RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

Alternative/Experimental OWTS Technology Program

Vendor Information:
Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Web: www.norweco.com

Scott Hetrick, Sales Manager
Email: shetrick@norweco.com
Tel: 419-668-4471
Fax: 419-663-5440

Local Contacts:
Siegmund Environmental Services, Inc.
Hollister Siegmund, President
49 Pavilion Avenue, 2nd Floor
Providence, RI 02905

Tel: 401-785-0130
Fax: 401-785-3110
Web: www.siegmundenvironmental.com/
Email: hollister@siegmundenvironmental.com

Technology Name & Model Numbers:
Concrete:
Singulair® TNT® 600 (Maximum design flow 600 GPD)
Singulair® TNT® 750 (Maximum design flow 750 GPD)
Singulair® TNT® 1000 (Maximum design flow 1000 GPD)
Singulair® TNT® 1250 (Maximum design flow 1250 GPD)
Singulair® TNT® 1500 (Maximum design flow 1500 GPD)

HDPE:
Singulair Green® TNT 600® (Maximum design flow 600 GPD)

Technology Type:
Nitrogen Reducing System – Class Two
TN $\leq$ 19 mg/L

Certification Dates:
Issued: April 5, 2013
Expires: April 5, 2018

CERTIFICATION

The RI Department of Environmental Management (RIDEM) has reviewed the Class Two Alternative/Experimental (A/E) Technology application for the Singulair TNT (concrete) and Singulair Green TNT (HDPE) treatment system, hereafter referred to as the "System". The System consists of a three-chambered tank. The first chamber provides pretreatment, the second is an aeration chamber with an infused air system: air is introduced to the aeration chamber by an aeration system, which spins a hollow aspirator shaft, drawing air into the hollow shaft through four intake ports located beneath the aerator handle; the aerator vent through which the air is drawn is integral to the access cover above the aerator. The aeration system is controlled by a factory programmed, non-adjustable timer to run a 60 minute aeration cycle followed by a 60 minute anoxic cycle, during which the aerator is not running. Settling takes place in the clarification chamber (the third chamber) following aeration and currents generated by the spinning aerator draw sludge from the clarification chamber back to the aeration chamber. The Bio-Kinetic filter within the clarification chamber filters wastewater prior to discharge to a leachfield.

Based upon information contained in the application and supplemental information submitted by Norweco, Inc. hereafter referred to as the "Vendor", the RIDEM hereby accepts the System for listing on the RIDEM Alternative/Experimental Technology List. The RIDEM recognizes the System as capable of achieving effluent concentrations of less than or equal to 19 mg/L total nitrogen (TN) and 30 mg/L for TSS and BOD. Design, installation and operation of the System shall be in accordance with the following terms and conditions:

I. Monitoring Requirements

1. Monitoring shall be performed according to the provisions of the attached Monitoring Protocol for Nitrogen Removal Systems.

2. A limit of fifty (50) systems will be approved for construction until sufficient data are received through the monitoring indicating treatment objectives are being achieved.

II. General Design Requirements

1. The System is recognized for treating residential-strength wastewater with model-specific design flow only; the System may not be installed in parallel to treat design flows that exceed the specified design flows. See Vendor's design manual for appropriate model-specific design flows.

2. Specific conditions relating to elevation of the seasonal high groundwater table and bury depth apply to Singulair Green TNT; these are specified in the Vendor's design and installation manuals.

3. The System is not preceded by a septic tank unless it is proposed for use where the design flow will be 1,000 gpd or greater; in these cases, the System must be preceded by a septic tank appropriately sized for the specified design flow in accordance with the Vendor's design manual.

4. The System is to be set for aeration on a 60 minute on, 60 minute off run cycle.

5. Leachfield Area Reduction
   a) Designs incorporating this System and a conventional leachfield shall be allowed a 40% reduction in the required leachfield size. This reduction is based upon the ability of the System to remove BOD and suspended solids as demonstrated by the data presented in the Vendor's submittal. No reduction in leachfield size shall be allowed for non-conventional leachfields unless the leachfield technology is approved as a Class I alternative component technology and such reduction is not prohibited by the Class I alternative component technology's certification. Deep leaching chambers and any conventional leachfield using more than one foot of stone below shall be prohibited with or without the reduction.

   b) Each applicant proposing a reduced leachfield area shall demonstrate that sufficient land area is available on the lot to permit installation of a full size leachfield. The full size leachfield shall meet all applicable OWTS setback requirements. This is not a requirement that an entire "replacement" field be available, only that enough additional land area be available to increase the "reduced" leachfield area to standard size if ever necessary.

6. In addition to other approved leachfield options allowed by regulation, the effluent from the System may be discharged to a pressure-dosed shallow-narrow drainfield provided the latter is designed in accordance with the Vendor's Design and Installation Manual and complies with related guidance and regulations issued by the RIDEM. A one-foot reduction in the required design groundwater separation distance is allowed when the System is used in conjunction with a pressure-dosed shallow-narrow drainfield.

7. No System where design flow exceeds 900 gpd shall employ the use of a bottomless sand filter (BSF) as the final means of disposal without technical studies to address the possible adverse effects as indicated in the BSF guidance document issued by the RIDEM.

8. The control panel must incorporate an event counter, an elapsed-time meter and a visible and audible pump/power failure warning indicator in a NEMA approved cabinet exterior to the building.

9. System tanks, septic tanks, dosing chambers, pumping chambers, and riser assemblies shall be certified watertight by the manufacturer or field-tested and certified water tight using procedures set forth in RIDEM OWTS Rules.

10. Design and installation shall be in strict conformance with the approved System design and installation manual. The design shall be prepared by a RIDEM licensed designer and the installation shall be performed by a RIDEM licensed installer each of whom has received training and is authorized in writing by the Vendor to perform the applicable work on the System.

11. Pumps must be wired to the same circuit as the aerator.

12. Each System installation shall meet all other applicable OWTS standards and receive prior approval by the RIDEM pursuant to the Rules in effect at the time of application.

III. General Certification Requirements

1. The Vendor shall submit to the RIDEM, a guidance document detailing all design, installation, operation and maintenance requirements for the System. Once this guidance document has been approved, the System shall be placed on the RIDEM's list of approved Alternative/Experimental Technologies and training may be scheduled.

2. The Vendor is responsible for making the RIDEM approved design, installation and operation and maintenance guidance available to the public.

3. Training
   a) The Vendor shall hold two training seminars for RIDEM Licensed Designers, Installers and Service Providers before the expiration or renewal of this Certification. The first shall be held within the first six (6) months of the date of this Certification.

   b) The Vendor shall notify the RIDEM of the date and time of each training seminar and submit to the RIDEM a detailed agenda, material to be distributed to attendees and a list of presenters specifying their credentials at least six weeks in advance of the date of the scheduled seminar. Please consult the RIDEM-issued requirements for Vendors' technology training available on the RIDEM website in the A/E technology section.

4. The Vendor shall make available to the public, a means of identifying the individuals, by name and category (designer, installer, professional service provider), who have received training and are authorized in writing by the Vendor to design, install and maintain the System.

5. The Vendor shall notify the RIDEM in writing of any changes to the System, including its discontinuation. Modifications deemed by the RIDEM to be substantial, may require re-application to the alternative/experimental program.

6. This Class Two approval shall be effective until the expiration date of this Certification.

7. If the Vendor wishes to extend this Class Two Certification beyond its expiration date, they shall apply for and obtain a renewal of this approval. The Vendor shall submit a renewal application in accordance with the RIDEM Onsite Wastewater Treatment System Rules.

8. The Vendor shall notify the RIDEM at least 30 days prior to any proposed transfer of ownership of the System technology. Notification shall include the name and address of the new owner and a written agreement between the existing and new owner specifying a date for transfer of ownership, responsibility, and liability for the technology. All provisions of this approval shall be applicable to any new owners.

9. The Vendor shall provide any purchaser of the System with a copy of this approval Certification prior to the sale of the System.

IV. Operation and Maintenance (O&M) Requirements

1. The RIDEM approved O&M Manual shall be provided to the Owner/Operator of each System.

2. Systems shall be maintained according to the manufacturer's specifications.

3. For seasonally used Systems, the Vendor shall provide specifications for protection of the System and the biological component from freezing, and conditions under which power to the System may be turned off.

4. The Vendor must offer for sale a minimum two-year service contract that must include, as an option, service to all A/E components of the treatment train in addition to the System.

5. Vendor trained homeowners may perform O&M on their own systems; training must have been received for all components of the treatment train on which a homeowner wishes to perform O&M.

6. The Applicant/Owner shall record copies of the OWTS construction permit issued by RIDEM and the initially executed O&M contract(s) for the System, and all other A/E components in the treatment train, in the land evidence records of the applicable city or town prior to the RIDEM issuing the Certificate of Conformance for each installation.

7. a.) The owner shall retain a public or private maintenance entity (Service Provider) for the life of the System and all other A/E components of the treatment train; a Vendor-authorized homeowner functioning as Service Provider is exempt from this for the System and any components of the treatment train for which the homeowner is providing service.

   b.) No agreement with a maintenance entity shall be for less than two years.

   c.) Service Providers must be trained and authorized in writing by the appropriate Vendor to perform O&M on the System and all other A/E components of the treatment train for which they will be performing O&M.

   d.) The Service Provider or homeowner providing O&M on his or her own System shall:
   (1) Receive training as approved by the Vendor.
   (2) Be available to perform required preventative maintenance, perform repairs, respond to System emergency situations, and conduct performance monitoring when required by this Certification or by permit.
   (3) Perform an inspection of the treatment System at least twice annually.
   (4) Report to the Vendor, all inspections and maintenance calls conducted and all problems or failures observed with a summary of the cause and remedial measures taken.

8. The Vendor shall provide to the RIDEM within six months of the issuance of this Certification, a list of trained Service Providers. At least two qualified independent professional Service Providers shall be maintained on the list at all times. A Service Provider who subcontracts service for the same technology, shall not be considered meeting this requirement. The list of Service Providers must be provided to RIDEM as part of the annual reporting requirement. Homeowners authorized to perform O&M on their own Systems shall be included on this list provided to the RIDEM, with the System address and associated permit number.

9. A list of trained professional Service Providers shall be made available to the public.

10. The Vendor shall have an inventory of System parts available locally.

V. Reporting Requirements

1. The Vendor shall submit an annual report to the RIDEM by the anniversary of this Certification each year, to include the following information for the preceding 12-months:

a) The number of Systems installed in Rhode Island since the last report,

b) The address of each installation, the name of the owner and the RIDEM permit number,

c) For each System, the number of inspections/maintenance calls conducted and a brief comment regarding activities performed and observations,

d) All known problems or failures experienced with a brief summary of the cause and remedial measures taken.

Electronic submission is encouraged.

2. The Service Provider shall report any termination or non-renewal of maintenance agreements to the RIDEM, the Vendor and to the local wastewater management authority should one exist for that area. Electronic notification is encouraged.

VI. Rights of the RIDEM

1. The RIDEM may suspend, modify or revoke this approval for cause, including but not limited to: non-compliance with any of the conditions or provisions of this approval, misrepresentation or failure to disclose fully all relevant data, or receipt of new information indicating that the use of the System is contrary to the public interest, public health or the environment.

2. This approval does not represent an endorsement of the System by the RIDEM. This letter of approval may be reproduced only in its entirety.

Russell J. Chateauneuf, P.E.
Chief of Groundwater and Wetlands Protection

4/5/13
Issuance Date

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

Monitoring Protocol for Nitrogen Removal Systems

All new N-removal technologies approved under OWTS Rules 37.4.2 (B) (i), or (ii), must be monitored according to the terms of this protocol. A minimum of 10 systems, with a minimum of four (4) sampling events for each is required. At least seven (7) must have year-round occupancy and at least three (3) shall be seasonal.

All enrolled systems must incorporate a means of measuring and recording forward flow from the treatment system into the leachfield. This may be accomplished using a pressurized in-line wastewater flow meter, a cycle event counter, elapsed time meter, tipping d-box with an event counter, or other suitable method. The forward flow shall be reported as an average daily flow in gallons per day. The measurement period must be at least 15 days but no more than 120 days.

System Enrollment:
The Vendor shall identify each system to be enrolled in the monitoring program. It is the intent of this Protocol to have all 10 test sites identified by the time 25 systems have been approved for construction. RIDEM may relieve an installation from this monitoring protocol based on extenuating circumstances, and order discontinuance and/or enrollment of a replacement system at its discretion.

For each system enrolled in monitoring, the vendor shall provide the following information to RIDEM at the time of enrollment:

- Owner(s') name(s)
- RIDEM OWTS Permit number
- Address at which the system is installed
- Occupancy (estimated number of occupants)
- Occupancy conditions (seasonal, or full time)
- Copy of the O&M contract and name and contact information of service provider
- Name and contact information of the third party performing sample collection and analysis

Frequency of monitoring
Year-round occupancy: Samples shall be collected quarterly. The first sample shall be collected between 60 and 90 days of start up.

Seasonal occupancy: The first effluent sample shall be collected two (2) weeks after initial start up for the season. The second sample in a season must be collected at least four (4) weeks after the first and while the system is still in service for the season. Annually thereafter, samples shall be collected in mid-June, mid-July, mid-August, and mid-September until eight (8) total samples are collected.

Sample collection & analysis
Prior to any sampling, the Vendor shall submit a system-specific sampling protocol to the RIDEM for review and approval. The protocol shall specify the location of sample collection and the procedures for collection of the sample and forward flow information. The sample shall be taken after the full treatment step but before delivery to the leaching field or drainfield.

A third party approved by RIDEM and trained by the vendor shall collect all effluent samples to be analyzed in the lab for BOD5, TSS, pH, total nitrogen (TN), perform field analysis for dissolved oxygen (DO) and temperature and record forward flow data. A chain-of-custody shall be completed for each sample through delivery to the laboratory. [Note: a service provider, distributor or dealer is not considered a third party.]

Effluent will be collected by composite sampler, or grab sample as preferred by the Vendor. Sample bottles will be prepared and sampling equipment will be cleaned between sampling events, following standard laboratory protocol and stored in a clean plastic bag.

Analysis of the wastewater samples will be performed by a laboratory certified by the RI Department of Health (HEALTH) for testing water samples.

Samples must not be collected within one week following a service visit or within one month following a septage pump out. The third party responsible for sampling each system is responsible for scheduling sampling to adhere to these restrictions, and coordinating with the service provider and homeowner as required.

Testing and reporting parameters

Table 1

Constituent	Report the Following for Routine Sampling events	Report the Following for Resampling events
Forward flow (gpd)	X	X
Dissolved Oxygen (*Field Test*)	X	X
Effluent temperature (F) (*Field Test*)	X	X
BOD5	X	X
TSS	X	X
pH	X	X
Total Nitrogen (TN)	X	X
Nitrate		X
Nitrite		X
Ammonia		X
Alkalinity		X
TKN		X

Resampling Option

The vendor may direct resampling of a system if the vendor has reason to believe the results are not representative of system performance. Reasons may include evidence of excess occupancy, possible shock load from the home, effects of antibiotics or other drugs, or system being in need of service or adjustment. The system must be resampled no sooner than seven (7) days after any adjustment is made to the system and within thirty (30) days of the original sample collection for that round. Resampling may be performed only once per sampling event. The sample must be analyzed for the additional constituents noted in Table 1 for any resampling events. Unless otherwise indicated by the vendor, when resampling is done, DEM will use the lowest N concentration result for each sampling round for each system in its analysis of performance. When resampling is performed, the vendor shall submit to the RIDEM, an explanation of the reasons for resampling and any measures taken to correct the system's performance.

Data Submittal

The vendor is responsible for submittal of all data generated under this protocol to the OWTS Program. This includes the average daily forward flow volume (report total gallons and the number of days in the measurement period, and in gallons per day), chain of custody forms, analytical results for all samples including resampling, reason for resampling, and any other explanatory notes. Electronic submission is preferred.

The Vendor must submit all the data and other required reporting, that has been collected to RIDEM. Data and other required reporting must be submitted to RIDEM until the systems are relieved from the requirement for monitoring by RIDEM in writing.