August 25, 2023



Wastewater and Reuse Standards

NSF's approach

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AGENDA

- 01 Who is NSF? A Global Leader in Public Health and Safety
- 02 NSF Global Water Certifications
- 03 NSF Wastewater Certification
- O4 Grey and Wastewater Certification
- 05 Focus on NSF Standards 40 & 245 and 350

06 Focus on NSF Standard 350

Who is NSF ?

A Global Leader in Certification





NSF

WHAT IS NSF?

NSF is an independent, not-for-profit,

non-governmental public health and

safety organization.

Our mission and focus have always been protecting and improving human

and planet health.

LEADERSHIP & ACCOMPLISHMENTS



Focus Industries and Services



NSF Global Water

Certifications







GLOBAL WATER SERVICES

NSF's global water program tests and certifies products that come into contact with drinking water, such as plumbing components, water treatment chemicals and drinking water filters, as well as pool and spa equipment. It has been also extended, to onsite wastewater and reuse water treatment equipment.

Global Water Certifications



Municipal Drinking Water Products

Tanks & Reservoirs, Coatings, Valves, Pumps, Membranes, etc.

Plumbing Products Fittings, Pipes, Sealing Materials, Gaskets, etc.



Drinking Water Treatment Chemicals Disinfectants, coagulants, corrosions & scale inhibitors, etc.



Recreational Water Products Pool & Spa Equipment, Treatment Chemicals & Analyzers



Residential Drinking Water Treatment and Filtration Systems Pitchers, Filter Taps, Softeners, etc.



Residential Wastewater Treatment and Reuse Systems Septic Tanks, Separators, Water Reuse Equipment, etc.



Electrical Safety Compliance to Electric Codes, Energy STAR, Field Evaluation, etc.



NSF Wastewater Certification



	1978		2002		2007		2009		2022
	NSF Standard 41 for Compost Toilets		Disinfection Devices included in NSF Standard 46		NSF Standard 245 on Nitrogen Reduction	1	Ozone devices ad to NSF Standard 4	ded 6	NSF Standard 385 for Disinfection Devices
•		•		•		•		• Salt	
600			•	1 ments	•				· · · · · · · · ·
1970		1997		2003		2007		2011	
NSF		NSF		Opening of NSF	Waco	UV devices add	ded to	NSF	
Standard 40 fo	or Onsite	Standard 46 fo	Septic	(TX) test facility		NSF Standard 4	16	Standard 350 f	or Water
Wastewater		Tank Effluent F	Iters					Reuse	
							15	-	
							/ /		



CAPABILITIES – Product Testing

Test Facilities:

• Actual diverted wastewater

Laboratory Facilities

- Simulated wastewater
- General assessments

Field evaluations

• Individual installations





CAPABILITIES – Current Test Facilities for wastewater



Policy Tied to Standards

All standards include an "Annex 1", 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



Grey and Wastewater Certification

Conditions





Analytical Support

Test facility must be supported by qualified, accredited analytical laboratory able to perform

- 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



Surveillance for Continued Compliance

Certified Systems undergo:

- Annual Production Facility Audits
- Field Audits
- Periodic Reassessment: 5-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.
- Minimum 4 audits/year by NSF or a companies authorized representatives, including three installations for each audit.
- Minimum 10% audits/year by manufacturer, submitted to NSF.
- Manufacturers required to keep list of all authorized representatives currently with NSF.



Residential Treatment Systems – Related Obligations

- Two-year initial service policy, four site visits
- Extended policy available for a fee
- Stand-by parts in stock
- Service within 48 hours

Responsibility often transferred to authorized representative; compliance ultimately resides with the manufacturer



- 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



Focus on NSF/ANSI 40 & 245





Current ONSITE NSF/ANSI Wastewater Standards

NSF/ANSI Standard 40 (2018)

- Complete residential treatment system with a capacity of 400 to 1500 gpd
- Focused on CBOD₅ and TSS reduction.

NSF/ANSI Standard 245 (2018)

- Complete residential treatment system with a capacity of 400 to 1500 gpd
- Focused on Nitrogen reduction.



Nitrogen – NSF/ANSI 245

Total Nitrogen = TKN + nitrites + nitrates

- TKN = Total Kjehldahl Nitrogen
 - Measures combination of organically bound and ammonia nitrogen
- Nitrogen reduction is heavily regulated in large treatment plants
- Now also more and more regulated for onsite wastewater and agricultural run-off
- TMDL (Total Maximum Daily Loads) now imposed in many states



Nitrogen – NSF/ANSI 245

- Standard for residential wastewater treatment systems designed to reduce nitrogen
- Was developed using
 - Existing NSF/EPA Environmental Reduction Protocol
 - Elements of standard NSF/ANSI 40
- The system must
 - Meet Class I requirements of NSF/ANSI 40 or
 - Meet Class I requirements during concurrent testing for nutrient removal
- Involves six months of performance testing, incorporating stress tests to simulate wash day, working parent, power outage, and vacation conditions.



Nitrogen – NSF/ANSI 245

- Emphasizes the importance of water chemistry in the ability of systems to nitrify/denitrify
- Alkalinity and organic carbon are important to the nitrification/denitrification process.
- Alkalinity destroyed during nitrification, created during denitrification.
- Low pH can result, with nitrifier activity stopped around pH 6.0

Total Nitrogen - <50% of average reduction



Focus on NSF/ANSI 350





NSF/ANSI Standard 350 (2017a)

- Onsite residential & Commercial treatment system with a capacity of 400 to 1500 gpd
- Focused on reduction of :
 - CBOD₅
 - TSS (Total Suspended Solids)
 - Escherichia Coli (E. Coli)
 - Turbidity

Categories:

- Greywater
- Wastewater
- Commercial Greywater



NSF/ANSI Standard 350 (2017a) – Reuse helping fighting Water Scarcity

By 2030:

- 47 percent of the world's population will live in areas of high-water stress (FAO)
- Water scarcity in some arid and semi-arid regions will displace between 24 million and 700 million people (UNCCD).

In Mexico City (BBC News)

- One in five citizens get just a few hours of water from their taps a week
- And another 20 percent have running water for just part of the day.
- The city imports as much as 40 percent of its water from distant sources but has no large-scale operation for recycling wastewater

India is undergoing the worst water stressed phase in its history.

- Some 600 million people face high to extreme water stress;
- The largest consumer of water, the agri sector is using the fresh water, part of which can be supplied by "reclaimed" water.
- The treated effluent use can de-stress the urban water bodies



NSF/ANSI Standard 350 (2017a) – Challenging Water Ingredients

Bathing Water

- Body wash with moisturizer
- Toothpaste
- Deodorant
- Shampoo
- Conditioner
- Lactic acid
- Secondary effluent
- Raw influent
- Bath cleaner
- Liquid hand soap
- Test dust
- Urea
- NaOH & HCL (for pH)



Laundry Water

- Liquid laundry fabric softener
- Test laundry detergent
- Secondary effluent
- Raw influent
- Test dust
- Na₂SO₄
- NaHCO₃
- Na₂PO₄
- Urea
- NaOH & HCL



Summary





Summary

- Many Authorities / 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.

