



State of Delaware  
Department of Natural Resources & Environmental Control  
Division of Water Resources  
Ground Water Discharges Section

**Innovative and Alternative System Approval**

**ISSUED TO:** Ecological Tanks, Inc.  
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**FROM:** Jason Baumgartner – Environmental Scientist  
Ground Water Discharges Section

**FOR:** Aqua Safe AS600+4NR Aerobic Treatment Unit

**APPROVAL DATE: 4/19/2011**

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In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated August 10, 2010 has been submitted by Ecological Tanks, Inc., for approval of the Aqua Safe Advanced Treatment Unit as an Innovative & Alternative On-Site Wastewater Treatment Unit.

Based on the review of the application, the Department hereby grants approval of the use of the Aqua Safe advanced treatment unit (AS600+4NR model) as an Innovative & Alternative On-Site Wastewater Treatment Unit subject to the conditions, limitations, and requirements set forth herein:

**1. Product Description**

The Aqua Safe unit utilizes an extended aeration, activated sludge process to achieve treatment. Wastewater enters the pretreatment tank with a minimum hydraulic capacity of 400 gallons. From here, the wastewater enters the aeration chamber of the system, where it is mixed with organisms formed during

decomposition of organic material in the wastewater. Mixing in the chamber is achieved by release of air near the bottom of the chamber through four air lines located above the tank bottom. Continuous aeration is provided by a linear compressor

A conical shaped clarifier is located internal to the tank to provide for settling of the solids from the mixed liquor. The mixed liquor passes into the bottom of the clarifier by hydraulic displacement as wastewater enters the aeration chamber. Solids settled from the wastewater are drawn back into the aeration chamber from the bottom of the cone by hydraulic roll created by the air released in the aeration chamber and are dispersed by the mixing induced by the rising bubbles. Discharge of the clarified effluent occurs through a submerged tee assembly located below the clarifier surface to prevent discharge of solids that may float on the surface of the clarifier.

The AS600+4NR model has a rated treatment capacity of 600 gallons per day. This unit requires a pre-treatment tank of a minimum capacity of 400 gallons. **All tanks must be DNREC approved.**

## 2. Claim

**Approval is based on information submitted by the Manufacturer indicating the specified model will routinely provide effluent quality not exceeding 30 mg/l of BOD<sub>5</sub>, 30 mg/l of TSS, and 20 mg/l of Total Nitrogen (TN) assuming influent loading does not exceed the treatment capabilities of the units.**

**This unit has been certified under NSF Standard 40 NSF 245 standards.**

## 3. Use and Design Criteria

- a. The Aqua Safe unit may be installed for new and replacement systems with conventional and innovative and alternative disposal systems.
- b. An on-site wastewater treatment and disposal system permit application incorporating an Aqua Safe unit shall be designed in accordance with the Regulations, and manufacturer's specifications. The design shall be completed by a DNREC Class C Design Engineer unless otherwise approved by the Department. The permit application shall include proper unit specifications.
- c. The designer must ensure a pre-treatment tank precedes the Aqua Safe unit. This tank shall be a volume not less than 400 gallons or sized per the manufacturer's recommendations.
- d. The designer must assure that all access risers and observation/sampling ports have above grade access. The design also must ensure that the control panel and blower are accessible.

- e. The Aqua Safe unit shall not be installed within areas subject to traffic loads unless specially designed on a case by case basis in accordance with the Regulations and in accordance with manufacturer's specifications.
- f. The manufacturer is responsible for providing the Department a list of all local distributors and their associated contact information. This list must be kept current and shall be submitted to the Department on a yearly basis.

#### **4. Installation Procedures**

- a. The Aqua Safe unit shall be installed by a DNREC Class E System Contractor under the supervision of a manufacturer's representative, or by a DNREC Class E System Contractor who has been certified for unit installation. Proof of certification shall be provided in writing to the Department.
- b. The blower must be installed on a factory base and enclosure and located no more than 100 feet from the tank
- c. Start up of the system and initial operational checks shall be conducted by the Class E System Contractor (trained by the manufacturer), Design Engineer, and a Ground Water Discharges Section (Large System Branch) representative. If the Class E System Contractor is not certified, a manufacturer's representative shall perform the operational checks of the system at start up. If the manufacturer's representative can not be on site at the time of start up, they must provide final start up approval to the Department in writing.

#### **5. Operation and Maintenance**

- a. The Aqua Safe unit shall be operated and maintained in accordance with the manufacturer's specifications.
- b. The manufacturer shall comply with all Department mandated requirements as specified in permit conditions. This shall include operation and maintenance requirements.

#### **6. Sampling and Approval**

The Department reserves the right to sample any unit at any time.

#### **7. General Conditions**

- a. Use of the system for wastes other than residential shall be on a case by case basis.
- b. In the event that the product fails to perform as claimed by the applicant, the use of the units for new installations shall cease. Use of the units shall not resume until such time the applicant and the Department have reached an acceptable agreement for resolving the situations.
- c. Any changes that deviate from the specifications as submitted with this approval shall be approved by the Department prior to use.