

Paul R. LaPage, Governor

Mary C. Mayhew, Commissioner

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-8016; Fax: (207) 287-9055
TTY Users: Dial 711 (Maine Relay)

Tel. (207) 287-5672
Fax (207) 287-4172

Subsurface Wastewater Unit

December 3, 2012

SYMPCO, LLC
Attn.: Robert F. Silva, VP
P. O. Box 2217
South Portland, ME 04106

Subject: Product Registration, Norweco Inc., Singulair Model 960 and Model TNT-500

Dear Mr. Silva:

The Division of Environmental Health has completed a review of a registration application for the subject products. This information was submitted pursuant to Section 6.HH of the Subsurface Wastewater Disposal Rules for registration for use in Maine.

The Norweco Inc., Singulair Model 960 and Model TNT-500 each consist of a multiple compartment treatment tank with primary, secondary, and clarification chambers. According to the information you provided, the Norweco Inc., Singulair Model 960 and Model TNT-500 have been certified by the National Sanitation Foundation (NSF) pursuant to ANSI/NSF Standard 40 for residential wastewater treatment systems, for reductions in organic loading and nitrogen. You have requested that the disposal area size be allowed to be reduced to 75 percent of the normal size required by the Rules, when used in conjunction with stone and pipe disposal trenches.

On the basis of the information, the Division has determined that the Norweco Inc., Singulair Model 960 and Model TNT-500 is acceptable for use in the State of Maine, provided that it is installed, operated, and maintained in conformance with the manufacturer's directions. The disposal area may be reduced to 75 percent of the normal size required by the Rules, when used in conjunction with stone and pipe disposal trenches.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of Norweco Inc., Singulair Model 960 and Model TNT-500. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar or competing products.

If you have any questions please feel free to contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen
Project Manager, Webmaster
Division of Environmental Health
Drinking Water Program
Subsurface Wastewater Unit
e-mail: james.jacobsen@maine.gov

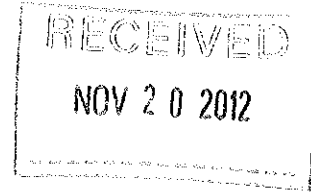
/jaj

cc: Singulair Product File



11/13/12

James A. Jacobsen, Environmental Specialist IV
Wastewater and Plumbing Control Program
Division of Health Engineering
161 Capitol St
11 State House Station
Augusta, ME 04333



Jim,

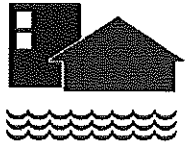
During these trying economic times coupled with the desire to more aggressively protect the environment Septic Preservation Services has expanded its resources to now include several new technologies. The White Knight has and continues to serve us and our customers well however under some instances there is equipment that can better serve our customers needs. One of these tools is the Singlair waste treatment system.

Due to strict non-compete clauses in distributor agreements Septic Preservation Services has used an existing subsidiary to distribute the Singlair and would like to offer the product in Maine. I mention this because I feel that full disclosure helps avoid confusion and rumors. I want you to know that while we are conducting business under multiple corporate names, we remain united and committed to the reputable quality of service that we have always delivered to our customers.

Please accept the attached request for approval for use of the Singlair and feel free to contact me with any questions or requests for additional information.

Sincerely,

Robert F. Silva
Vice President



SYMPCO, LLC

CUSTOM DESIGN & ENGINEERING SOLUTIONS

11/13/12

James A. Jacobsen, Environmental Specialist IV
Wastewater and Plumbing Control Program
Division of Health Engineering
161 Capitol St
11 State House Station
Augusta, ME 04333

Jim,

As the authorized representative of Norweco I would like to respectfully submit this request for a modification to the approval of the Singulair waste treatment equipment. This equipment is NSF approved with a long history of proven performance.

I have attached the following documents for your review;

1. Brochures
2. Specifications and CAD drawings
3. Installation Instructions
4. Owners Manual
5. Service instructions and inspection record
6. NSF Final Report
7. NSF full report including all test results
8. NH State approval
9. Mass State approval

Upon review of this request I ask that the following be incorporated into the approval;

1. The Singulair model 960 or Singulair Green model are approved for use
2. The maximum field size reduction is 75% when installed with a pipe and stone trench. A summary of the NSF testing is on page 10 of section 7 of this submittal. In this summary the average BOD was 3 mg/l and the average TSS was 8 for a combined total average of 11 mg/l.
3. The technology is recognized to reduce total nitrogen to under 12 mg/l. A summary of these test results from NSF is also on page 10 of section 7 in this submittal.

Thank you in advance for your efforts.

Please feel free to contact me with any questions or requests for additional information.

Sincerely,

Robert F. Silva
Vice President

FINAL REPORT

Analysis of Norweco Singulair[®] Model 960 System for Denitrification

Engineering & Research Services
NSF International • Ann Arbor, Michigan



1.0 INTRODUCTION

Denitrification testing of the Norweco Singulair® Model 960 wastewater treatment system was conducted at the NSF International Wastewater Test Site in Chelsea, Michigan. The Model 960 used in the testing was modified from the Model 960 that is certified by NSF under ANSI/NSF Standard 40 – 2000 (Residential Wastewater Treatment Systems). This modification is shown on Norweco drawing #PC-5-9611 as shown in Appendix A. The Singulair system as modified for testing, has not been certified under NSF Standard 40. This report does not constitute certification and is not to be distributed without the written permission of NSF International. A representative of Norweco had access to the system under test once per week during this evaluation for the purpose of making additional observations on the system.

Raw wastewater diverted from the Chelsea municipal collection system was used for the testing. The system had been in operation at design flow conditions for 3 months prior to this testing. The Model 960 was dosed at the design rated capacity of 500 gallons per day through the entire 21-week testing period, beginning in May and continuing into October 2000. Wastewater was fed to the Model 960 according to the schedule below, as listed in Standard 40:

- 6 a.m. to 9 a.m. - 35 percent of daily rated capacity (175 gallons)
- 11 a.m. to 2 p.m. - 25 percent of daily rated capacity (125 gallons)
- 5 p.m. to 8 p.m. - 40 percent of daily rated capacity (200 gallons)

2.0 PROCESS DESCRIPTION

Modifications to the Singulair® Model 960 specifically for this testing included the addition of a 100 gallon effluent sump with a float controlled pump, downstream of the Singulair tank. Discharge for the pump was plumbed to allow a portion of the effluent to be returned to the system influent line at each pump cycle. At the beginning of the evaluation, the system was calibrated to recirculate approximately 12% (6 gallons) of the discharge volume at each pump cycle. Detailed drawings of the system used in this evaluation are included in Appendix A.

3.0 EVALUATION METHODS

3.1 Sampling Method

During the evaluation all samples were 24-hour composite samples, collected by automatic samplers programmed to collect samples in coordination with the discharge of treated wastewater from the system. Samples were stored at 2 ± 2 °C. Total Kjeldahl Nitrogen (TKN) samples were preserved with sulfuric acid at the time of collection.

3.2 Analytical Methods

Samples collected during the evaluation for the nitrogen series were analyzed by NSF at the Ann Arbor Laboratory. The analyses were completed using EPA methods – Method 300 for nitrate nitrogen and Method 351.2 for TKN.

4.0 EVALUATION RESULTS

4.1 Influent Characteristics

Influent nitrogen samples were analyzed once per week during a portion of this testing. Table 1 provides a summary of influent nitrogen strength for samples collected between September 6 and November 1, 2000.

Table 1. Chelsea Influent Nitrogen Strength From September 6 to November 1, 2000

	Average	Standard Deviation	Minimum	Maximum
Ammonia Nitrogen (mg/L)	18	2	16	23
Total Kjeldahl Nitrogen (mg/L)	25	2	23	27

Carbonaceous biochemical oxygen demand (CBOD) and suspended solids were also measured in the influent on most weekdays over the course of the evaluation. Influent CBOD ranged between 100 and 240 and averaged 167 mg/L. The average influent suspended solids concentration was 226, ranging between 170 and 300 mg/L.

4.2 Testing Summary

Effluent nitrogen test results are summarized in Table 2.

Table 2. Effluent Nitrogen Summary

	Nitrate Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)
Test Average During Effluent Recirculation	4.8	1.9
Test Average Without Effluent Recirculation	10.0	1.8
Total Test Average	6.5	1.8

The evaluation was conducted in three segments. The effluent pump was installed on August 16, 2000 and the flow rate through the recirculation line was set with a throttling valve. Sampling during Phase 1 began on August 21 and ended on September 6. During this time, Total Kjeldahl Nitrogen averaged 1.6 mg/L and ranged from 0.9 to 2.0 mg/L. Effluent nitrate ranged from 3.2 to 5.3 and averaged 4.3 during the first phase of testing. Complete results of the nitrogen testing during Phase 1 of the testing are shown in Table 3.

Following sampling on September 6, a ball valve in the recirculation line was shut off and 100% of the effluent was discharged from the system at each pump cycle. Phase 2 was conducted to determine the extent of denitrification that was occurring due to the effluent recirculation. Sampling for the second segment of the evaluation began on September 11 and ended on September 27. During this period of time, the effluent Total Kjeldahl Nitrogen averaged 1.8 mg/L, ranging from 0.3 to 2.6 mg/L. Effluent nitrate nitrogen averaged 10.0 mg/L, ranging from 9.1 to 12 during the second phase of testing. Complete results of the nitrogen testing during the second phase of the testing are shown in Table 4.

Following sampling on September 27, the ball valve in the recirculation line was opened to bring the system back to the same conditions as in Phase 1 of the evaluation, with approximately 12% of the effluent being recirculated back to the head of the system. The position of the throttling valve was not changed throughout the testing to allow Phase 3 conditions to match Phase 1 conditions as closely as possible. Sampling for Phase 3 began on October 2 and ended on October 18. Effluent Total Kjeldahl Nitrogen averaged 2.2 mg/L and ranged from 1.4 to 2.7 mg/L during this phase. Effluent nitrate nitrogen ranged from 4.3 to 6.3 mg/L and averaged 5.4 mg/L. Complete results of the nitrogen testing during Phase 3 of the evaluation are shown in Table 5.

Appendix A

Plant Specifications and Drawings

This job requires more memory than is available in this printer.

Try one or more of the following, and then print again:

- For the output format, choose Optimize For Portability.

- In the Device Settings page, make sure the Available PostScript Memory is accurate.

- Reduce the number of fonts in the document.

- Print the document in parts.

GENERAL NOTES:

- ① SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
- ② FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TEN AND ONE HALF INCHES BELOW TANK TOP.
- ③ ON DEEPER INSTALLATIONS, RISERS MUST BE USED TO EXTEND AERATOR MOUNTING RISER AND BIO-KINETIC® SYSTEM MOUNTING RISER TO GRADE. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE.
- ④ REMOVABLE COVERS ON RISERS ARE EACH SECURED TO PREVENT UNAUTHORIZED ACCESS.
- ⑤ CONTACT THE LOCAL, LICENSED SINGULAR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

PROJECT ENGINEER'S APPROVAL:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

CONTRACTOR'S CERTIFICATION:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

DATE: _____

NAME: _____

CRITICAL DIMENSIONS

A	1'-5 1/2"	N	0'-0 3/8"
B	3'-3"	O	0'-6"
C	3'-5 1/4"	P	0'-0 3/8"
D	4'-1 3/4"	Q	1'-2 1/2"
E	2'-5 3/4"	R	4'-3 1/2"
F	10'-3"	S	5'-6"
G	0'-10 1/2"	T	1'-11"
H	4'-7 1/2"	U	6'-6"
I	0'-3"	V	6'-6"
J	0'-1 1/2"	W	6'-6"
K	1'-0"	X	6'-6"
L	0'-0 3/4"	Y	6'-6"
M	4'-4"	Z	6'-6"

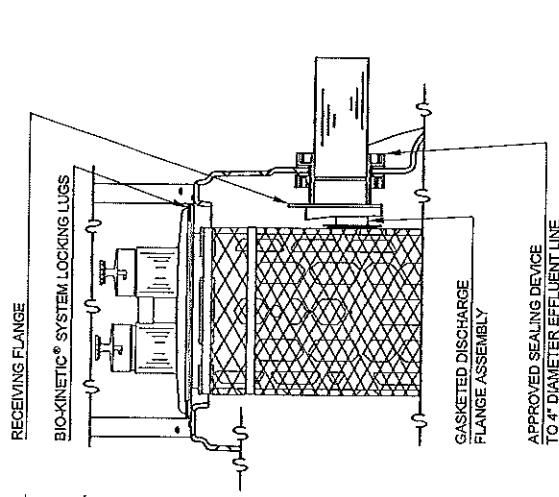
U.S. AND FOREIGN PATENTS PENDING

norweco

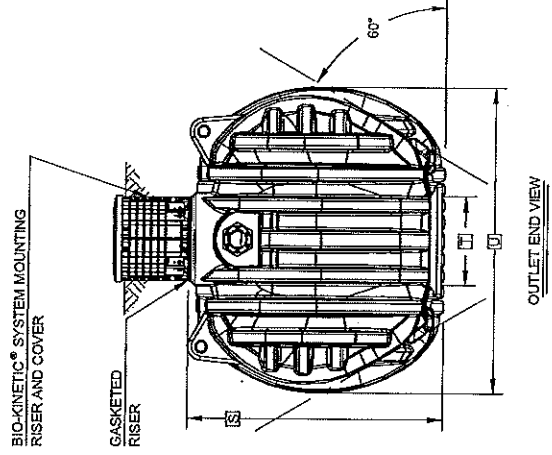
SINGULAR® GREEN
999-566 SYSTEM

NSF
B-4-10

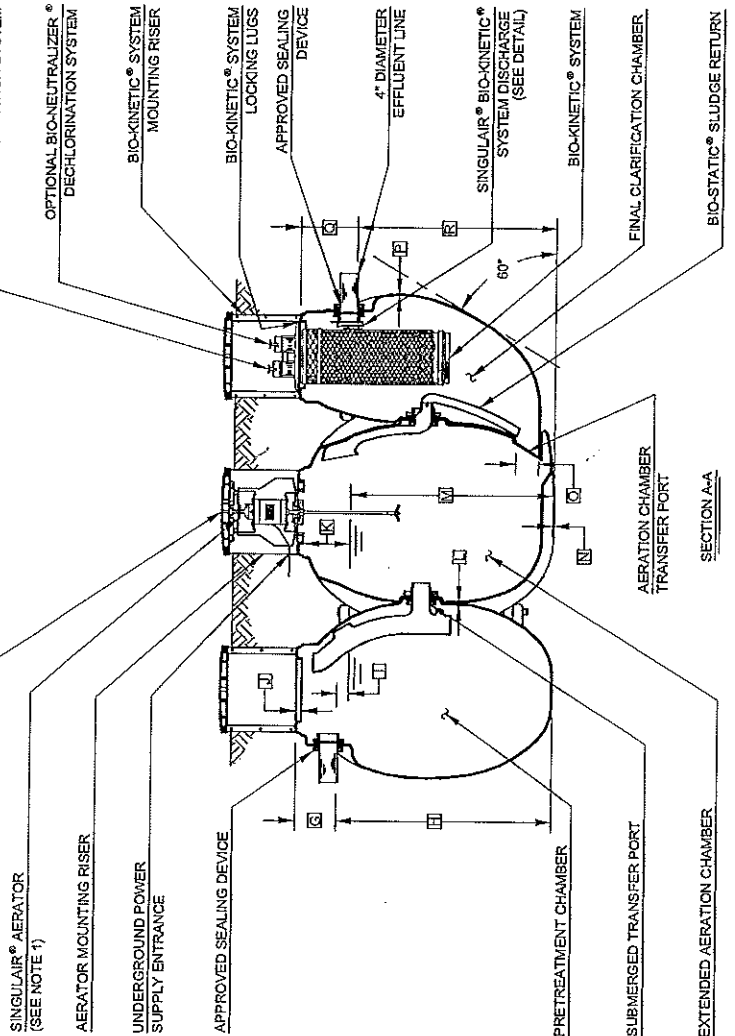
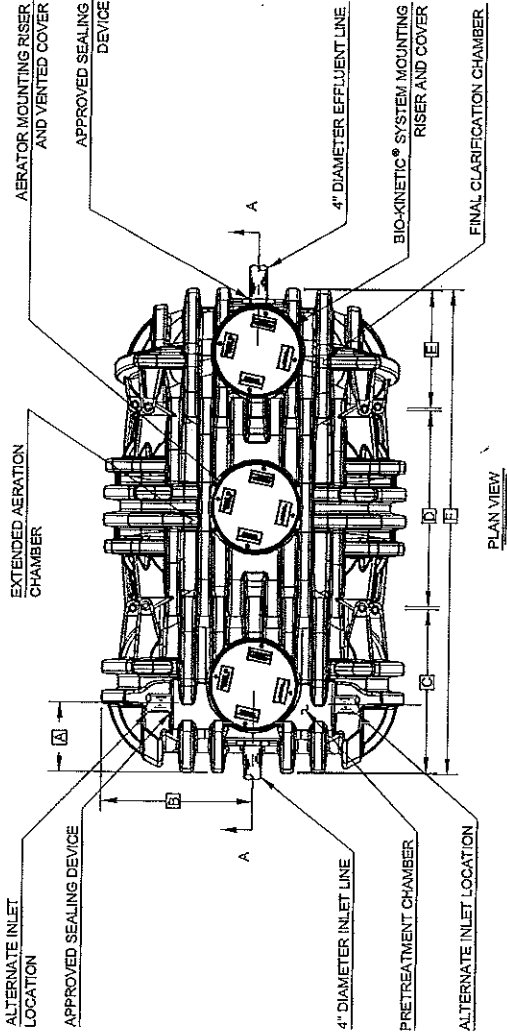
PC-5-7122



BIO-KINETIC® SYSTEM DISCHARGE DETAIL



NOTE: TOTAL SYSTEM CAPACITY: 1,500 GALLONS
RATED CAPACITY: 500 GALLONS PER DAY



SINGULAR® AERATOR (SEE NOTE 1)

AERATOR MOUNTING RISER

UNDERGROUND POWER SUPPLY ENTRANCE

APPROVED SEALING DEVICE

PRETREATMENT CHAMBER

SUBMERGED TRANSFER PORT

EXTENDED AERATION CHAMBER

AERATION CHAMBER TRANSFER PORT

FINAL CLARIFICATION CHAMBER

BIO-KINETIC® SYSTEM DISCHARGE (SEE DETAIL)

BIO-STATIC® SLUDGE RETURN

WE HAVE REVOLUTIONIZED AIR DELIVERY

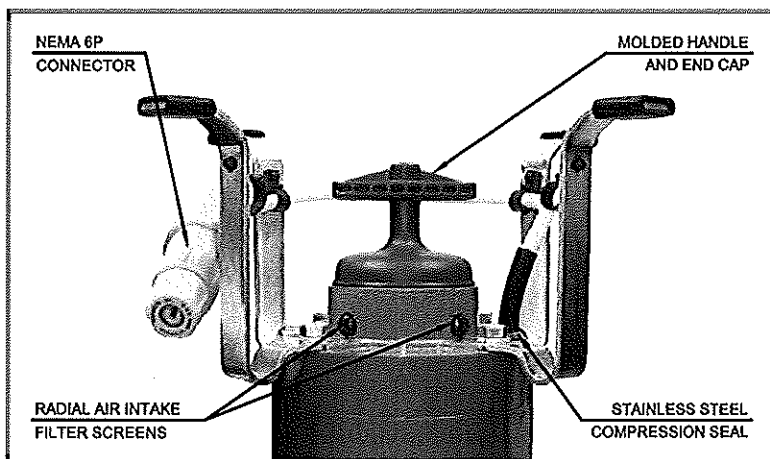
THE SINGULAIR MODEL 206C AERATOR
FLOODPROOF CONSTRUCTION
DEPENDABLE PERFORMANCE
EASILY MAINTAINED

The Model 206C Singulair aerator delivers performance worth talking about. Built with improved watertight integrity, state-of-the-art ball bearings, radial air intake openings and waterproof electrical connections, this Singulair air delivery system outperforms and outlasts all others.

TECHNOLOGY YOU CAN COUNT ON ENGINEERED FOR EXTENDED LIFE

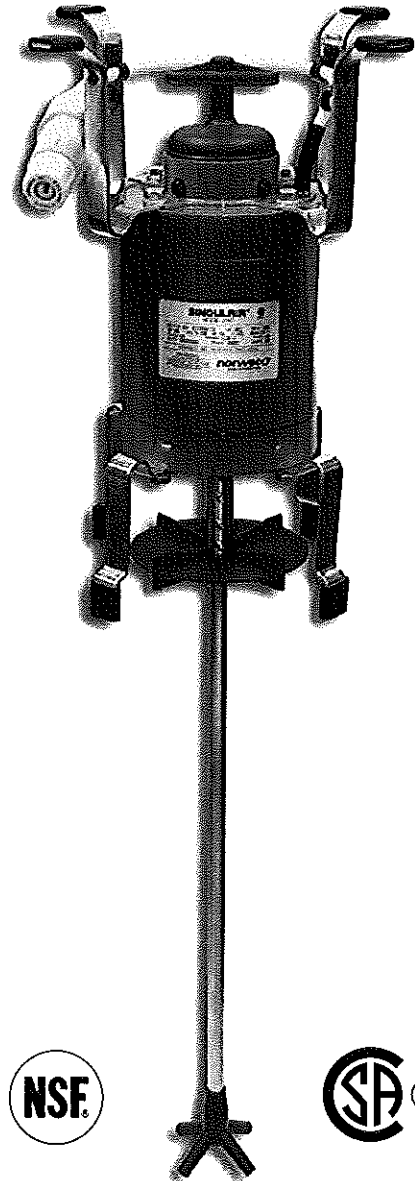
Combining advanced electro-mechanical components with energy efficiency, the Model 206C aerator masters the competition. Designed specifically for use in the rigorous environment of an aeration chamber, this aerator runs cooler, cleaner, quieter and longer than any other air delivery system on the market today.

THE PERFORMANCE YOU NEED THE QUALITY YOU CAN TRUST



SINGULAIR MODEL 206C AERATOR FEATURES

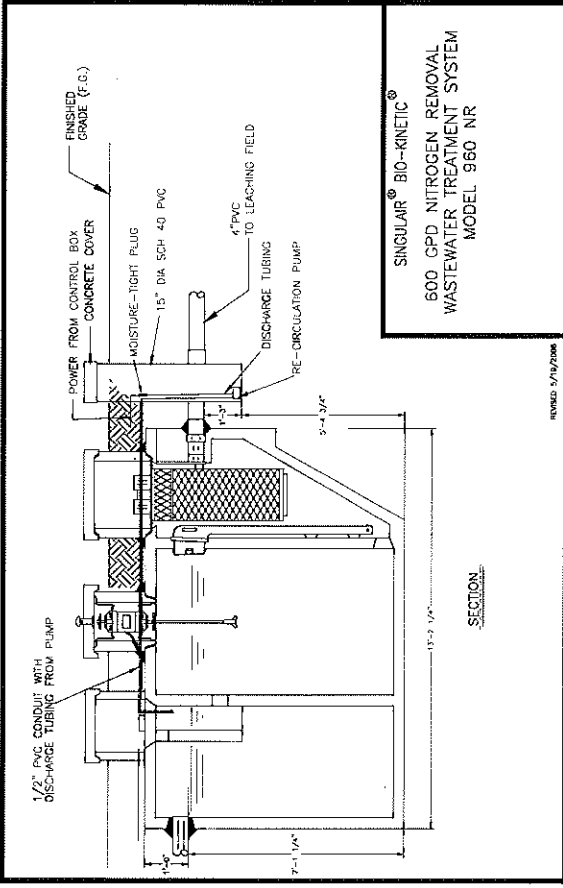
- Lowest electrical usage in the industry
- Technologically advanced ball bearings
- NEMA 6P electrical connector
- Floodproof design
- Proprietary bearing protection system
- Radial air intake openings
- Quieter, cleaner operation
- Certified to UL standard
- Made in the U.S.A.



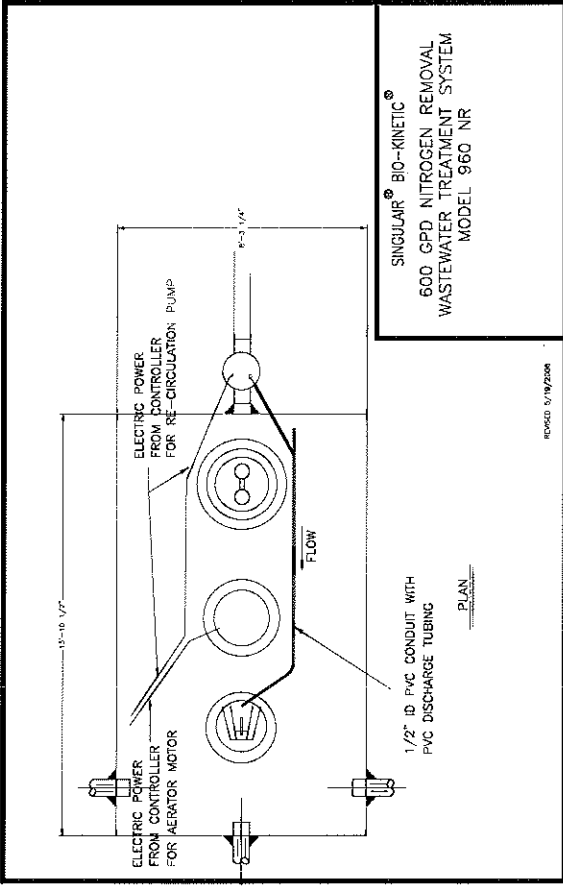
norweco[®]

*Engineering the future of water
and wastewater treatment*

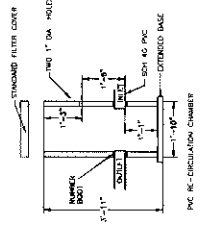
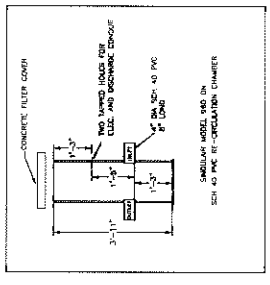
220 REPUBLIC STREET
NORWALK, OHIO, USA 44857-1156
TELEPHONE (419) 668-4471
FAX (419) 663-5440
www.norweco.com



SINGULAR® BIO-KINETIC®
 600 GPD NITROGEN REMOVAL
 WASTEWATER TREATMENT SYSTEM
 MODEL 960 NR

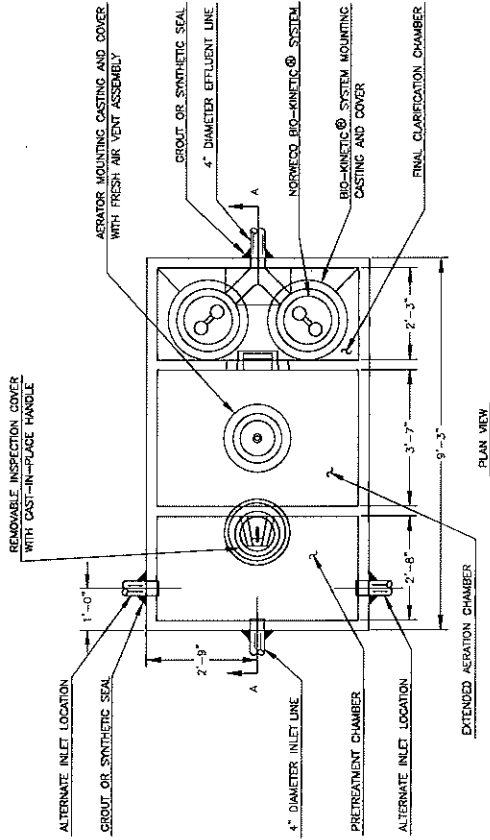


SINGULAR® BIO-KINETIC®
 600 GPD NITROGEN REMOVAL
 WASTEWATER TREATMENT SYSTEM
 MODEL 960 NR

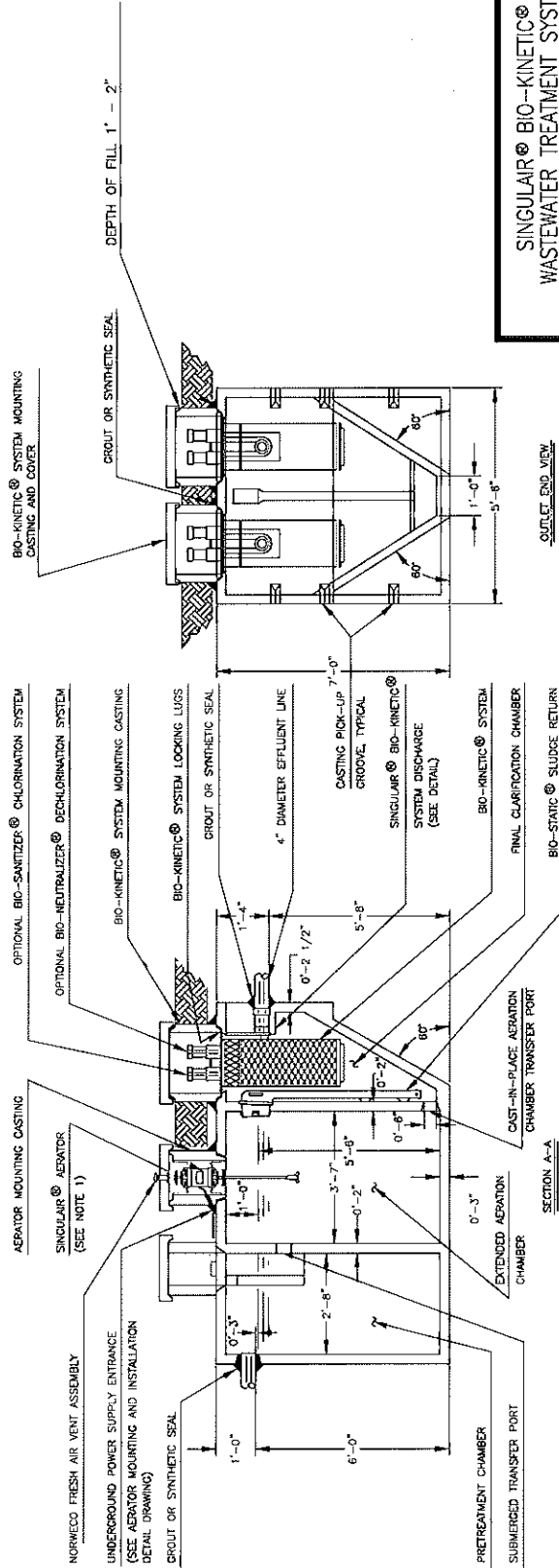


GENERAL NOTES

1. SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
2. FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE.
4. TANK REINFORCED PER ACI STD. 318-83.
5. REMOVABLE COVERS ON RISERS WEIGH 40 POUNDS EACH. SEVENTY FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
7. TOTAL SYSTEM CAPACITY: 1600 GAL.



PLAN VIEW

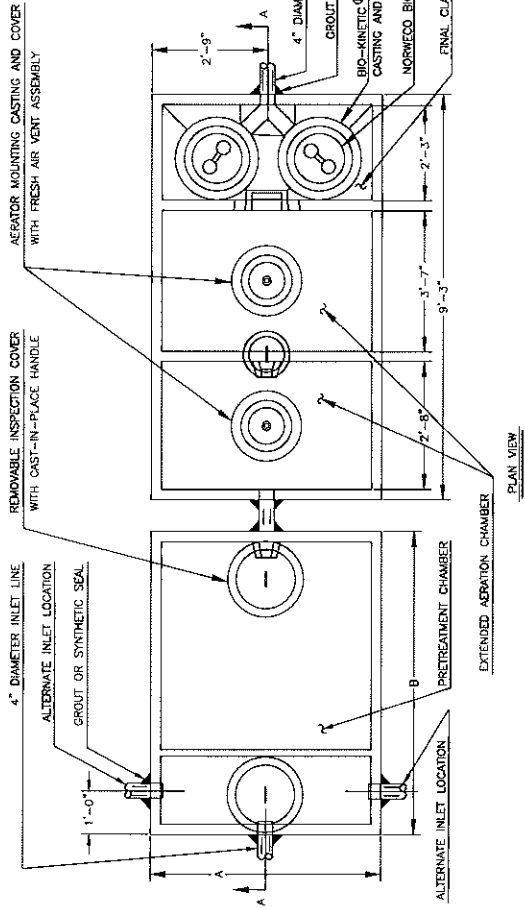


SECTION A-A

SINGULAR® BIO-KINETIC®
WASTEWATER TREATMENT SYSTEM
MODEL 960
750 GPD TREATMENT CAPACITY

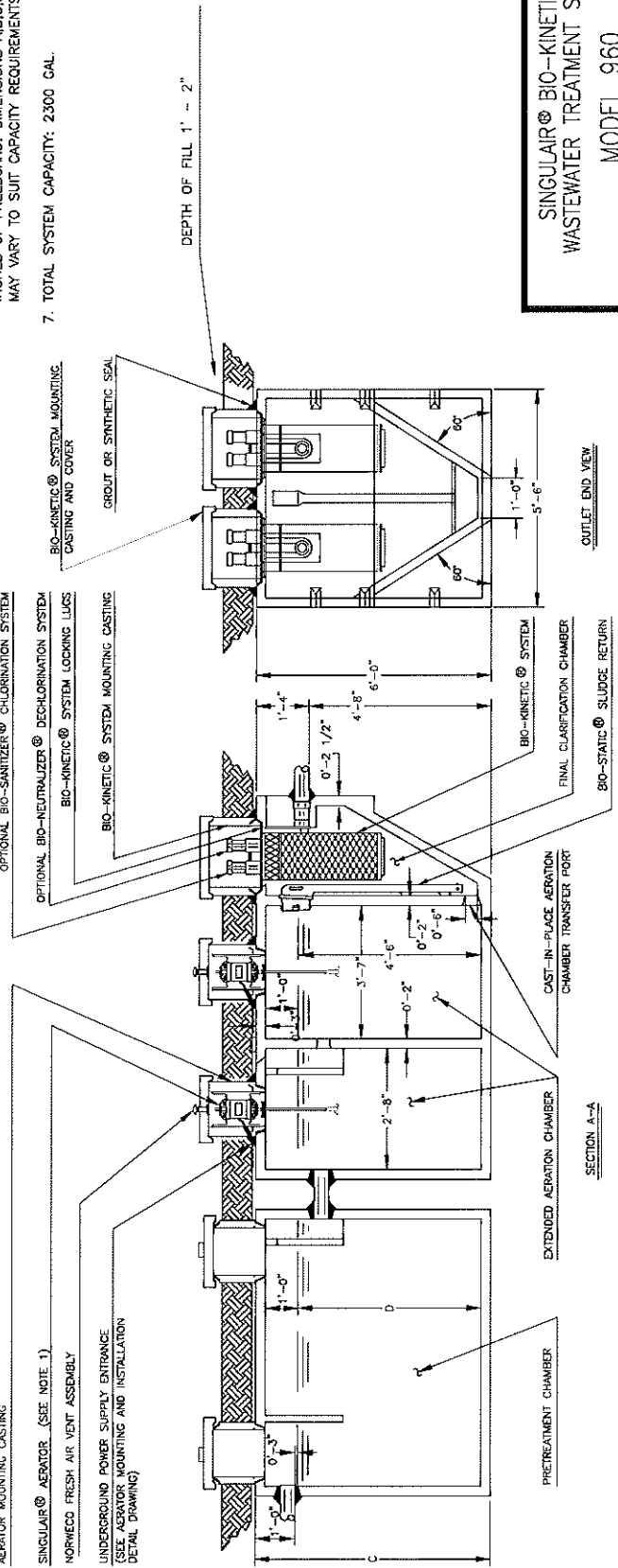
GENERAL NOTES

1. SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
2. FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND BIO-KINETIC® SYSTEM MOUNTING AND AERATOR MOUNTING CASTING TO GRADE. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE.
4. TANK REINFORCED PER ACI STD. 318-83.
5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
6. PRETREATMENT CHAMBER MINIMUM REQUIREMENTS SHALL BE: 1000 GALLONS CAPACITY, 15 GALLONS PER INCH OF LIQUID LEVEL AND 12 INCHES OF FREEBOARD. DIMENSIONS A,B,C,&D MAY VARY TO SUIT CAPACITY REQUIREMENTS
7. TOTAL SYSTEM CAPACITY: 2300 GAL.



PLAN VIEW

SECTION A-A

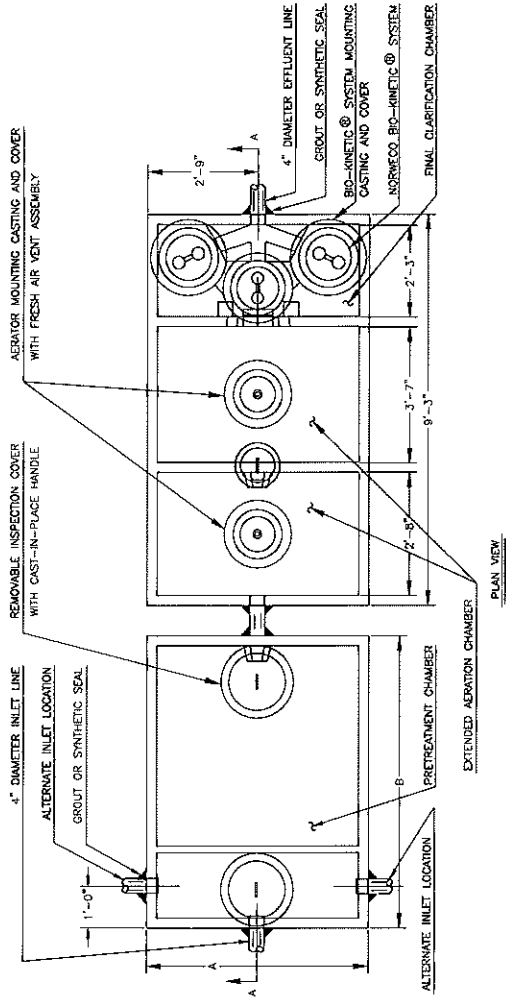


SECTION A-A

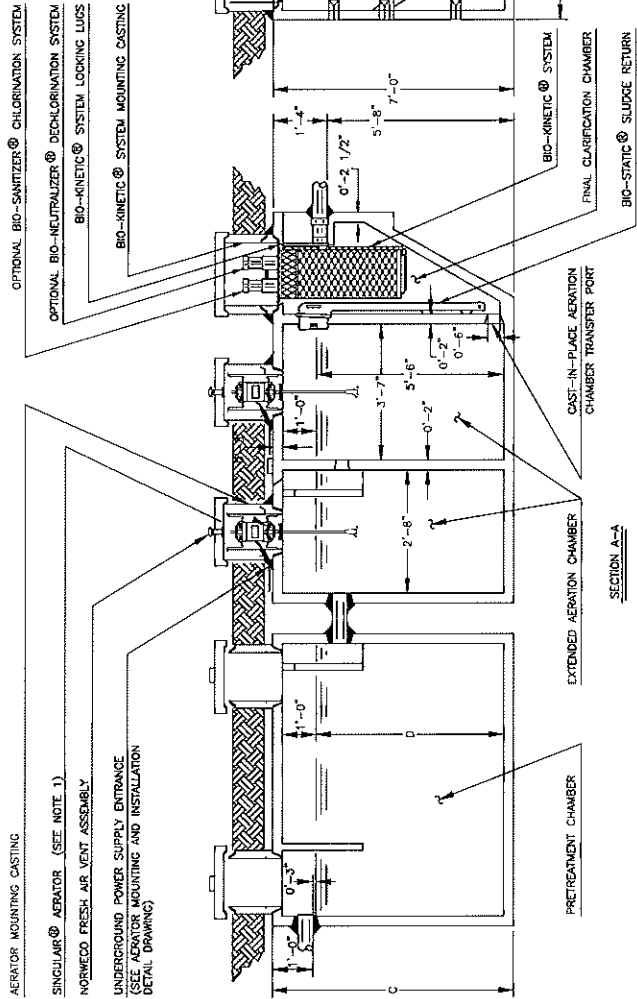
SINGULAR® BIO-KINETIC®
WASTEWATER TREATMENT SYSTEM
MODEL 960
1,000 GALLON TREATMENT CAPACITY

GENERAL NOTES

1. SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
2. FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE.
4. TANK REINFORCED PER ACI STD. 318-83.
5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
6. PRETREATMENT CHAMBER MINIMUM REQUIREMENTS SHALL BE: 1250 GALLONS CAPACITY, 16 GALLONS PER INCH OF LIQUID LEVEL AND 12 INCHES OF FREEBOARD. DIMENSIONS A,B,C&D MAY VARY TO SUIT CAPACITY REQUIREMENTS
7. TOTAL SYSTEM CAPACITY: 2850 GAL.



PLAN VIEW



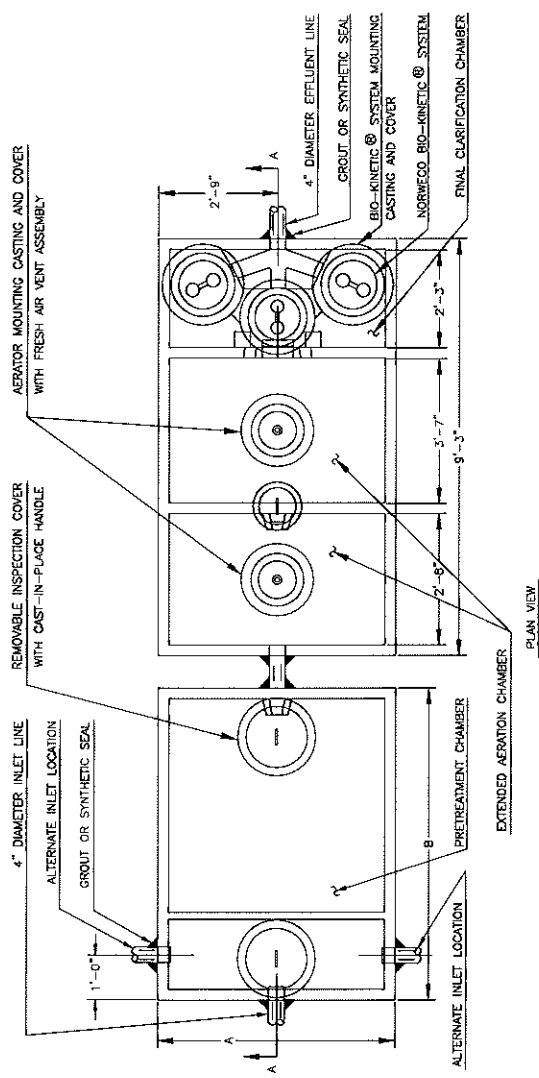
SECTION A-A

SINGULAR® BIO-KINETIC®
WASTEWATER TREATMENT SYSTEM
MODEL 960
1,250 GALLON TREATMENT CAPACITY

GENERAL NOTES

1. SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
2. FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
3. ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE.
4. TANK REINFORCED PER ACI STD. 318-83.
5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
6. PRETREATMENT CHAMBER MINIMUM REQUIREMENTS SHALL BE: 1500 GALLONS CAPACITY, 22 GALLONS PER INCH OF LIQUID LEVEL AND 12 INCHES OF FREEBOARD. DIMENSIONS A,B,C&D MAY VARY TO SUIT CAPACITY REQUIREMENTS.
7. TOTAL SYSTEM CAPACITY: 3400 GAL.

**SINGULAR® BIO-KINETIC®
WASTEWATER TREATMENT SYSTEM**
MODEL 960
1500 GPD TREATMENT CAPACITY



AERATOR MOUNTING CASTING

SINGULAR® AERATOR (SEE NOTE 1)
NORWECO FRESH AIR VENT ASSEMBLY

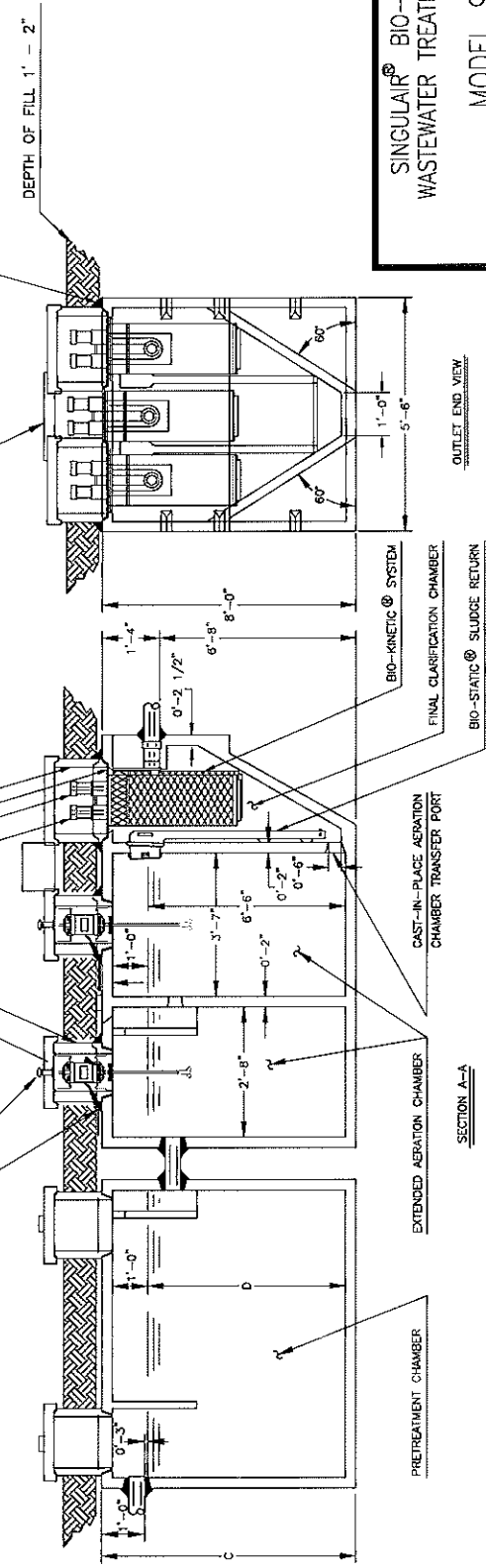
UNDERGROUND POWER SUPPLY ENTRANCE
(SEE AERATOR MOUNTING AND INSTALLATION
DETAIL DRAWING)

OPTIONAL BIO-SANITIZER® CHLORINATION SYSTEM

OPTIONAL BIO-NEUTRALIZER® DECHLORINATION SYSTEM

BIO-KINETIC® SYSTEM LOCKING LUGS

BIO-KINETIC® SYSTEM MOUNTING CASTING



NO SCALE

U.S. AND FOREIGN PATENTS GRANTED AND PENDING - NORWECO, INC.

norweco[®]

SINGULAIR GREEN[®] BIO-KINETIC[®] WASTEWATER TREATMENT SYSTEM MODELS 960 AND TNT WITH SERVICE PRO[®] CONTROL CENTER

OWNER'S MANUAL

INTRODUCTION

The Singulair Green unit is the finest system available and utilizes the most up-to-date wastewater treatment technology. It is a sound investment that protects you and the environment. Please take the time to familiarize yourself with the contents of this manual.

HOW THE SINGULAIR GREEN[®] SYSTEM WORKS

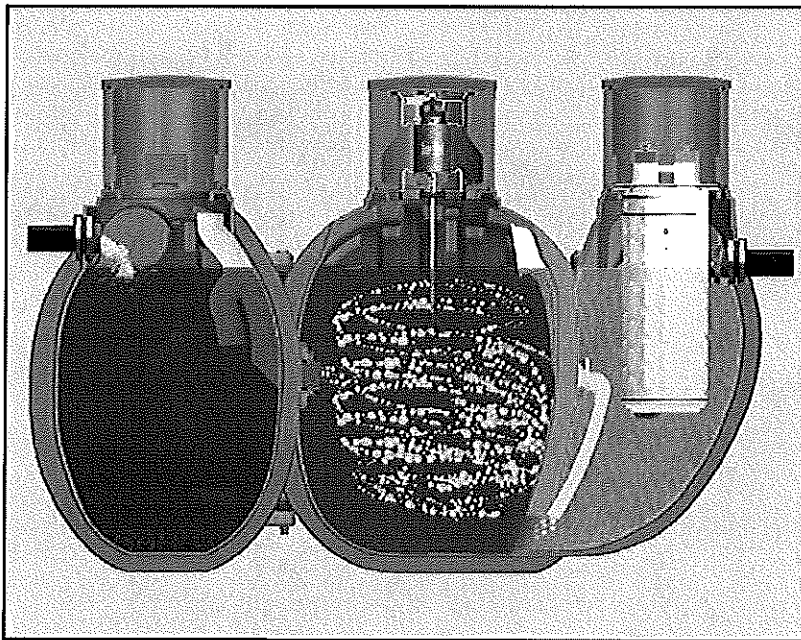
Developed to serve homes and small businesses beyond the reach of city sewers, the Singulair Green system employs the extended aeration process. Similar to the treatment method used by most municipal wastewater treatment facilities, this process involves a natural, biological breakdown of the organic matter in wastewater.

Wastewater enters the pretreatment chamber where anaerobic bacterial action combines with the effects of gravity to precondition the waste before it flows into the aeration chamber. Once in the aeration chamber, aerobic bacteria utilize the organic matter in the wastewater to biologically convert the waste into stable substances. Following aeration, flow is transferred to the clarification chamber where the effects of gravity settle out biologically active material. The Bio-Static sludge return, located in the clarification chamber, creates hydraulic currents that gently transfer settled particles back to the aeration chamber. As clarified liquids pass through the Bio-Kinetic system, they are filtered, settled and flow equalized. As a result, complete pretreatment, aeration, clarification and final filtration are assured. The Singulair Green system reliably protects you, your property and the environment.

FEATURES AND ADVANTAGES

Singulair Green tanks are constructed of rotationally molded, UV stabilized, high density polyethylene. Integrally molded treatment chamber walls and structural support ribs insure durability and maximum strength. Risers and lids are injection molded, heavy duty, glass-filled polypropylene. All components within the system that will contact the wastewater are constructed entirely of molded plastic, stainless steel or rubber.

The Singulair aerator is powered by a 1725 RPM, 115 volt, 60 hertz, single phase, fractional horsepower motor. It is the only electrically powered component in the Singulair Green system. The aerator has been designed specifically for use in the Singulair system. It costs less to operate and consumes fewer kilowatt hours of electricity than most major appliances.



The Singulair aerator is supplied with a prewired electrical control center contained in a NEMA rated enclosure. The control center contains a power switch and time clock that control aerator operation. The local dealer's name, address and telephone number are displayed on the control center cover.

All system controls and necessary owner information are conveniently located at your fingertips.

Non-mechanical flow equalization and final filtration is accomplished within the Singulair Green tank by the Bio-Kinetic system. This revolutionary device is installed in the clarification chamber and connected to the system outlet. Optional chlorination and dechlorination may be included in the Bio-Kinetic system if required. All Singulair Green components work together to assure complete pretreatment, aeration, clarification and final filtration.

SINGULAIR GREEN® SYSTEM PERFORMANCE

Rivalling the performance of the most advanced wastewater treatment plants in the world, the Singulair Green system complies with USEPA wastewater treatment guidelines for secondary treatment systems and meets all requirements of NSF/ANSI Standards 40 and 245. In ecologically sensitive areas, the most stringent effluent standards are 10 mg/L CBOD and 10 mg/L TSS. Rated Class I after successfully completing the 7 month Standard 40 test protocol, the Model 960 system averaged effluent of 6 mg/L CBOD and 10 mg/L TSS. The Model TNT system averaged effluent of 4 mg/L CBOD, 9 mg/L TSS and 12 mg/L Total Nitrogen.

OPERATIONAL REQUIREMENTS

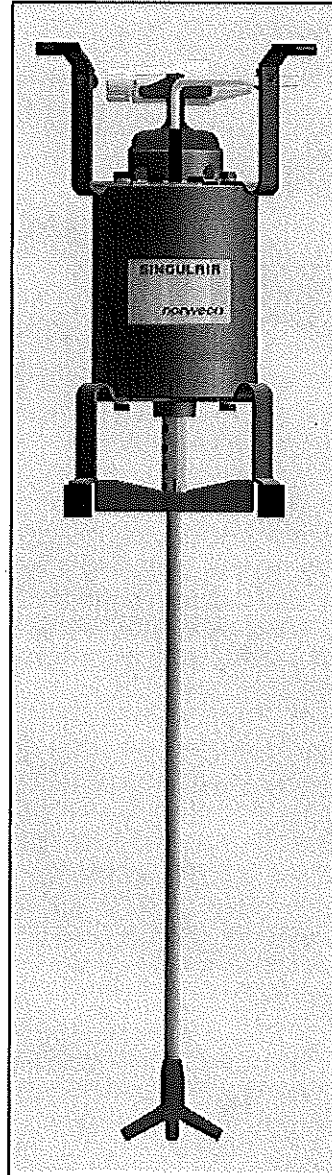
The Singulair Green system is designed to treat only domestic wastewater. Domestic wastewater is defined as the waste generated from a typical residence. This includes flows originating from: bathtubs, clothes washers, dishwashers, drinking fountains, water coolers, food grinders, kitchen sinks, lavatories, mop basins, service sinks, shower stalls, sinks, wash sinks, water closets and whirlpool baths. While the use of bio-degradable detergents is recommended, the Singulair Green system has been designed to handle any reasonable amount of bathroom, kitchen or laundry waste. However, some care should be exercised to insure that non-biodegradable and/or toxic materials are not disposed of via the domestic wastewater plumbing. Do not use the plumbing system for disposal of lint, cooking grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags, dental floss, strings, cigarette filters, rubber or plastic products, paints and thinning agents, gasoline, motor oil, drain cleaners or other harsh chemicals. These items could plug portions of the plumbing, interfere with biological treatment, accumulate in the treatment system and adversely affect system performance. Never connect roofing down spouts, footer drains, sump pump piping, garage and basement floor drains or water softener backwash to the domestic wastewater plumbing or the treatment system. Water softener backwash will interfere with biological treatment and must be disposed of separately.

ELECTRICAL REQUIREMENTS

The Service Pro control center must be wired to a dedicated 115 VAC, single phase circuit at the main electrical service panel. A 15 amp circuit is recommended (10 amp minimum). A pictorial wiring diagram is provided inside the control center enclosure. All electrical work must be performed in accordance with the requirements of the National Electrical Code and all applicable local codes. Electrical connections should be made only by a qualified electrician following proper procedures and using safe tools.

CAUTION: Any time service is required, first shut off the dedicated circuit breaker in the main electrical service panel. Next, shut off the power switch in the Service Pro control center. Failure to do so could result in personal injury or equipment damage.

SINGULAIR® AERATOR



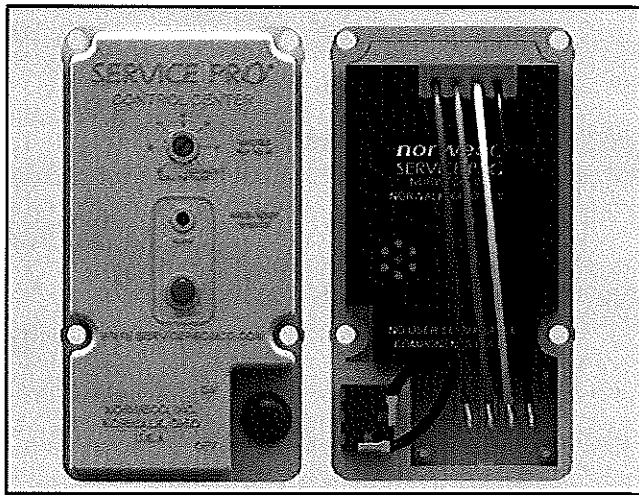
The aerator has been specifically designed for use in the Singulair system and includes special alloy and molded plastic parts to prolong aerator life. Aerator bearings are pre-lubricated and sealed. The Singulair aerator is installed in a plastic mounting riser above the aeration chamber. Fresh air enters the aerator through four intake ports located under the aerator handle. Air is drawn down the hollow aspirator shaft where it is introduced below the liquid surface. Only the molded plastic aspirator and the lower portion of the stainless steel aspirator shaft are submerged.

The aerator is not designed to run under water and will automatically shut off if a high water condition occurs. If the liquid rises to the level of the foam restrictor, the control center will shut off power to the aerator. Next, an automatic diagnostic sequence will begin, as outlined in the section titled SERVICE PRO CONTROL CENTER.

The Singulair aerator is a precision engineered electro-mechanical device. Do not remove it from its installed position. Do not attempt any type of repair. Contact your local dealer if service is needed. Unauthorized tampering or repair will void important provisions of the lifetime warranty and exchange program.

FRESH AIR VENTING SYSTEM

A fresh air vent is designed into the perimeter of the access cover above the Singulair aerator. The perimeter vent supplies fresh air to the aerator, which is drawn through the aspirator and into the wastewater. Finished landscaping should be maintained six inches below the top of the vented access cover and graded to drain runoff away from the cover. Do not obstruct the vented access cover or allow plants, shrubbery, mulch or landscaping of any type to restrict the flow of air to the perimeter vent.



SERVICE PRO® CONTROL CENTER

To permit fully automatic operation, prewired electrical controls are supplied in a sealed NEMA rated enclosure for your safety and the protection of components and wiring. The control center should be located so the red warning light can be seen and the audible alarm heard, while minimizing exposure to harsh weather or conditions that might prevent routine access. If an issue with the aerator is detected, the red alarm light will flash and the control center will attempt to restart the aerator every five minutes for two hours. For an open motor or under current condition, the alarm light will display a repeating pattern of two short flashes followed by a three second pause. For an over current condition, the alarm light will flash evenly until serviced. If the aerator does not restart after two hours, the audible alarm will sound. To silence the audible alarm and attempt to restart the aerator, push the reset button on the control center cover. This should allow the aerator to resume normal operation. If the alarm condition is not resolved, the audible alarm will be silenced for 48 hours, but the alarm light will continue to flash. In this case, contact your local Singulair Green dealer.

TIME CLOCK

The control center for the Model TNT system is supplied with a non-adjustable time clock. The non-adjustable time clock creates a 60 minute aeration cycle followed by a 60 minute anoxic cycle during which the aerator is off. All other control centers are supplied with an adjustable time clock that determines the operating cycle of the aerator. The time clock will not permit the aerator to run less than 30 minutes out of each hour and is adjustable in five minute increments up to continuous operation. The performance of the Singulair Green system has been certified to meet NSF/ANSI Standard 40 effluent quality requirements and USEPA secondary treatment guidelines at the minimum time clock setting. The time clock is factory preset and should not be adjusted by the owner. Your factory-trained Singulair Green dealer will make necessary adjustments under the specific direction and authorization of the local regulatory agency.

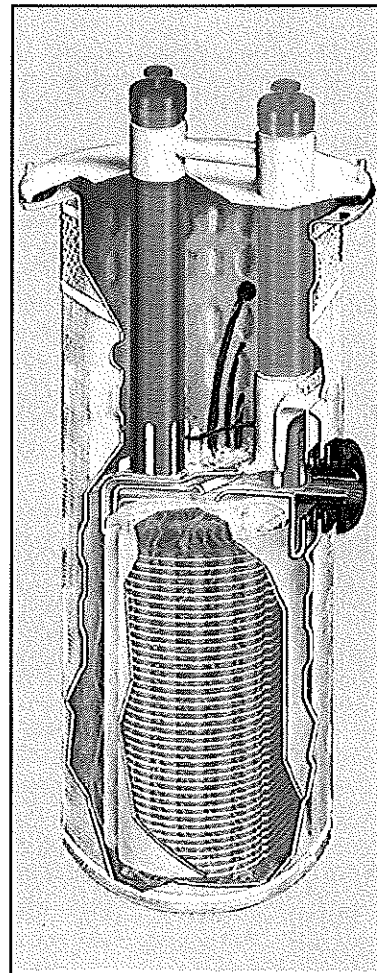
NOTE: The control center may regularly communicate with the Service Pro monitoring center using your telephone line and a toll free number. If the control center is using the line when you attempt to place a call, a high pitched digital communication signal will be heard. Hang up all telephones sharing the line and wait a few seconds. This will automatically disconnect the control center and make the line available for use.

BIO-STATIC® SLUDGE RETURN

A Bio-Static sludge return is installed in the aeration/clarification chamber wall. Aeration chamber hydraulic currents enter the sludge return and transfer solids from the clarification chamber back to the aeration chamber for additional treatment. The Bio-Static sludge return accomplishes resuspension and return of settled solids without disturbing the contents of the clarification chamber.

BIO-KINETIC® SYSTEM

The Bio-Kinetic system provides non-mechanical flow equalization through all plant processes. The Bio-Kinetic system contains 3 separate filtration zones, 8 independent settling zones, optional chlorination and dechlorination tablet feed systems and serves as its own chlorine contact chamber. When used with Blue Crystal residential disinfecting tablets,



the performance of the Bio-Kinetic system as a chlorine dispenser is certified to NSF/ANSI Standard 46, Section 11. All components are manufactured from plastic or rubber. The Bio-Kinetic system is equipped with fill and drain valves which facilitate service to the filter. Your local dealer has the necessary training, tools and equipment for removal and cleaning. If your Bio-Kinetic system is in need of service, contact your local Singulair Green dealer. During each semi-annual service inspection, your local dealer will remove and clean the Bio-Kinetic system or replace it with a unit from their service stock.

NON-MECHANICAL FLOW EQUALIZATION

The patented design of the Bio-Kinetic system provides non-mechanical flow equalization for the Singulair Green wastewater treatment plant. Equalization reduces incoming hydraulic surges (e.g. typical shower of 10 minutes duration, bathtub discharge of 5 minutes duration, clothes washer discharge of 2 minutes duration and dishwasher discharge of 2 minutes duration) throughout the system. The flow equalization provided by the Bio-Kinetic system causes wastewater to be held upstream of the final outlet during hydraulic surges, which preserves treatment integrity and enhances system operation. The actual rate of equalization varies and depends upon specific loading patterns and the duration of each flow surge. At the 600 GPD (gallons per day) NSF/ANSI Standard 40 design loading schedule, minimum performance of the Singulair Green system equalizes all flow an average of 50%. As a result, hydraulic surges and periods of high wastewater flow are automatically reduced to protect the environment and all treatment plant processes on a demand use, as needed, basis.

BLUE CRYSTAL® RESIDENTIAL DISINFECTING TABLETS

If local regulations require, an initial supply of Blue Crystal disinfecting tablets will be placed in the Bio-Kinetic system chlorine feed tube at system start-up. Specifically formulated for use in the Singulair system, Blue Crystal disinfecting tablets provide efficient and reliable disinfection when effluent chlorination is desirable. Manufactured from calcium hypochlorite, Blue Crystal disinfecting tablets provide effective, economical bacteria killing power. Liquid entering the Bio-Kinetic system contacts the installed Blue Crystal disinfecting tablets, just downstream of the equalization ports. A fully charged feed tube will last an average of three to six months. During each semi-annual inspection, your local dealer's service technician will check system operation, the rate of tablet consumption and install tablets to insure maximum system performance.

NOTE: USEPA guidelines state, "On the average, satisfactory disinfection of secondary wastewater effluent can be obtained when the chlorine residual is 0.5 ppm after 15 minutes contact." Retention time must comply with the controlling regulatory jurisdiction.

CAUTION: *The improper handling of Blue Crystal tablets may cause personal injury or property damage. Keep out of the reach of children and do not allow the tablets or feed tubes to contact skin, eyes or clothing. Tablets may be fatal if swallowed and tablet dust is irritating to the eyes, nose and throat. Do not handle the tablets or feed tube without first carefully reading the product container label, MSDS information and the handling and storage instructions. Mixing of chemicals may cause a violent action leading to fire or explosion. For additional information about Blue Crystal tablets contact your local authorized dealer.*

BIO-MAX® DECHLORINATION TABLETS

In ecologically sensitive areas, environmental standards or regulations may require the use of Bio-Max dechlorination tablets. Bio-Max tablets are formulated to remove chlorine residual to non-detectable levels for the protection of sensitive receiving environments. Containing 92% sodium sulfite as the active ingredient, the tablets are manufactured to neutralize both free and combined chlorine. Bio-Max dechlorination tablets dissolve slowly, releasing controlled amounts of chemical for the instantaneous removal of residual chlorine from the wastewater flow. As liquid passes through the final discharge zone of the Bio-Kinetic system, the flow contacts the installed Bio-Max tablets and residual chlorine is removed from the system effluent. A fully charged Bio-Max feed tube will last an average of three to six months. During each semi-annual inspection, your local dealer's service technician will check system operation, the rate of tablet consumption and install tablets to insure maximum system performance.

CAUTION: *Bio-Max tablets or feed tubes should not be mixed with Blue Crystal tablets. Do not handle the tablets or feed tube without first carefully reading the product container label, MSDS information and the handling and storage instructions. For additional information about Bio-Max tablets contact your local authorized dealer.*

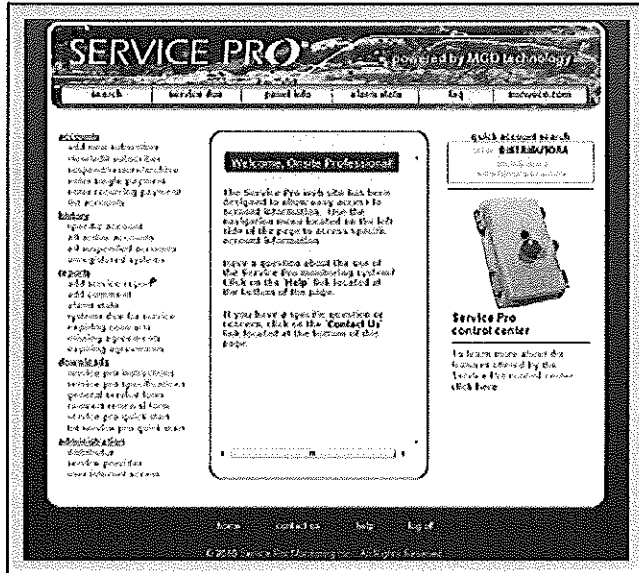
NO OWNER MAINTENANCE

The Singulair Green system is inspected and serviced by a local licensed, factory-trained dealer, therefore, no owner maintenance is required during the warranty period. The Singulair Green system does not require pumping as often as a septic tank. Under normal use only the pretreatment chamber should be pumped. How often pumping is necessary depends on system use. The local Singulair Green dealer will inspect the aeration chamber contents and plant effluent at six month intervals to determine if the pretreatment chamber is discharging excessive solids. Every three years, the pretreatment chamber should be inspected. The pretreatment chamber will normally require pumping at three to five year intervals. Contact your local dealer prior to tank pumping for complete information on removal of equipment, access to individual chambers, coordination of services and proper disposal of tank contents. A tank pumping service licensed by the local regulatory agency must be used for removal and disposal of tank contents. The tank pumper should consult with local authorities to determine the proper disposal method.

If a period of intermittent use, or an extended period of non-use of the Singulair Green system is anticipated, contact the local dealer for instructions. Your local dealer has comprehensive service instructions and has been factory-trained in troubleshooting procedures. Contact your local Singulair Green dealer if you require service or information regarding tank pumping.

SERVICE PRO® MONITORING CENTER

The Service Pro monitoring center is a maintenance tracking database that is free for use by all Singulair Green dealers and service providers. If your Singulair Green dealer uses the Service Pro website, a record for your system will be created at www.servicepromcd.com when the system is installed. The serial numbers for Singulair Green equipment and treatment plant information will be entered at that time. This proprietary website stores all relevant system information in one convenient, secure and password protected location. The Service Pro website keeps a detailed history of all maintenance visits that are made to your installation. The monitoring center will schedule future service inspections and notify your Singulair Green dealer when they are due. System owners can also use the Service Pro website to access information, track service calls or monitor compliance with regulatory requirements. If you would like to use the Service Pro website, contact your Singulair Green dealer to receive a user name and password.



An optional Service Pro MCD control center or Service Pro TNT control center is available for use with the Singulair Green system. Designed to connect to a standard telephone line, these control centers provide MONITORING, COMPLIANCE and DIAGNOSTIC functions complete with telemetry for communication with the Service Pro monitoring center. Digital Subscriber Line (DSL) phone service requires the use of a low-cost DSL filter. Voice Over Internet Protocol (VOIP) is not reliable with any telemetry system and not recommended. Once your Service Pro control center is connected to a telephone line, commissioned, and covered by a remote monitoring agreement, your dealer will be immediately notified of any alarm condition. The Service Pro monitoring center will automatically log the time and date of alarm conditions, as well as service performed, and store them in your system history record for viewing at www.servicepromcd.com.

SINGULAIR GREEN® SERVICE PROGRAM

A minimum of four service inspections within the first two years of operation are provided by your local Singulair Green dealer and are included in your original purchase price. Costs for travel and labor are not charged to the owner. The exact frequency and scope of these visits are determined by the applicable regulatory agency. The obligation to provide these service inspections rests solely with your Singulair Green dealer or the authorized service provider, so it is important that you save a copy of your original purchase contract. To schedule service, learn more about maintenance requirements or report system malfunctions, contact your local Singulair Green dealer directly. Your dealer's name, address and phone number are conveniently located on the front of the control center. During an inspection, each Singulair aerator, Bio-Kinetic system and other plant components are serviced as outlined in the "SINGULAIR GREEN PRODUCT MANUAL". Auxiliary equipment required in addition to the Singulair Green system, such as pumps, filters, valves, tankage, leach fields, chambers, mounds or irrigation components, are not part of the Singulair Green service program and should be covered by a separate maintenance agreement.

After the initial two year service program is completed, the Singulair Green dealer will offer to provide a continuing service agreement at the owner's option. In many areas, this continuing service agreement is required by the local regulatory agency. The service program should be renewed by the owner to insure maximum system performance. Professional service is important to proper system operation and should not be allowed to lapse. Each of these items are important:

- ✓ Check aerator operation
- ✓ Check aerator power consumption
- ✓ Check aerator air delivery
- ✓ Clean stainless steel aspirator shaft
- ✓ Clean aspirator tip
- ✓ Clean perimeter air vent in aerator cover
- ✓ Inspect aeration chamber contents
- ✓ Check operation of control center
- ✓ Adjust time clock when required
- ✓ Remove the Bio-Kinetic system
- ✓ Scrape the clarification chamber
- ✓ Inspect the Bio-Static sludge return
- ✓ Inspect outlet coupling
- ✓ Install a clean Bio-Kinetic system
- ✓ Fill Blue Crystal feed tube
- ✓ Fill Bio-Max feed tube
- ✓ Inspect effluent quality
- ✓ Inspect outlet line
- ✓ Inspect ground water relief point
- ✓ Inspect effluent disposal system
- ✓ Complete 3-part service record
- ✓ Hang owner's record on front door
- ✓ Enter record into www.servicepromcd.com
- ✓ Mail health department notification

Your Singulair Green dealer will perform the services outlined above during each service inspection.

WARRANTY REGISTRATION

A Warranty Registration Card was included with the Model 206C aerator before it was shipped from the factory. If this card has not been returned to Norweco, complete and mail it immediately. If it is not returned within thirty days of the installation date, the three year limited warranty and lifetime aerator exchange program will begin on the date of component shipment from the factory.

If the Service Pro control center is mounted in an outdoor location, remove the aerator model number and serial number record card and store it safely for future reference. Otherwise, do not remove this card from the control center. If it is necessary to call your dealer for service, make note of the information on the control center data plate and the aerator serial number before calling. Warranty and service records are cross-indexed by owner name and aerator serial number. Supplying the aerator serial number with the service request will give the service provider a ready reference so that changes in system ownership will not delay service.

SERVICE PRO® SECURITY LOG IN

For your convenience, record your www.servicepromcd.com access information here:

User name:	Password:
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SUPPLEMENTAL SERVICE RECORD

For your reference, please document service performed on the following chart:

DATE	DESCRIPTION

SINGULAIR GREEN® LIFETIME PROTECTION

The Singulair aerator enjoys the distinction of being the only aerator on the market today backed by a lifetime warranty and exchange program. Each Singulair aerator, Service Pro control center and Bio-Kinetic system are warranted to be free from defects in material and workmanship, under normal use and service, for a period of three years. The local, licensed dealer or service center has detailed warranty and exchange information and should be contacted for service or replacement instructions.



Engineering the future of water and wastewater treatment

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SINGULAIR® BIO-KINETIC®

WASTEWATER TREATMENT SYSTEM WITH SERVICE PRO® CONTROL CENTER

MODELS 960 AND TNT OWNER'S MANUAL

INTRODUCTION

The Singulair system is the finest equipment available and utilizes the most up-to-date wastewater treatment technology. It is a sound investment that protects you and the environment. Please take the time to familiarize yourself with the contents of this manual.

HOW THE SINGULAIR® SYSTEM WORKS

Developed to serve homes and small businesses beyond the reach of city sewers, the Singulair system employs the extended aeration process. Similar to the treatment method used by most municipal wastewater treatment facilities, this process involves a natural, biological breakdown of the organic matter in wastewater.

Wastewater enters the pretreatment chamber where anaerobic bacterial action combines with the effects of gravity to precondition the waste before it flows into the aeration chamber. Once in the aeration chamber, aerobic bacteria utilize the organic matter in the wastewater to biologically convert the waste into stable substances. Following aeration, flow is transferred to the clarification chamber where the effects of gravity settle out biologically active material. The Bio-Static sludge return, located in the clarification chamber, creates hydraulic currents that gently transfer settled particles back to the aeration chamber. As clarified liquids pass through the Bio-Kinetic system, they are filtered, settled and flow equalized. As a result, complete pretreatment, aeration, clarification and final filtration are assured. The Singulair system reliably protects you, your property and the environment.

FEATURES AND ADVANTAGES

Singulair tanks are reinforced precast concrete, manufactured by the licensed Norweco distributor. Internal walls and baffles are cast-in-place to insure uniformity and maximum strength. Risers and access covers are either heavy duty plastic or concrete construction. All components within the system that will contact the wastewater are constructed entirely of molded plastic, stainless steel or rubber.

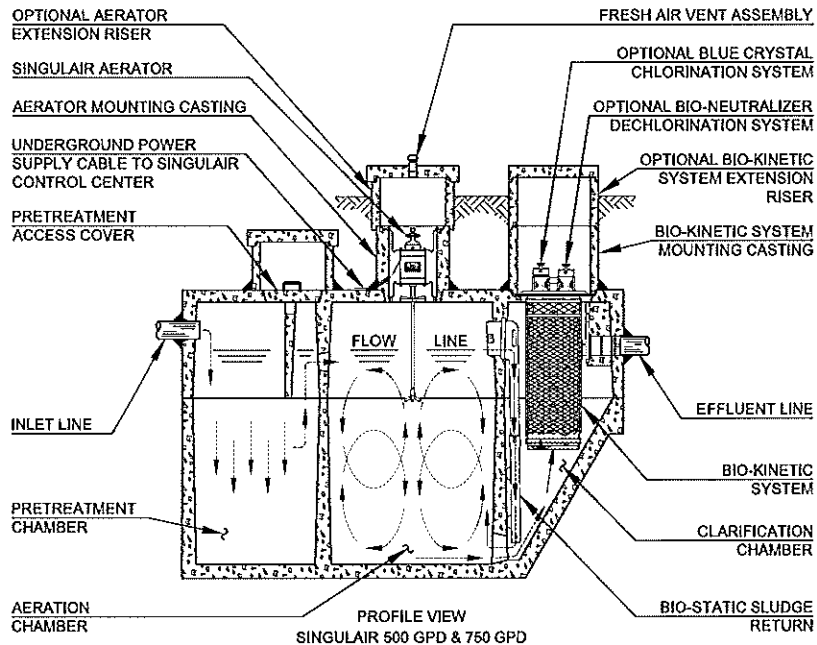
The Singulair aerator is powered by a 1725 RPM, 115 volt, 60 hertz, single-phase, fractional horsepower motor. It is the only electrically powered component in the Singulair system.

The aerator has been designed specifically for use in the Singulair system. It costs less to operate and consumes fewer kilowatt hours of electricity than most major appliances.

Singulair aerators are supplied with a Service Pro control center with MCD technology. The NEMA rated control center contains a power switch and time clock that control aerator operation. The local distributor's name, address and telephone number are displayed on the control center cover.

All system controls and necessary owner information are conveniently located at your fingertips.

Non-mechanical flow equalization and final filtration is accomplished within the Singulair tank by the Bio-Kinetic system. This revolutionary device is installed in the clarification chamber and connected to the system outlet. Optional chlorination and dechlorination may be included in the Bio-Kinetic system if required. All Singulair components work together to assure complete pretreatment, aeration, clarification and final filtration.



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Rivalling the performance of the most advanced wastewater treatment plants in the world, the Singulair system complies with USEPA wastewater treatment guidelines for secondary treatment systems and meets all requirements of NSF/ANSI Standard 40. In ecologically sensitive areas, the most stringent effluent standards are 10 mg/L CBOD and 10 mg/L TSS. Rated Class I after successfully completing the 7 month Standard 40 test protocol, the Model 960 system averaged effluent of 6 mg/L CBOD and 10 mg/L TSS. The Model TNT system averaged effluent of 4 mg/L CBOD, 9 mg/L TSS and 12 mg/L Total Nitrogen.

OPERATIONAL REQUIREMENTS

The Singulair system is designed to treat only domestic wastewater. Domestic wastewater is defined as the waste generated from a typical residence. This includes flows originating from: bathtubs, clothes washers, dishwashers, drinking fountains, water coolers, food grinders, kitchen sinks, lavatories, mop basins, service sinks, shower stalls, sinks, wash sinks, water closets and whirlpool baths. While the use of bio-degradable detergents is recommended, the Singulair system has been designed to handle any reasonable amount of bathroom, kitchen or laundry waste. However, some care should be exercised to insure that non-biodegradable and/or toxic materials are not disposed of via the domestic wastewater plumbing. Do not use the plumbing system for disposal of lint, cooking grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags, dental floss, strings, cigarette filters, rubber or plastic products, paints and thinning agents, gasoline, motor oil, drain cleaners or other harsh chemicals. These items could plug portions of the plumbing, interfere with biological treatment, accumulate in the treatment system and adversely affect system performance. Never connect roofing down spouts, footer drains, sump pump piping, garage and basement floor drains or water softener backwash to the domestic wastewater plumbing or the treatment system. Water softener backwash will interfere with biological treatment and must be disposed of separately.

ELECTRICAL REQUIREMENTS

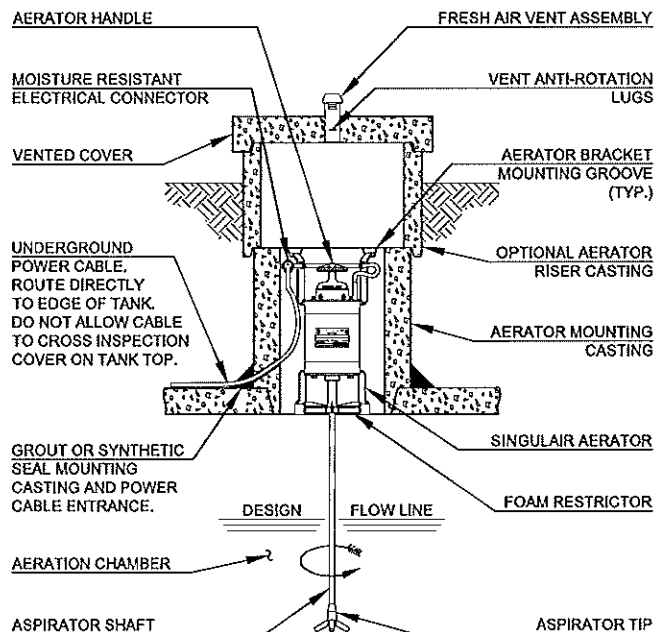
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SINGULAIR® AERATOR

The aerator has been specifically designed for use in the Singulair system and includes special alloy and molded plastic parts to prolong aerator life. Aerator bearings are pre-lubricated and sealed. Singulair aerators are installed in a concrete mounting casting above the aeration chamber. Fresh air enters the aerator through four intake ports located under the aerator handle. The air is drawn down the hollow aspirator shaft where it is introduced below the liquid surface. Only the molded plastic aspirator and the lower portion of the stainless steel aspirator shaft are submerged.

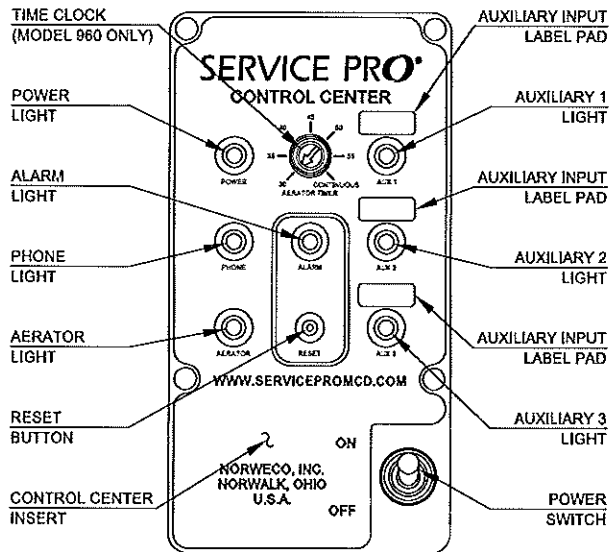
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FRESH AIR VENTING SYSTEM

An aerator vent assembly is cast into the concrete access cover above each aerator. The vent assembly supplies fresh air to the aerator, which is drawn through the aspirator and into the wastewater. Finished landscaping should be maintained six inches below the top of the vented access cover and graded to drain runoff away from the cover. Do not allow plants, shrubbery, mulch or landscaping of any type to restrict the flow of air to the vent assembly or obstruct the access cover.



SERVICE PRO® CONTROL CENTER

Every Singulair aerator is supplied with a prewired UL Listed Service Pro control center featuring MCD technology to permit fully automatic aerator operation. The control center provides MONITORING, COMPLIANCE and DIAGNOSTIC functions complete with telemetry for communication with the Service Pro remote monitoring center. If an alarm condition occurs for any reason within the Singulair system or monitored auxiliary equipment, the red alarm light will flash. If aerator operation has been interrupted, the Service Pro control center will attempt to restart the aerator every five minutes for two hours. If the aerator does not restart after two hours, the audible alarm will sound. If the Singulair system is covered by a Service Pro monitoring agreement, the Singulair service provider will be automatically notified and the alarm condition will be displayed on the remote monitoring center website, www.servicepromcd.com. Each control center for the Model 960 treatment system is supplied with a time clock adjustable in five minute increments up to continuous run. This clock is factory preset to run 30 minutes per hour and should only be adjusted by an authorized Singulair service provider. Each control center for the Model TNT system is supplied with a non-adjustable time clock.

SERVICE PRO® MONITORING CENTER

When connected to a telephone line, the control center will automatically notify the Service Pro monitoring center of any service required by the Singulair system or accessory components. The Service Pro monitoring center will automatically record the time and date of any alarm condition and post this information to your system's history record accessible at www.servicepromcd.com. The monitoring center will also notify your Singulair service provider that the system needs attention and record the time and date when service is performed. All information regarding your system is available to you on the secure, password protected Service Pro website. Contact your Singulair service provider for your user name and password.

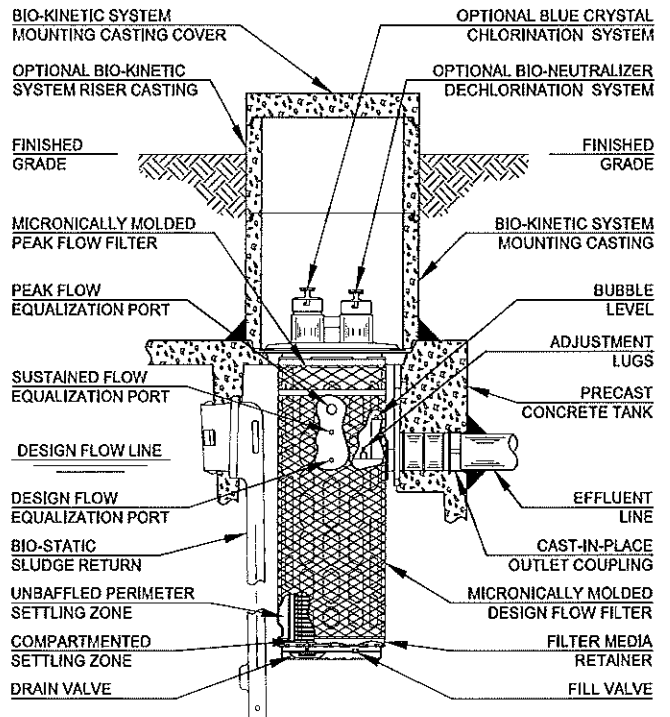
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Each Bio-Static sludge return is installed in the aeration/clarification chamber wall. Aeration chamber hydraulic currents enter the sludge return(s) and transfer solids from the clarification chamber back to the aeration chamber for additional treatment. The Bio-Static sludge return accomplishes resuspension and return of settled solids without disturbing the contents of the clarification chamber.

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Bio-Kinetic systems provide non-mechanical flow equalization through all plant processes. The Bio-Kinetic system contains 3 separate filtration zones, 8 independent settling zones, optional chlorination and dechlorination tablet feed systems and serves as its own chlorine contact chamber. When used with Blue Crystal disinfecting tablets, the performance of the Bio-Kinetic system as a chlorination device is certified to NSF/ANSI Standard 46, Section 11. All components are manufactured from plastic or rubber. Your service provider has the necessary training, tools and equipment for removal and cleaning. If your Bio-Kinetic system is in need of service, contact your service provider. During each semi-annual service inspection, your service provider will remove and clean the Bio-Kinetic system or replace it with a unit from their service stock.



NON-MECHANICAL FLOW EQUALIZATION

The patented design of the Bio-Kinetic system provides non-mechanical flow equalization for the Singulair wastewater treatment plant. Equalization reduces incoming hydraulic surges (e.g. typical shower of 10 minutes duration, bathtub discharge of 5 minutes duration, clothes washer discharge of 2 minutes duration and dishwasher discharge of 2 minutes duration) throughout the system. The flow equalization provided by the Bio-Kinetic system causes wastewater to be held upstream of the final outlet during hydraulic surges, which preserves treatment integrity and enhances system operation. The actual rate of equalization varies and depends upon specific loading patterns and the duration of each flow surge. At the design loading pattern used during the NSF/ANSI Standard 40 performance evaluation, the Singulair system equalizes all flow an average of 48%. As a result, hydraulic surges and periods of high wastewater flow are automatically reduced to protect the environment and all treatment plant processes on a demand use, as needed, basis.

BLUE CRYSTAL® RESIDENTIAL DISINFECTING TABLETS

If local regulations require, an initial supply of Blue Crystal disinfecting tablets will be placed in the Bio-Kinetic system chlorine feed tube(s) at system start-up. Specifically formulated for use in the Singulair system, Blue Crystal disinfecting tablets provide efficient and reliable disinfection when effluent chlorination is desirable. Manufactured from calcium hypochlorite, Blue Crystal disinfecting tablets provide effective, economical bacteria killing power. Liquid entering the Bio-Kinetic system contacts the installed Blue Crystal disinfecting tablets, just downstream of the equalization ports. A fully charged feed tube will last an average of six months. During each semi-annual inspection, your Singulair service provider will check system operation, the rate of tablet consumption and install tablets during routine service inspections.

NOTE: USEPA guidelines state "On the average, satisfactory disinfection of secondary wastewater effluent can be obtained when the chlorine residual is 0.5 ppm after 15 minutes contact." Retention time must comply with the controlling regulatory jurisdiction.

CAUTION: *The improper handling of Blue Crystal tablets may cause personal injury or property damage. Keep out of the reach of children and do not allow the tablets or feed tube to contact skin, eyes, or clothing. Tablets may be fatal if swallowed and tablet dust is irritating to the eyes, nose and throat. Do not handle the tablets or feed tubes without first carefully reading the product container label, MSDS information and the handling and storage instructions. Mixing of chemicals may cause violent reaction leading to fire or explosion. For additional information about Blue Crystal tablets contact your Singulair service provider.*

BIO-NEUTRALIZER® DECHLORINATION TABLETS

In environmentally sensitive areas, environmental regulations may require the use of Bio-Neutralizer dechlorination tablets. Manufactured as an efficient and dependable means to chemically neutralize both free and combined chlorine, Bio-Neutralizer dechlorination tablets provide consistent reduction or elimination of chlorine residual without unnecessarily reducing the level of dissolved oxygen in the treatment system effluent. Bio-Neutralizer dechlorination tablets utilize a unique chemical mixture for chlorine reduction and environmental protection. As liquid passes through the final discharge zone of the Bio-Kinetic system, the flow contacts the installed Bio-Neutralizer tablets and residual chlorine is removed from the system effluent. A fully charged Bio-Neutralizer feed tube will last an average of six months. During each semi-annual inspection, your Singulair service provider will check system operation, the rate of tablet consumption and install tablets during routine service inspections.

CAUTION: *Bio-Neutralizer tablets or feed tubes should not be mixed with Blue Crystal tablets. Do not handle the tablets or feed tubes without first carefully reading the product container label, MSDS information and the handling and storage instructions. For additional information about Bio-Neutralizer tablets contact your Singulair service provider.*

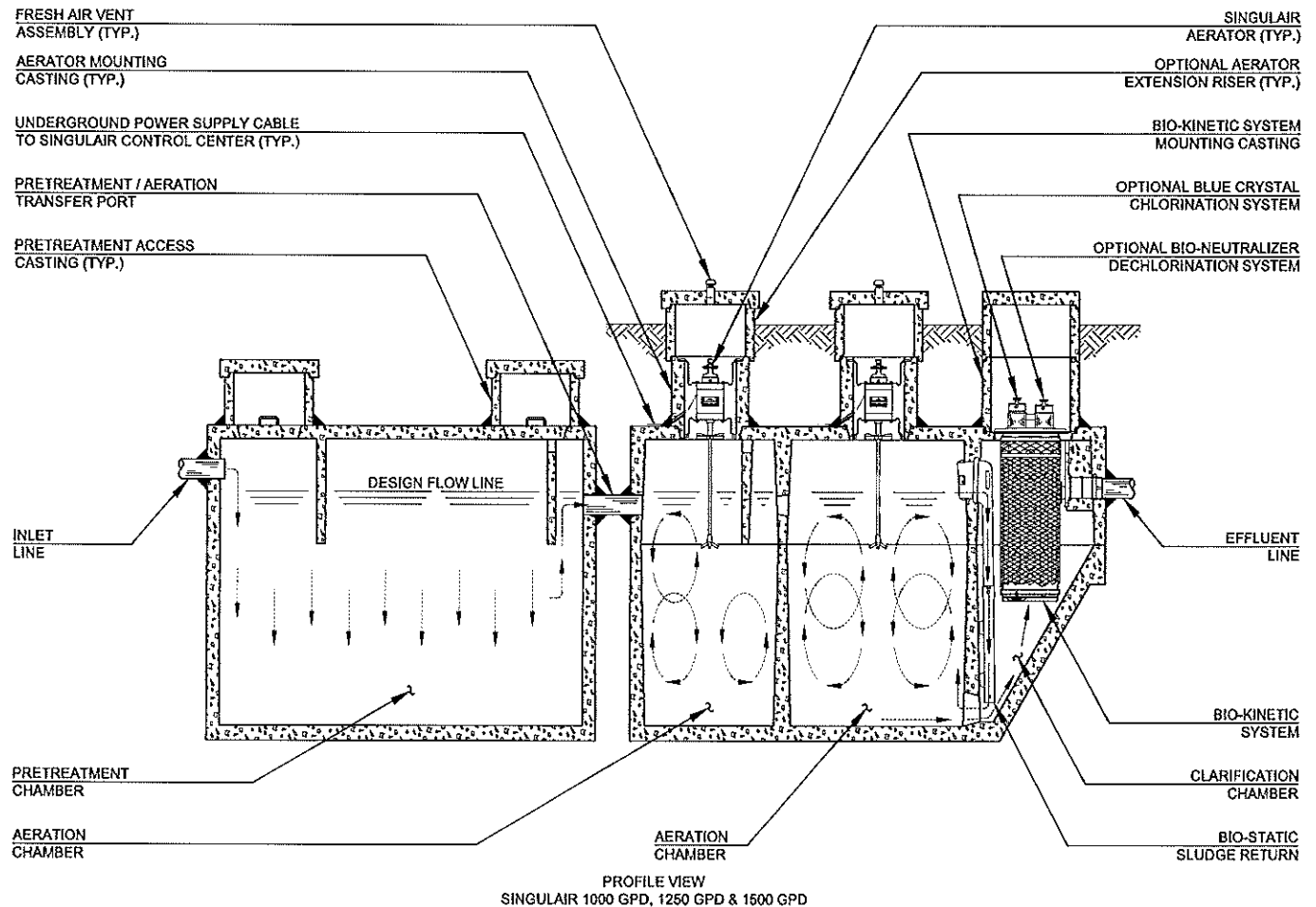
NO OWNER MAINTENANCE

The Singulair system is inspected and serviced by a local, factory-trained service provider, therefore, no owner maintenance is required during the warranty period. The Singulair system does not require pumping as often as a septic tank. Under normal use only the pretreatment chamber should be pumped. How often pumping is necessary depends on system use. The local Singulair service provider will inspect the aeration chamber contents and plant effluent at six month intervals to determine if the pretreatment chamber is discharging excessive solids. Every three years, the pretreatment chamber should be inspected. The pretreatment chamber will normally require pumping at three to five year intervals. Contact your local service provider prior to tank pumping for complete information on removal of equipment, access to individual chambers, coordination of services and proper disposal of tank contents. A tank pumping service licensed by the local regulatory agency must be used for removal and disposal of tank contents. The tank pumper should consult with local authorities to determine the proper disposal method.

If a period of intermittent use, or an extended period of non-use of the Singulair system is anticipated, contact your Singulair service provider for instructions. Your service provider has comprehensive Singulair service instructions and has been factory-trained in troubleshooting procedures. Contact your service provider if you require service or information regarding tank pumping.

SINGULAIR® SERVICE PROGRAM

Semi-annual service inspections, at six month intervals for the first two years of system operation, are provided by your local Norweco distributor and are included in the original purchase price of the Singulair system. Costs for travel and labor are not charged to the owner. During an inspection, each mechanical aerator, Bio-Kinetic system and other plant components are serviced as outlined in the Singulair Service Manual. After the initial two year service program is completed, the local service provider will provide continued service at the owner's option. The service program should be renewed by the owner to insure maximum system performance.



Ask your Singulair service provider about a renewable service contract. If you allow service coverage to expire, you can still obtain the professional assistance of a factory-trained technician. However, these special service calls will be performed on a time and materials basis. Professional service is important to proper system operation and should not be allowed to lapse. Be sure to consider the advantages of a renewable service contract.

The Singulair service provider will perform the following services during each service inspection:

- ✓ Check aerator operation
- ✓ Check aerator power consumption
- ✓ Check aerator air delivery
- ✓ Clean stainless steel aspirator shaft
- ✓ Clean aspirator tip
- ✓ Clean fresh air vent in concrete cover
- ✓ Inspect aeration chamber contents
- ✓ Check operation of control center
- ✓ Adjust time clock when required
- ✓ Remove the Bio-Kinetic system
- ✓ Scrape the clarification chamber
- ✓ Inspect the Bio-Static sludge return
- ✓ Inspect outlet coupling
- ✓ Install a clean Bio-Kinetic system
- ✓ Fill Blue Crystal feed tube
- ✓ Fill Bio-Neutralizer feed tube
- ✓ Inspect effluent quality
- ✓ Inspect outlet line
- ✓ Inspect ground water relief point
- ✓ Inspect effluent disposal system
- ✓ Complete 3-part service record
- ✓ Hang owner's record on front door
- ✓ Enter record into www.servicepromcd.com
- ✓ Mail health department notification

WARRANTY REGISTRATION

A Warranty Registration Card was attached to the Service Pro control center before it was shipped from the factory. If this card has not been returned to Norweco, complete and mail it immediately. If it is not returned within thirty days of the installation date, the two year limited warranty and fifty year aerator exchange program will begin on the date of component shipment from the factory.

If the Service Pro control center is mounted in an outdoor location, remove the aerator model number and serial number record card and store it in a safe location. Otherwise, do not remove this card from the control center. If it is necessary to call your service provider for service, make note of the information on the control center data plate and the aerator serial number before calling. Warranty and service records are cross-indexed by owner name and aerator serial number. Supplying the aerator serial number with the service request will give the service provider a ready reference so that changes in system ownership will not delay service.

SINGULAIR® LIMITED WARRANTY

The Singulair aerator enjoys the distinction of being the only aerator on the market today backed by a lifetime warranty and exchange program. Each Singulair aerator, Service Pro control center, Bio-Kinetic system and any other components manufactured by Norweco, are warranted to be free from defects in material and workmanship, under normal use and service, for a period of three years from the date of purchase. The three year limited warranty is included in the original purchase price of every Singulair system. The comprehensive aerator exchange program offers Singulair owners a lifetime of protection. Owners with a Singulair system may exchange any aerator of any age for a replacement unit at a prorated cost. If the Singulair aerator or Service Pro control center fails, do not use or dismantle the unit. The local, licensed distributor has detailed warranty and exchange information and should be contacted for service or replacement instructions.

SERVICE PRO® SECURITY LOG IN

For your convenience, record your www.servicepromcd.com access information here:

User name:	Password:
-------------------	------------------

SUPPLEMENTAL SERVICE RECORD

For your reference, please document service performed on the following chart:

DATE	DESCRIPTION



*Engineering the future of water
and wastewater treatment*

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 TELEPHONE (419) 668-4471
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SINGULAIR GREEN® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM

TANK PUMPING INSTRUCTIONS

These instructions provide a general guideline concerning when and how to pump out the Singulair Green system. This literature supplements other instructional materials included in the Singulair Green Bio-Kinetic System Service Manual.

In order to maximize performance, protect system components and insure protection of the surrounding environment, the Singulair Green system should be thoroughly checked every six months by a factory-trained Norweco service technician. An initial service program that provides a minimum of four service inspections during the first two years of system operation is included in the system purchase price. Renewable service contracts to extend these routine inspections after the initial program expires are available from the local licensed Norweco dealer.

The pretreatment chamber of the Singulair Green system will periodically require pumping. Because the Singulair Green system is a biological treatment device, the time frames listed within these instructions are estimates. Actual pumping frequency will depend on the amount and strength of the wastewater being treated.

Handling and disposal of pretreatment chamber contents, referred to as septage, or the contents of the aeration and clarification chambers, referred to as biosolids, are regulated by local, state and federal authorities. Disposal options may include land application, lagoon treatment, municipal wastewater treatment or landfill disposal. Prior to arranging for tank pumping, contact the Norweco dealer to obtain complete information on access to chambers, removing equipment, coordination of services and disposal of tank contents.

During Singulair Green system installation and backfilling, do not allow dirt or mud to enter the system. Once in the system, dirt or mud will form a heavy sludge which will affect settling characteristics, interfere with filtration and degrade effluent quality. If dirt or mud enters the system, it must be removed to insure proper system operation. Removing the dirt or mud may require repeated flushing and tank pumping. For additional details refer to Singulair Green Tank Delivery and Setting instructions.

INTRODUCTION

The Singulair Green system is a biological treatment device and should not require pumping as frequently as a septic tank. Septic tanks are designed to store solids and perform limited biological treatment. Frequent pumping of a septic tank is mandatory to remove and dispose of these solids before they discharge from the tank. The Singulair Green system is designed to biologically treat all incoming wastewater and return only a high quality effluent to the environment. The multiple operating processes contained within the plant accomplish primary, secondary and tertiary treatment in each Singulair Green system. The pretreatment chamber of the Singulair Green system is designed to retain non-biodegradable solids and allow biodegradable solids to flow into the aeration chamber. The aerobic treatment process in the Singulair Green system utilizes these biodegradable solids to convert the wastewater into carbon dioxide and water. This natural biological process minimizes the accumulation of solids and eliminates the need to pump the system as frequently as a septic tank. Because the Singulair Green system utilizes the biodegradable material found in wastewater to perform biological treatment, pumping the system more often than needed will not improve operational performance. Removal of the solids in the Singulair Green system will be required when indicated by an inspection or evaluation as outlined herein.

WHEN TO PUMP

Norweco dealers provide maintenance and service inspections free of charge at regular six month intervals during the initial warranty period. These routine service inspections will determine if a pretreatment chamber evaluation is necessary. The pretreatment chamber should be evaluated by a factory-trained technician at least every three years to determine if pumping is required. Pumping of this chamber by a licensed tank pumping and disposal service will likely be necessary at 3 to 5 year intervals, based on variations in system occupancy, usage and loading.

ROUTINE SERVICE INSPECTIONS

Semi-annual service inspection procedures are outlined in detail in the Singulair Green Bio-Kinetic System Service Manual. These routine service procedures include inspection of the aeration chamber, clarification chamber and effluent line to determine if the pretreatment chamber should be evaluated. A brief outline of these routine service procedures, as well as the detailed steps required to perform a comprehensive pretreatment chamber evaluation, are listed here. The results of the routine service inspection, pretreatment chamber evaluation and tank pumping (when performed) should be noted on the Service Inspection Card.

AERATION CHAMBER INSPECTION

A summary of the aeration chamber inspection procedure is listed below. For complete details on aeration chamber service, refer to the Singlair Green Service Manual.

CAUTION: Any time an aerator or service pump is connected or disconnected, first shut off the selector switch in the Service Pro control center. Failure to do so could result in personal injury or equipment damage.

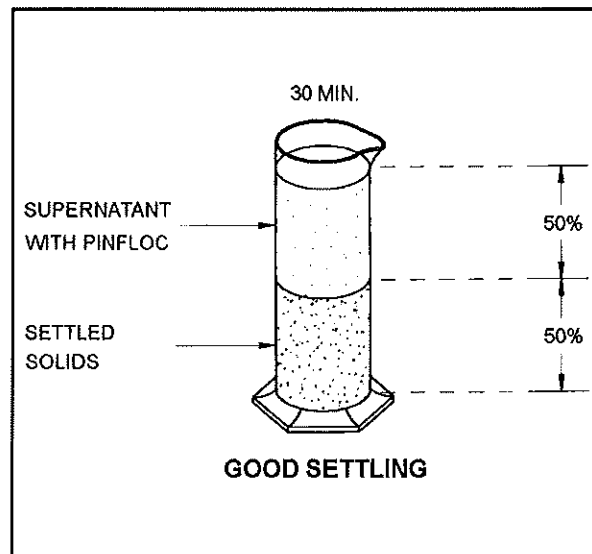
1. Remove the vented aeration chamber access cover and set aside.
2. Unplug the aerator and secure the closure cap in position to protect the electrical connector.
3. Lift the aerator straight up out of the aeration chamber access opening and lay it flat on the vented cover. DO NOT bump the aspirator shaft or rest the aerator on the aspirator shaft.
4. Perform a settleable solids test using a graduated cone or other clear container. For this test, make sure the aerator has been running for at least 10 minutes. Collect an aeration chamber sample immediately after turning off and removing the aerator. Refer to the "Settleable Solids Test" section of these instructions for additional details.
5. Loosen the two set screws on the bottom of the intermediate shaft and remove the aspirator shaft.
6. Connect the aspirator shaft to the shaft cleaning hose and outside water faucet to flush the inside of the aspirator shaft clean. Use full water pressure. Remove the aspirator shaft from the cleaning hose and inspect the bore to see that it is clean.
7. Visually check the aeration chamber surface for the presence of grease or oil. An accumulation of these materials indicates the pretreatment chamber should be evaluated.
8. Check the aeration chamber contents for the presence of non-biodegradable materials, paper, mop fibers, hair, grease or oil. A significant accumulation of these materials in the aeration chamber indicates the pretreatment chamber should be evaluated.

NOTE: Do not replace the aerator until the Bio-Kinetic system has been removed from the clarification chamber and properly serviced.

SETTLEABLE SOLIDS TEST

A settleable solids test should be conducted as part of the aeration chamber evaluation during each routine service inspection to monitor system performance. The results of the settleable solids test can be used to verify that a mature biomass has developed in the Singlair Green system. The test will also indicate when excessive solids have accumulated in the pretreatment chamber of the Singlair Green system. When this occurs, it may be necessary to pump the contents of the pretreatment chamber.

To insure a well mixed sample is collected for the settleable solids test, make sure the aerator has been running for at least 10 minutes. Collect the sample immediately after turning off and removing the aerator and before the aeration chamber contents begin to settle. Using a graduated cone or other clear container, dip the container into the aeration chamber to a depth of 2½ feet. Set the container on a level surface and allow the solids to "settle" for 30 minutes while you complete the service inspection. Do not disturb the container during the test.



After 30 minutes, read the level of solids and compare it with the total liquid volume in the container. Calculate the percentage of settled solids volume (i.e. ½ full of solids equals 50%). If the settled material contains large pockets of clear liquid, estimate the volume of these pockets and reduce the settled solids reading by that amount. A settled solids reading of up to 75% indicates no adjustments are necessary.

NOTE: The solids should settle and compact within the 30 minute test. System start-up, or periods of low organic loading will result in solids that are too light to settle, and will appear as a full container with no clear separation. This should not be interpreted as having excess solids and system operation can continue without any adjustment.

A settled solids level greater than 75% at the end of the 30 minute test indicates excessive solids in the aeration chamber and that the pretreatment chamber may need to be pumped. In this case, a pretreatment chamber evaluation must be performed. Refer to the "Pretreatment Chamber Evaluation" section of these instructions for more details. If the pretreatment chamber evaluation indicates pumping is not required, the aerator operating cycle may need to be increased. Consult the local regulatory agency and the Service Pro Time Clock Setting instructions before adjusting the aerator operating cycle.

The results of the settleable solids test, and any adjustment made to the system time cycle, should be recorded on the Service Inspection Card.

CLARIFICATION CHAMBER INSPECTION

A summary of the clarification chamber and Bio-Kinetic service inspection procedure is listed below. For complete details on clarification chamber service, refer to the Singulair Green Bio-Kinetic System Service Manual.

1. Remove the clarification chamber access cover.
2. Remove the optional Blue Crystal and Bio-Neutralizer feed tubes. Do not allow the tubes to touch.
3. Install the outlet sealing tool into the receiving flange to prevent loss of liquid from the Singulair Green system during service.
4. Remove the Singulair aerator and place the service funnel over the aerator mounting riser.
5. Using the universal tool, remove the flow deck and chamber plate assembly from the Bio-Kinetic system. Place the assembly on the service funnel for cleaning.
6. Using the universal tool, disengage all four black locking lugs to allow for removal of the outer chamber.
7. Lower the fixed handle of the universal tool into the upper lip of the Bio-Kinetic system outer chamber. Turn the handle until the lifting tool is engaged into the lifting rib.
8. The outer chamber is equipped with a drain valve and fill valve to allow for easy removal and reinstallation during service. Begin lifting the outer chamber from the tank. The drain valve will automatically open as the outer chamber is lifted out of the clarification chamber. Remove the outer chamber from the mounting riser and set it on the upside down lid of the service container.
9. Reinstall the Singulair aerator as outlined in the Singulair Green Aerator Service Instructions. The aerator must be in operation while the remaining clarification chamber service is performed. The aerator works in conjunction with the Bio-Static sludge return to create a hydraulic current that will return settled solids to the aeration chamber.
10. Check the surface of the clarification chamber for the presence of grease or biologically untreatable material. A significant accumulation of these materials would indicate that the pretreatment chamber should be evaluated.
11. With the aerator running, use the hopper scraping tool to gently scrape all areas of the clarification chamber hopper side walls.
12. Complete the clarification chamber service as outlined in the "Clarification Chamber" section of the Singulair Green Bio-Kinetic System Service Manual.
13. Make appropriate notations on the Singulair Service Inspection Card and on the Owner's Manual.

EFFLUENT LINE INSPECTION

Check the groundwater relief point installed in the effluent line to make sure it is free of obstruction. An accumulation of paper, fibers, hair or grease indicates that the Singulair Green system needs to be pumped. If there is a surface discharge point, make sure that it is free of debris, foam, mud, etc. Make appropriate notations on the Service Inspection Card.

PRETREATMENT CHAMBER EVALUATION

The pretreatment chamber must be evaluated within three years of system start-up or the most recent tank pumping. An evaluation must also take place any time a routine service inspection indicates the chamber may be discharging excessive solids. This evaluation includes measuring the depth of the floating scum and settled sludge layers to determine if pumping is required. If the pretreatment chamber evaluation indicates the chamber does not require pumping, these evaluations should be repeated annually until pumping is necessary.

PRETREATMENT CHAMBER INSPECTION

A complete pretreatment chamber inspection procedure is listed below. The results of the inspection should be noted on the Service Inspection Card.

1. If the pretreatment chamber access opening is not equipped with a riser and cover at grade, dig down to the access opening in the top of the tank. The opening is in line with the access opening for the aeration chamber and the system outlet. The access cover should not be more than 12" below grade.
2. Remove the access cover and be careful not to allow dirt or mud to enter the tank. If dirt or mud enters the system, it must be removed to insure proper system operation.
3. Visually examine the surface of the pretreatment chamber for a significant accumulation of grease, oil or non-biodegradable materials.
4. Using the hopper scraping tool, gently probe the surface of the chamber to determine the thickness of the scum mat. Force the tool down through the scum mat, rotate the tool one quarter turn, then raise it until the bottom of the mat is felt. If the depth of the floating scum layer has reached the bottom of the discharge tee, the chamber should be pumped.
5. To check the depth of the settled sludge layer, secure a rough white towel to the handle of the hopper scraping tool and lower it to the bottom of the chamber.

Push the tool through the settled sludge layer to the bottom of the tank. Wait several minutes and carefully remove the tool. The depth of the settled sludge layer will be shown by a dark line on the towel. If the settled sludge layer has accumulated to the bottom of the discharge tee, the chamber should be pumped.

Review the "Operational Requirements" section of the Owner's Manual with the owner. If lint, grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags, dental floss, strings, cigarette filters, rubber or plastic products, paints, thinning agents or other harsh chemicals are discovered in the system, the owner should be cautioned regarding proper use of the system.

WHAT TO PUMP

When pumping is required, normally it is necessary to pump only the pretreatment chamber if the system has been serviced at regular 6-month intervals. If service has been interrupted for an extended period of time, or if mud or toxic material is present, it may be necessary to pump out the entire system. When pumping, it is not necessary to wash down the compartments unless significant quantities of grease, hair, fibers, mud, toxic substances or biologically untreatable materials are present. The capacity of the pretreatment chamber is 450 gallons. When pumping the pretreatment chamber, an additional 400 gallons will be removed from the aeration and clarification chambers until the liquid level drops below the transfer port invert. A total of 850 gallons will be removed when the pretreatment chamber is pumped. The total capacity of the system is 1,300 gallons.

CAUTION: After pumping any portion of the Singulair Green tank, it is essential to immediately refill each chamber with clear water to the design flow line. The water must be free of leaves, mud, grit or other materials that might interfere with system operation. Dewatering and leaving the system empty will affect tank integrity and void the warranty.

HOW TO PUMP THE SYSTEM

A complete Singulair Green system pumping procedure is listed below. Prior to pumping, contact the Singulair Green dealer to obtain complete information on equipment removal and reinstallation. Failure to properly remove and reinstall equipment and access covers during tank pumping may result in damage to the system and will void the warranty.

1. If any portion of the Singulair Green system requires pumping, contact a tank pumping service licensed by the local regulatory agency. The septage or biosolids must be removed and disposed of in a manner consistent with federal, state and local regulations.
2. Advise the pumping service what volume of liquid is to be removed from the system.

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3. For pumping the pretreatment chamber only, remove all three access covers and insert a suction hose into the pretreatment chamber. Lower the hose until it contacts the bottom of the tank. Withdraw the hose approximately 2" and connect the opposite end to the pump being used to evacuate the chamber. Do not allow the hose to rest on the bottom of the tank.
4. Break up the scum mat to facilitate pumping. Activate the pump and remove the pretreatment chamber contents. It is not necessary to wash down the sidewalls or tank bottom.
5. If the solids in the chamber are so concentrated that the suction hose cannot withdraw them, the pretreatment chamber contents may be back-flushed to break up the solid matter.
6. If special circumstances require the total system to be pumped, contact the local Singulair Green dealer. The aerator and Bio-Kinetic system must be removed for full access to all chambers and to prevent damage to components. Only the factory trained Singulair Green dealer should attempt to remove and reinstall the equipment.

NOTE: Access to the contents of the aeration and clarification chambers of Singulair Green systems should be made only through an aerator mounting riser. Never insert the hose through the Bio-Kinetic system mounting riser.

7. A Singulair Green system that has been inactive for an extended period of time or that has accumulated mud or dirt during installation may have to be washed down with fresh water and pumped out. This process may have to be repeated for proper system operation.
8. After pumping, fill all chambers to capacity with water. Return the aerator, Bio-Kinetic system and all access covers to their proper locations, as outlined in the Singulair Green Service Manual. Be sure each control center selector switch is in the "on" position, and each enclosure is secured with a tamper evident seal.

Following tank pumping, no other system adjustments are necessary for proper biological treatment to continue. Semi-annual service inspections by a factory-trained Norweco service technician should be conducted to insure long term system performance.

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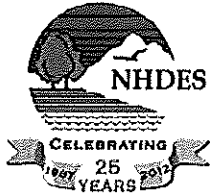
NSF/ANSI Standard 245 - *Wastewater Treatment Systems – Nitrogen Reduction*

Final Report:

**Norweco, Inc.
Singlair Model TNT-500 Wastewater Treatment System
05/06/2015/060**



NSF International
789 N. Dixboro Road
PO Box 130140
Ann Arbor, Michigan 48113-0140 USA



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

October 29, 2012

Scott Hetrick, Sales Manager
NORWECO, Inc.
220 Republic Street
Norwalk, OH 44857

Subject: NORWECO Singulair® Bio-Kinetic® System-Waiver Amendment

Dear Mr. Hetrick:

The New Hampshire Department of Environmental Services (DES) has reviewed information provided by NORWECO, Inc received on October 19, 2012. You have requested an amendment to the waiver granted to you on September 11, 2012 relative to the provisions in Env-Wq 1016 to allow effluent disposal area (EDA) reduction to be changed from 50%, as granted in the approval letter dated October 29, 2001, up to 75% reduction in EDA sizing. Based on the your recent information, DES hereby grants the requested amendment by the removal of the sentence in condition #4 in the September 11, 2012 approval letter stating (A septic tank is required upstream of the Subject unit.) The amended waiver is granted with the following conditions:

1. Individual sewage disposal systems (ISDS) using the Subject unit must be designed and installed in accordance with manufacturer's recommendations.
2. Double reductions will not be allowed. For example, you may not claim the allowable reduction for Large Diameter Graveless Pipe EDAs in a residential use, and then claim a 75% reduction of that reduced size. DES will not permit EDAs any smaller than $\frac{1}{4}$ of the size listed in Env-Wq 1016.
3. For any installation using a reduced EDA size per No. 2 above, except where the Subject unit is proposed to replace an existing failed system on an existing lot that predates DES subdivision regulations, the designer must include information on the design plans sufficient to document that it is possible to construct a full size EDA on the property.
4. All other design criteria of the overall ISDS using the Subject unit must comply with the provisions of Chapter Env-Wq 1000.

5. A copy of this letter shall accompany any specific ISDS design involving the use of the Subject unit under this approval which may be submitted to DES.

6. Maintenance contracts, signed by the property owner, must be included with each ISDS application submitted for DES approval. The maintenance contract must remain in place for the life of the approved ISDS and work must be performed by a licensed wastewater treatment plant operator. DES expects that a Grade 1 operator's license will be sufficient. NORWECO must notify the Subsurface Systems Bureau of any property owner who does not renew their maintenance contract prior to its expiration.

I hope this amendment meets your needs. If you have any questions, please contact me at 603-271-2951 or Robert Tardiff at 271-2904 or at robert.tardif@des.nh.gov.

Sincerely,

Rene Pelletier
Asst Director
Water Division

CC: Robert Tardiff, P.E., DES
Paul Heitzler, P.E., Administrator, Wastewater Engineering Bureau
Don Bach, Director of Sales, NORWECO, Inc.



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

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Secretary

TIMOTHY P. MURRAY
Lieutenant Governor

KENNETH L. KIMMELL
Commissioner

APPROVAL FOR REMEDIAL USE

Pursuant to Title, 310 CMR 15.00

Name and Address of Applicant:

NORWECO, Inc.
220 Republic Street
Norwalk, OH 44857

Trade name of technology: Singulair Bio-Kinetic Wastewater Treatment System
Models: Singulair 960-500, 960-600, 960-750, 960-1000, 960-1250, 960-1500, TNT-500, TNT-600, TNT-750, TNT-1000, TNT-1250, TNT-1500 (concrete tank), and, Singulair Green models 960-500, 960-600, TNT-500, TNT-600 (plastic tank) (all hereinafter called the "System").
Schematic drawings illustrating the models and an Inspection checklist are part of this approval.

Transmittal Number: X235820
Renewal Date: June 8, 2007, modified February 25, 2011
Expiration Date: June 8, 2012

Authority for Issuance

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental Protection hereby issues this Approval to: NORWECO, Inc., 220 Republic Street, Norwalk, OH 44857 (hereinafter "the Company"), approving the System described above and herein for Remedial Use in the Commonwealth of Massachusetts. Sale and use of the System are conditioned on compliance by the Company and the System owner with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Approval constitutes a violation of 310 CMR 15.000.

David Ferris, Director
Wastewater Management Program
Bureau of Resource Protection

February 25, 2011

Date

I. Purpose

1. The purpose of this Approval is to allow use of the System in Massachusetts, on a Remedial Use basis.
2. With the necessary permits and approvals required by 310 CMR 15.000, this Approval for Remedial Use authorizes the use and installation of the System in Massachusetts.
3. The System may only be installed on facilities that meet the criteria of 310 CMR 15.284(2), *Approval for Remedial Use*.
4. This Approval for Remedial Use authorizes the use of the System where the local approving authority finds that the System is for upgrade of a failed, failing or nonconforming system and the design flow for the facility is less than 1,500 gallons per day (GPD).

II. Design Standards

1. The Singularair® Bio-Kinetic wastewater treatment system, which includes both the Singularair model with concrete tank and the Green model with plastic tank, is a suspended growth with filtration process for treating sanitary wastewater. The Singularair model 960 treatment process takes place in a three-compartment precast concrete tank or similarly sized three-compartment plastic tank (Green models). The initial chamber removes gross solids, grease and oil from the wastewater by settling and flotation. The clarified liquid is aerated in the second chamber using a fractional horsepower, 1725 RPM aerator, operating at 30 min on and 30 min off, to mix and aerate the liquid and promote aerobic treatment. The TNT models are designed to additionally reduce total nitrogen in the wastewater with aeration timed to operate 60 min on and 60 min off. The third chamber contains the Bio-Kinetic unit, which provides additional filtration and settling using non-mechanical flow equalization. Sludge that settles in the third chamber is returned to the aeration chamber using a Bio-Static sludge return installed in an opening between the second and third compartments.
2. Singularair Green model installations with plastic tank are not designed for traffic loading. No Green System shall be located or installed in a vehicle traffic area. Siting of the Green models 960-500, 960-600, TNT-500, TNT-600 in a location subject to vehicular loading is specifically prohibited by this Approval. Where vehicles can possibly access an installed Singularair Green System site, suitable warnings shall be installed.
3. The maximum burial depth for the Singularair Green models shall not exceed 16.5 inches. For deeper burials the System designer shall consult with NORWECO, Inc. and their 'Deeper Burial Requirements' for the Green plastic tank models.
4. All proposed Singularair installations, including the Green models, shall require buoyancy calculations in locations with a high groundwater elevation. Tie downs and associated anchors, such as the anti-flotation beams available from NORWECO, Inc, may be required to prevent tank floatation. The buoyancy calculations shall be included on the Title 5 septic system plan for each System installation. System buoyancy calculations shall include consideration of the high groundwater elevation developed as required by 310 CMR 15.100

- through 15.105. Design plans prepared in accordance with 310 CMR 15.220 shall include System anchoring and backstay details when necessary.
5. The control panel including alarms and controls shall be housed within a weatherproof enclosure mounted in a location always accessible to the System operator.
 6. All access ports and manhole covers shall be installed and maintained at grade to allow for maintenance of the System.
 7. The System, shall be installed between the building sewer and the effluent pump chamber for disposal in the SAS of a system designed and constructed in accordance with 310 CMR 15.100 - 15.279, subject to the provisions of this Approval.
 8. The System may be used in soils with a percolation rate of up to 90 min./inch in accordance with 310 CMR 15.245(4)
 9. Pressure distribution designed in accordance with Department guidelines is required for all installations of the System.

III. Allowable Soil Absorption System Design

1. The following reductions are allowable for Soil Absorption Systems (SAS) when designing the System.
 - A. The approving authority may allow up to a 50 percent reduction in the area of the soil absorption system required by 310 CMR 15.242; or
 - B. The approving authority may allow a reduction in the required separation between the bottom of the SAS and the high groundwater elevation of up to two feet. This provides a minimum separation of two feet (in soils with a recorded percolation rate of more than two minutes per inch) or a three feet (in soils with a recorded percolation rate of two minutes or less per inch); or
 - C. The approving authority may allow a reduction in the required four feet of naturally occurring pervious material in an area with no less than two feet of naturally occurring pervious material, provided that it has been demonstrated that the four foot requirement cannot be met anywhere on the site.

EXCEPTION: If a remedial System needs more than one of the allowable reductions listed above, then the reductions must first be approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284 through filing a BRPWP 64c permit application.
2. Additional reductions allowable for Soil Absorption System (SAS) when designing the System:
 - A. When using 1A, 1B, or 1C above for the System where full compliance with 310 CMR 15.000 is not feasible, the local approving authority may consider granting local upgrade approvals in accordance with the provisions of 310 CMR 15.401 – 15.405.

For example:

- i. When an applicant chooses up to a 50 % reduction in the SAS area with the use of I/A technologies, the local approving authority may grant a local upgrade approval for reduction to estimated high groundwater in accordance with 310 CMR 15.405(1)(h).
 - ii. When an applicant chooses up to a two foot reduction in the estimated separation of high groundwater from the bottom of the SAS area with an I/A technology, the local approving authority may consider granting a local upgrade approval for SAS reduction in accordance with 310 CMR 15.405(1)(c).
 - iii. When an applicant chooses a reduction in the naturally occurring soil with the use of an I/A technology, a local upgrade approval may grant either a reduction in SAS area in accordance with 310 CMR 15.405(1)c or a reduction in groundwater separation in accordance with 310 CMR 15.405(1)(h).
- B. If any remedial system is still not able to achieve full compliance with all of the minimum set back distances in 310 CMR 15.211, even taking into account provisions for local upgrade approval in accordance with the provisions of 310 CMR 15.401 – 15.405 the applicant must obtain variance(s) from the approving authority and then approval from the Department pursuant to 310 CMR 15.410 through filing a BRPWP 59c permit application.

IV. General Conditions

1. All provisions of 310 CMR 15.000 are applicable to the use of this System, the System owner and the Company, except those that specifically have been varied by the terms of this Approval.
2. Any required operation and maintenance, monitoring and testing shall be performed in accordance with a Department approved plan. Any required sample analysis shall be conducted by an independent U.S.EPA or DEP approved testing laboratory, or a DEP approved independent university laboratory. It shall be a violation of this Approval to falsify any data collected pursuant to an approved testing plan, to omit any required data or to fail to submit any report required by such plan.
3. The facility served by the System and the System itself shall be open to inspection and sampling by the Department and the local approving authority at all reasonable times.
4. In accordance with applicable law, the Department and the local approving authority may require the System owner to cease operation of the system and/or to take any other action as it deems necessary to protect public health, safety, welfare and the environment.
5. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sewer system. No System shall be installed, upgraded or expanded, if it is feasible to connect the facility to a sanitary sewer, unless as allowed by 310 CMR 15.004. When a sanitary sewer connection becomes feasible, the facility served by the System shall be connected to the sewer, within 60 days of such feasibility, and the System shall be abandoned in compliance with 310 CMR 15.354, unless a later time is allowed, in writing, by the approving authority.

6. Design, installation and operation shall be in strict conformance with the Company's DEP approved plans and specifications, 310 CMR 15.000 and this Approval.
7. Pressure distribution designed in accordance with Department guidance is required for all installations of the System.

V. Conditions Applicable to the System Owner

1. The System is approved for the treatment and disposal of sanitary sewage only. Any wastes that are non-sanitary sewage generated or used at the facility served by the System shall not be introduced into the System and shall be lawfully disposed.
2. Effluent discharge concentrations shall meet or exceed secondary treatment standards of 30 mg/L biochemical oxygen demand (BOD₅) and 30 mg/L total suspended solids (TSS). The effluent pH shall not be less than 6.0 or more than 9.0 standard units (S.U.).
3. Any effluent samples shall be taken at a flowing discharge point, i.e. distribution box, pump chamber or other Company approved location downstream of the treatment unit. Any required influent sample shall be taken at a point that will provide a representative sample of the influent. The system designer, subject to approval by the Company, shall determine influent sampling locations.
4. The System owner shall have the Company or its designee conduct a design review for any proposed non-residential System or System with a design flow 2,000 GPD or greater to ensure that the proposed use of the System is consistent with the unit's capabilities.
5. Operation and Maintenance Agreement:
 - A. Throughout its life, the owner shall operate and maintain the System in accordance with the Company and designer's operation and maintenance requirements and this Approval. To ensure proper operation and maintenance (O&M), the owner shall enter into an O&M agreement. No O&M agreement shall be for less than one year.
 - B. No System shall be used until an O&M agreement is submitted to the approving authority which:
 - i. Provides for the contracting of a person or firm trained by the Company as provided in Section VI (5) and competent in providing services consistent with the System's specifications, with the operation and maintenance requirements specified by the Company and the designer, and with any specified by the Department;
 - ii. Contains procedures for notification to the local board of health within five days of a System failure or alarm event and for corrective measures to be taken immediately; and
 - iii. Provides the name of an operator, which must be a Massachusetts certified operator if one is required by 257 CMR 2.00, that will operate and monitor the System. The operator must inspect and field test Systems installed at single family homes at least every six months in accordance with the Department's policy and anytime there is an alarm event, and for all other Systems at least every three months and anytime there is an alarm event. This Department policy, *Inspection and Sampling in Title 5 I/A Single Family Home Remedial and General Use Treatment Systems with Design*

Flows Less than 2000 gallons/day can be viewed on the internet at:
<http://mass.gov/dep/water/wastewater/iatechs.htm>.

- iv. For all other Systems the operator must inspect and maintain the System at least every three months and anytime there is an alarm event.
6. Effluent from the System serving a single family residential facility shall be field tested in accordance with the Department's policy available at <http://www.mass.gov/dep/water/laws/policies.htm#t5pols>. For non-residential facilities and all facilities with design flows of 2,000 GPD or greater, System effluent shall be sampled for laboratory analysis at least quarterly for the following parameters: pH, BOD₅, and TSS.
7. The System owner shall at all times have the System properly operated and maintained in accordance with this Approval, the designer's operation and maintenance requirements and the Company's approved procedures and sampling protocols. The System owner shall notify the local approving authority in writing within seven days of any cancellation, expiration or other change in the terms and/or conditions of their O&M agreement.
8. Prior to transferring any or all interest in the property served by the System, or any portion of the property, including any possessory interest, the System owner shall provide written notice of all conditions contained in this Approval to the transferee(s). Any and all instruments of transfer and any leases or rental agreements shall include as an exhibit attached thereto and made a part thereof a copy of this Approval for the System. The System owner shall send a copy of such written notification(s) to the local approving authority within 10 days of such notice being given.
9. By January 31st of each year for the previous year, the System owner shall submit to the local approving authority all data collected in accordance with item 6, above, including all Department Title 5 IA O&M checklists and System technology checklists completed during the previous calendar year by the System operator for each inspection performed.
10. Prior to the issuance of a Certificate of Compliance for the System, the System owner shall record and/or register in the appropriate Registry of Deeds and/or Land Registration Office, a Notice disclosing both the existence of the alternative septic system subject to this Approval on the property and the Department's approval of the System. If the property subject to the Notice is unregistered land, the Notice shall be marginally referenced on the owner's deed to the property. Within 30 days of recording and/or registering the Notice, the System owner shall submit the following to the local approving authority: (i) a certified Registry copy of the Notice bearing the book and page/instrument number and/or document number; and (ii) if the property is unregistered land, a Registry copy of the owner's deed to the property, bearing the marginal reference.

VI. Conditions Applicable to the Company

1. By February 15th of each year, the Company shall submit a report to the Department, signed by a corporate officer, general partner or Company owner that contains information on the System, for the previous calendar year. The report shall state: the number of units of the System sold for use in Massachusetts including the installation date and date of start-up during the previous year; the address of each installed System, the owner's name and address, the type of use (e.g. residential, commercial, institutional) and the design flow; and

- for all Systems installed since the date of issuance of this Approval, all known failures, malfunctions, and corrective actions taken and the address of each such event.
2. The Company shall notify the Director of the Wastewater Management Program at least 30 days in advance of the proposed transfer of ownership of the technology for which this Approval issued. Said notification shall include the name and address of the proposed new owner and a written agreement between the existing and proposed new owner containing a specific date for transfer of ownership, responsibility, coverage and liability between them. All provisions of this Approval applicable to the Company shall be applicable to successors and assigns of the Company, unless the Department determines otherwise.
 3. The Company shall develop and submit to the Department within 60 days of the effective date of this Approval, if not already provided, a standard protocol essential for consistent and accurate measurement of performance of installed Systems, including procedures for sample collection and analysis of the System. The protocol shall be in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater.
 4. The Company shall make available, in print and electronic format, the referenced procedures and protocol in Section VI (3) and (4) to owners, operators, designers and installers of the System.
 5. The Company shall institute and maintain a program of operator training and continuing education, as approved by the Department. The company shall update the list of qualified operators and make the list known to users of the technology.
 6. The Company or its designee shall conduct a design review for any proposed non-residential System to ensure that the proposed use of the System is consistent with the unit's capabilities.
 6. The Company shall furnish the Department any information that the Department requests regarding the System within 21 days of the receipt of that request.
 7. The Company shall include copies of this Approval and the procedures and protocol described in Section VI (3) and (4) each System that is sold. Also, in any contract executed by the Company for distribution or re-sale of the System, the Company shall require the distributor or re-seller to provide each purchaser of the System with copies of this Approval and the procedures and protocol described in Section VI (3) and (4).
 8. The Company shall comply with 310 CMR 15.000 and all the Department policies and guidance that apply and as they may be amended from time to time.

VII. Reporting

1. All notices and documents required to be submitted to the Department by this Approval shall be submitted to:

Director
Wastewater Management Program
Department of Environmental Protection
One Winter Street - 5th floor
Boston, Massachusetts 02108

VIII. Rights of the Department

1. The Department may suspend, modify or revoke this Approval for cause, including, but not limited to, non-compliance with the terms of this Approval, non-payment of the annual compliance assurance fee, for obtaining the Approval by misrepresentation or failure to disclose fully all relevant facts or any change in or discovery of conditions that would constitute grounds for discontinuance of the Approval, or as necessary for the protection of public health, safety, welfare or the environment, and as authorized by applicable law. The Department reserves its rights to take any enforcement action authorized by law with respect to this Approval and/or the System against the owner, or operator of the System and/or the Company.