

NSF/ANSI 245 – 2007

Wastewater treatment systems – Nitrogen reduction

**NSF International Standard/
American National Standard**

NSF/ANSI 245 –2007



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American National Standard
for Wastewater Technology —

Nitrogen reduction

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Foreword²

The purpose of this Standard is to establish minimum materials, design and construction, and performance requirements for residential wastewater treatment systems providing for nitrogen reduction. This Standard also specifies the minimum literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

The Joint Committee on Wastewater Technology granted NSF International the authority to proceed with the evaluation and development of a stand-alone Nutrient Reduction Standard. A task group of Joint Committee members was formed to do the evaluation and bring recommendations to the Joint Committee. After evaluating the scope of the Standard, the task group decided to narrow the focus to nitrogen reduction and revisit the issue of reduction of other nutrients at a later time.

This Standard was developed using the existing NSF/EPA Environmental Technology Verification (ETV) Nutrient Reduction protocol as a reference for the test method, and using elements of NSF/ANSI 40 to complete the balance of the Standard. ETV protocols are developed for specific technology areas and serve as templates for developing test plans for the evaluation of individual technologies at specific locations. The differences between the ETV protocol and this Standard are outlined in the table below.

Testing Aspect	NSF/ANSI 245	ETV Nutrient Reduction
Duration of testing	6 months; up to 37 weeks total	1 year
System start-up	Up to 3 weeks	Up to 8 weeks
Influent requirements	Average over course of the test shall be: CBOD ₅ – 100 – 300 mg/L TSS – 100 – 350 mg/L TKN – 35 – 70 mg/L as N* Alkalinity – > 120 mg/L as CaCO ₃ * Temperature – 10° C - 30° C * allows chemical addition to adjust influent – sodium bicarbonate for alkalinity; urea and methanol at a C:N ratio of not less than 5:1 for TKN.	Only suggested ranges: CBOD ₅ – 100 – 450 mg/L TSS – 100 – 500 mg/L TKN – 25 – 70 mg/L Totl P – 3 – 20 mg/L Alkalinity – > 60 mg/L * Temperature – 10° C – 30° C * allows chemical addition to adjust influent – sodium bicarbonate for alkalinity.
Temperature impacts (temperatures below 10 °C impact process bacteria)	Allows for suspension of Nitrogen sampling when temperature drops below 10 °C, with extension of sampling to obtain a minimum of 55 valid sample sets	No allowance, test runs 1 year and all data is reported
Maintenance during testing	None – same as NSF/ANSI 40	Maintenance allowed, but documented and reported in final report
Stress sequences	Per NSF/ANSI 40	Same as NSF/ANSI 40 with one additional
Number	Four	Five

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Testing Aspect	NSF/ANSI 245	ETV Nutrient Reduction
Which ones	Wash day, Working parent, Equip/power failure, Vacation	Wash day, Working parent, Equipment/power failure, Low loading, Vacation
When	Run consecutively after 16 weeks of testing	First after 2 months, remainder about 6-7 weeks after previous
Sampling	3 times/week during design loading (weeks 1–16 and weeks 24½–26); 2 times during the week following each stress test	Minimum 1 time/month; same as NSF/ANSI 40 during stress sequence; also for 5 consecutive days at end of test
Acceptance criteria	<p>For pass/fail, only samples collected during design loading periods (samples during stress sequence are reported, but not included in the pass/fail criteria calculation).</p> <p>Average of all effluent samples shall not exceed:</p> <p>CBOD₅ – 25 mg/L TSS – 30 mg/L TKN – <50% of average of all influent TKN samples pH – 6.0 – 9.0 S. U.</p>	None; all data is reported

This Standard was developed by the NSF Joint Committee on Wastewater Technology using the consensus process described by the American National Standards Institute.

Suggestions for improvements of this Standard are welcome. Comments should be sent to Chair, Joint Committee on Wastewater Technology, c/o NSF International, Standards Department, P. O. Box 130140, Ann Arbor, Michigan 48113-0140, USA.

NSF/ANSI Standard for Wastewater Treatment Systems —

Nitrogen Reduction

1 General

1.1 Purpose

The purpose of this Standard is to establish minimum materials, design and construction, and performance requirements for residential wastewater treatment systems providing for nitrogen reduction. This Standard also specifies the minimum literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

1.2 Scope

This Standard contains minimum requirements for residential wastewater treatment systems having rated treatment capacities of 1514 L/d (400 gal/d) to 5678 L/d (1500 gal/d) that are designed to provide reduction of nitrogen in residential wastewater. Management methods for the treated effluent discharged from these systems are not addressed by this Standard. A system, in the same configuration, must either be demonstrated to have met the Class I requirements of NSF/ANSI Standard 40 or must meet the Class I requirements of Standard 40 during concurrent testing for nutrient removal.

The water chemistry of a site for installation and use of these systems is critical to achieve expected water quality results. Before these systems are installed at a location, the water used within the residence must be analyzed to verify that there is sufficient alkalinity to achieve the system's performance. Refer to Annex A for further explanation.

Natural systems involving features such as vegetation, wetlands, free access or buried sand filters, and soil systems may be evaluated using this protocol as long as effluent samples are representative of all treated effluent discharged from the system, as sampled from a central point of collection of all treated effluent.

1.3 Alternate materials, design, and construction

While specific materials, designs, and constructions may be stipulated in this Standard, systems that incorporate alternate materials, designs, or constructions may be acceptable when it is verified that such systems meet the applicable requirements herein.

1.4 Performance classification

For the purpose of this Standard, systems are classified according to the chemical, biological, and physical characteristics of their effluents as determined by the performance testing and evaluations described herein.

All systems within a manufacturer's model series may be classified according to the performance testing and evaluation of the system with the smallest hydraulic capacity within the series. Performance testing and evaluation of larger systems within the series (having hydraulic treatment capacities within the scope of this Standard) may not be necessary provided that the dimensions, hydraulics, mixing, filtering and biological treatment capabilities, and other applicable design characteristics are proportionately equivalent to the evaluated system.