



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

Innovative and Alternative System Approval

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FOR: Singlair Model TNT Advanced Treatment Unit

APPROVAL DATE: **July 11, 2006**

In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated July 6, 2006, has been submitted by Norweco Equipment Company, for approval of the Singlair Model TNT 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 Singlair Model TNT Advanced Treatment Unit as an Innovative & Alternative On-Site Wastewater Treatment Unit. The following conditions, limitations, and requirements must be adhered to:

1. Product Description

The Singlair TNT Advanced Treatment Unit utilizes a patented extended aeration, activated sludge and filtration process. The system starts with a pretreatment chamber, followed by an aeration chamber provided with an infused air system operating on a timed run cycle. Settling is accomplished in a clarification chamber following the aeration chamber. A Bio-Kinetic System, located in the clarification chamber provides flow equalization, optional chlorination, final filtration, settling and optional dechlorination prior to effluent discharge.

The Singlair TNT is made up of four treatment stages. Incoming wastewater flows into the pretreatment chamber for removal of solids. Anaerobic bacteria break down the solids. A tee located at the chamber outlet provides for retention of floating solids in the chamber.

The aeration chamber provides a minimum retention time of 24 hours. Aeration is achieved by the use of a spinning submerged aerator. The aspirator draws air down the aspirator shaft, releasing small bubbles that cause the wastewater to rise in the chamber.

The aerator run cycle is controlled by a timer, where it will run for 60 minutes and off for 60 minutes.

After the aeration chamber, the wastewater passes into the clarification chamber, where a stationary sludge return device is located and utilizes hydraulic currents to return settled activated sludge from the bottom of the clarifier back to the aeration chamber.

A Bio-Kinetic system that is connected to the outlet of the tank provides the final treatment stage. The System is made up of three filtration zones, seven settling zones and three pairs of flow equalization ports. Wastewater passes down through the design flow filter mesh which provides for initial filtration and entrapment of solids. All flow passing through the flow equalization ports drops to a deck that directs flow through an optional chlorine tablet feeder and then downward to the un baffled settling zone. The clarified water then is ready to be disposed.

Singular Model TNT Data Chart

Model TNT	500 gpd	750 gpd	1000 gpd	1250 gpd	1500 gpd
Daily Treatment Capacity (gpd)	500	750	1000	1250	1500
Total System Capacity (gallons)	1300	1600	2300	2850	3400
Number of Singular Aerators	1	1	2	2	2
Number of Bio-Kinetic Systems	1	2	2	3	3
Number of Bio-Static Sludge Returns	1	1	1	2	2

2. Claim

Approval is based on information submitted by the Manufacturer indicating the specified model will routinely provide effluent quality not exceeding 10 mg/l of BOD₅, 10 mg/l of TSS, and <20 mg/L of Total Nitrogen.

This unit has been certified as NSF Standard 40, Class I, which meets secondary effluent characteristics.

3. Use and Design Criteria

- a. The Singular TNT advanced treatment unit may be installed for new and replacement systems with conventional and innovative and alternative disposal systems.
- b. The Singular TNT advanced treatment unit shall be utilized for residential applications up to 1500 gallons per day. Additional flows will require manufacturer’s guidance.
- c. An on-site wastewater treatment and disposal system permit application incorporating a Singular TNT advanced treatment 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.

- d. The designer must assure that the pretreatment chamber, extended aeration chamber, and the final clarification chamber all have above grade access. The design also must ensure that the control panel and blower are accessible.
- e. The Singlair TNT advanced treatment 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 use of chlorination and dechlorination shall be on a case by case basis.
- g. 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.
- h. The Department shall approve of the use of ultraviolet disinfection on a case by case basis.

4. Installation Procedures

- a. The Singlair TNT advanced treatment 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. 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 Singlair TNT advanced treatment unit shall be operated and maintained in accordance with the manufacturer's specifications.
- b. The manufacturer shall comply will 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.