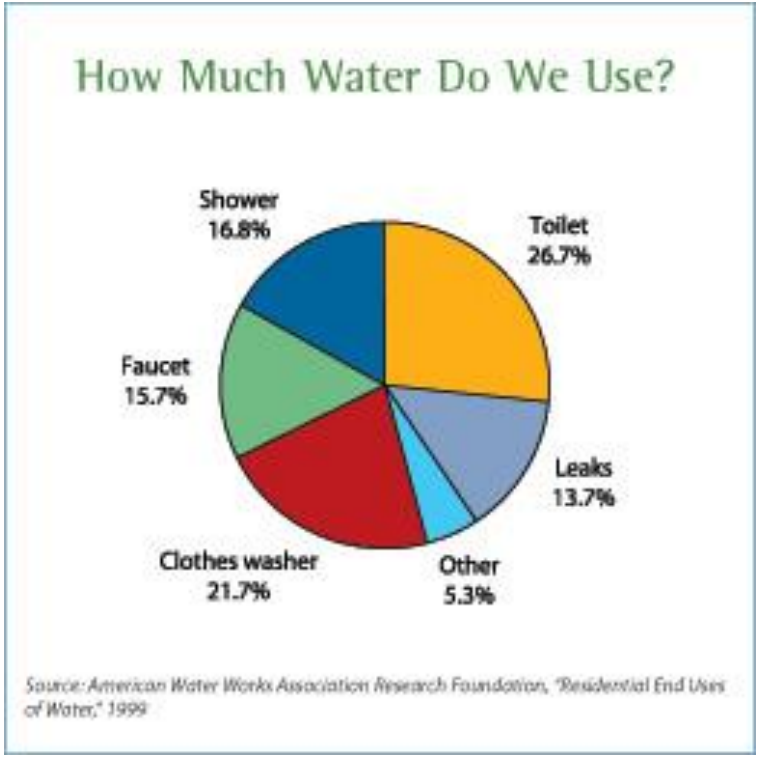
Estimated % State Populations Served by Onsite Systems, SORA Survey April 29, 2015



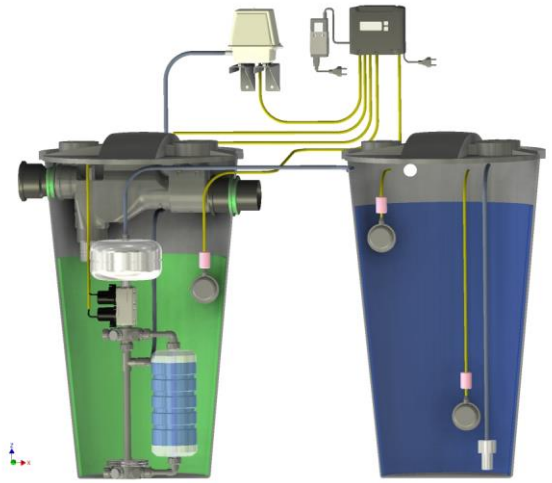
Wastewater Reuse System Standards (NSF/ANSI 350)

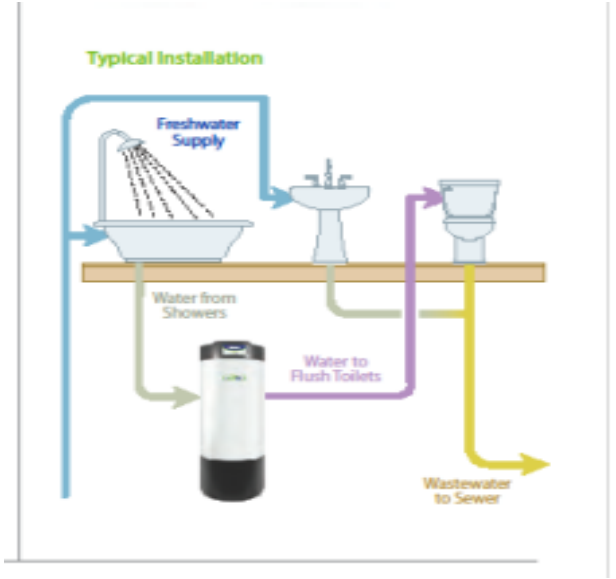
NSF 350 Water Reuse Standard

- Standard 350 (2017a): Onsite residential & Commercial treatment system with a capacity of 400 to 1500 gpd; $CBOD_5$, TSS, E-coli & turbidity reduction.



NSF/ANSI 350 Certified Products – **Greywater** 8.1





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Challenge Water Ingredients

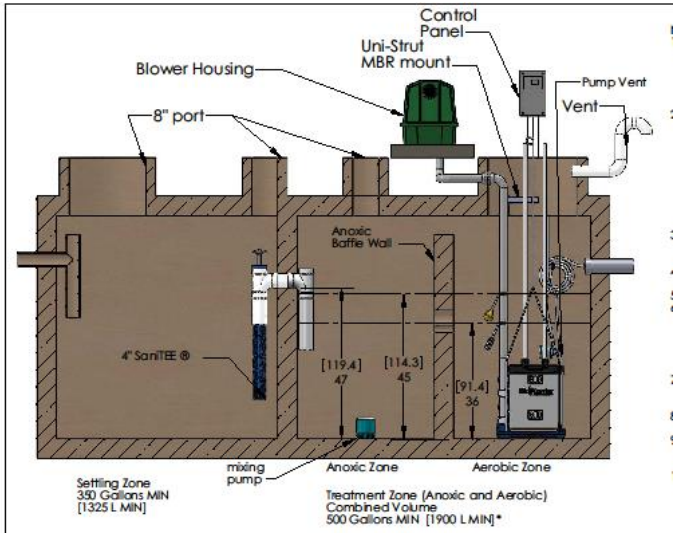
Bathing Water

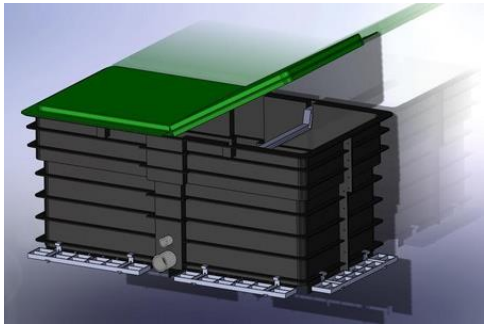
- body wash with moisturizer
- toothpaste
- deodorant
- shampoo
- conditioner
- lactic acid
- secondary effluent
- Screened raw influent
- bath cleaner
- liquid hand soap
- test dust
- Urea
- NaOH
- HCL

Laundry Water

- liquid laundry detergent
- test dust
- secondary effluent
- Screened raw influent
- liquid laundry fabric softener
- Na_2SO_4
- $NaHCO_3$
- Na_3PO_4
- Urea
- NaOH
- HCL

NSF/ANSI 350 Certified Products – **Wastewater** 8.2





BIO MICROBICS
BETTER WATER. BETTER WORLD.

E-Z TREAT

NSF 350 Water Reuse testing

- Design & Construction
  - structural integrity, watertightness, alarm, visual, noise, access ports
- Product Literature Review
  - Data plates, owners manuals, O&M, troubleshooting, warranty.
- Performance Testing
  - 6 months, no maintenance, influent & effluent 5 days per week, wash loads, power failure, vacation stress, working parent stress.

Measure	Class R		Class C	
	Test average average	Single sample maximum	Test average	Single sample maximum
$CBOD_5$ (mg/L)	10	25	10	25
TSS (mg/L)	10	30	10	30
turbidity (NTU)	5	10	2	5
E. coli [2] (MPN/100 mL)	14	240	2.2	200
pH (SU)	6.0 – 9.0	NA[1]	6.0 – 9.0	NA
storage vessel disinfection (mg/L)[3]	= 0.5 – = 2.5	NA	= 0.5 – = 2.5	NA
color	MR[4]	NA	MR	NA
odor	Non-offensive	NA	Non-offensive	NA
oily film and foam	Non-detectable	Non-detectable	Non-detectable	Non-detectable
energy consumption	MR	NA	MR	NA

[1]NA: not applicable.

[2]Calculated as geometric mean.

[3](See 8.6.2.6 or 8.6.3.6)

[4]MR: measured and reported only.

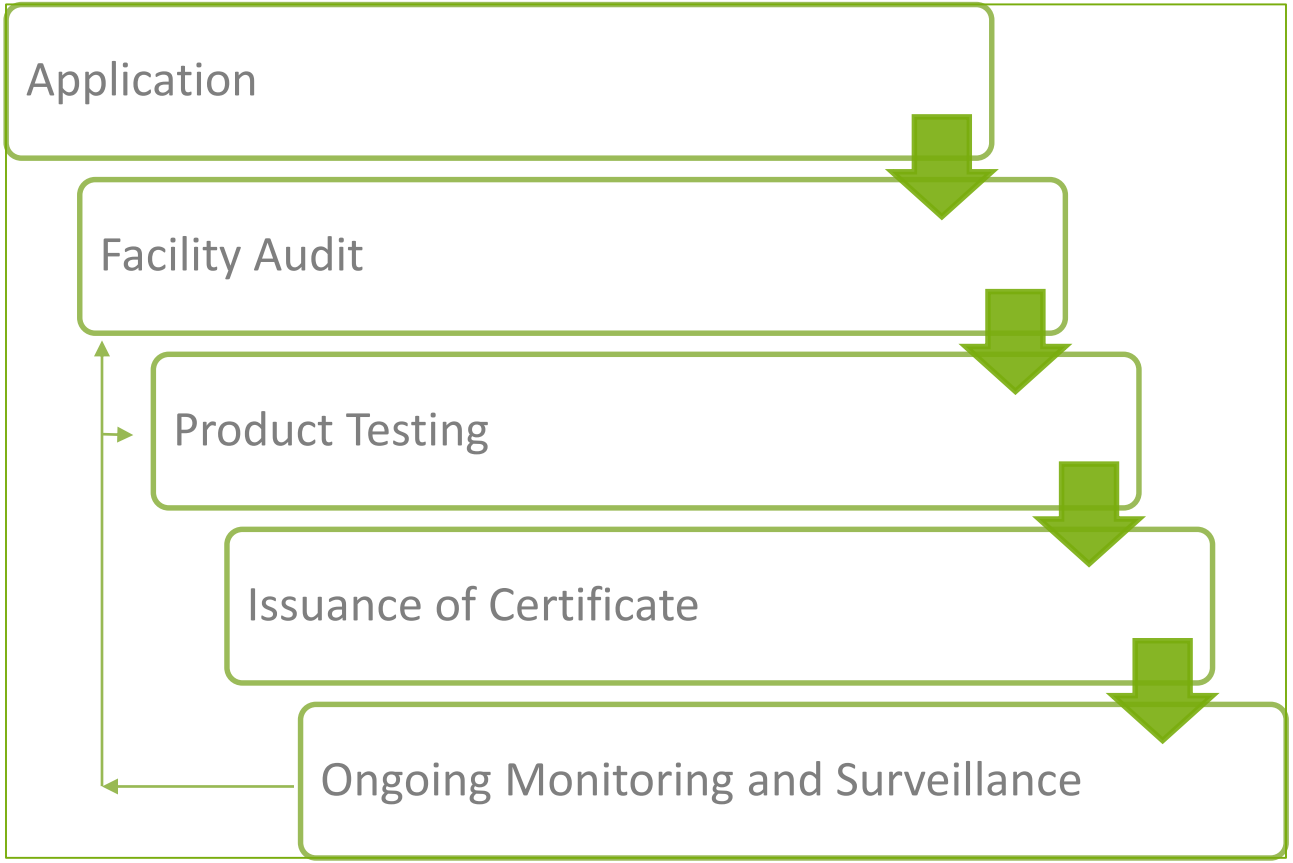
Analytical Support

- Test facility must be supported by qualified, accredited analytical laboratory
- Microbiological and chemical analyses
- Routine and non-routine
- Standard methods for the examination of water and wastewater

Product "Families"

- Scale-up of tested product to larger systems based on proportionality
  - Allows certification of a family of models spanning a range of flows using a single test.
- May be added based on similarity of design and construction without testing
- Similarity established by fundamental scientific principles
- Similarity shall be equivalent to or more conservative performance

NSF Product Certification Process



Policy Tie to Standards

- All include an “Annex A”; informative only
- Key elements of a certification program for components and devices used in wastewater treatment systems
  - Marking
  - Testing
  - Audits
  - Corrective Action and Enforcement
  - Administrative review and Appeals
  - Complaints
  - Advertising
  - and more

Surveillance for Continued Compliance

Certified systems undergo:

- Annual Production Facility Audits
- Field Audits
- Periodic Reassessment – 7 year Re-evaluation

Wastewater Program Audits

Manufacturing Facilities:

- Focus on proper product specifications.
- Annual, unannounced audit of all production locations.

Residential treatment systems:

- Focus on service obligations.
- 4 audits/year by NSF, including three installations for each audit.
- Minimum 10% audits/year by manufacturer, submitted to NSF.
- Manufacturers required to keep list of all authorized representatives current with NSF.

Service Obligations of the Manufacturer

- Residential treatment systems
- Once in the standard, now in policy
- Service related obligations
  - Two year initial service policy, four site visits
  - Extended policy available for fee
  - Stand-by parts in stock
  - Service within 48 hours
- Responsibility often transferred to authorized representative; compliance ultimately resides with the manufacturer

Product Modifications

Certified Systems:

- Review of all design changes
- Review of all product series
- Must be reviewed and approved in writing prior to production and use of the NSF Mark
- May require no additional testing
- Determine impact on all requirements of the standard

Summary

- Many State and County regulators rely on NSF Wastewater Certifications in order to approve the manufactures of onsite wastewater treatment systems.
- Products meeting these standards have demonstrated compliance with strict measures of performance.
- Certification gives the regulatory agencies reliable third-party source to verify claims about quality, performance and reliability.
- Manufacturer is held accountable for compliance in all certified products to the requirements of the standard.

Questions ?

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