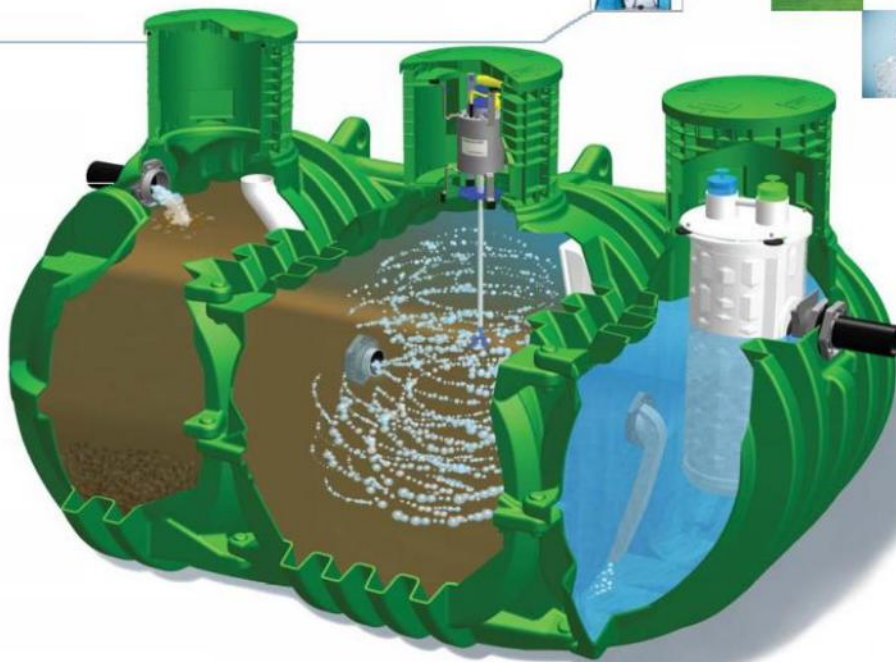
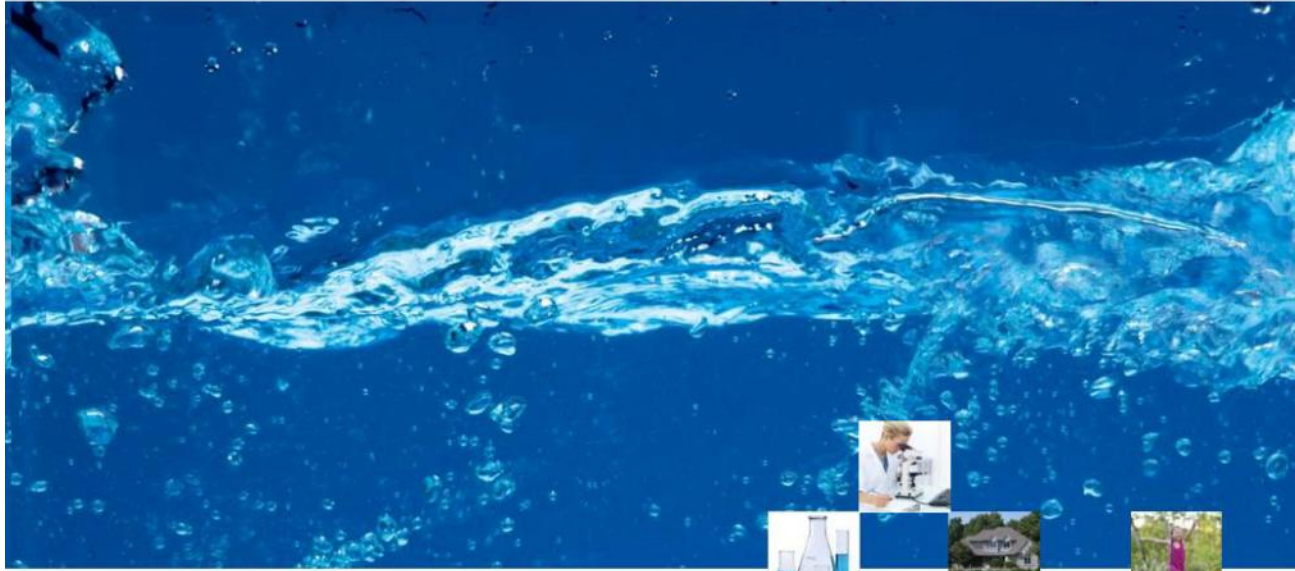


SINGULAIR GREEN®



norweco

*Engineering the future of water
and wastewater treatment*

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SINGULAIR GREEN®

The best treatment system
is now even better,
with simplified installation
and competitive pricing

We've been providing progress through service since 1906. The Singulair Green aerobic wastewater treatment system incorporates our advanced aerobic treatment process into a durable, watertight polyethylene tank. Easily installed at even the most difficult jobsite with just a backhoe, the integral support ribs insure the structural integrity of the Singulair Green tank, while the four step Singulair treatment process flawlessly transforms domestic wastewater into clean, odorless effluent in less than 24 hours.

Providing a treatment solution for any property not connected to centralized sewers, Singulair Green is the most advanced and versatile treatment system on the market.

solutions in wastewater treatment

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Norweco distributors, dealers, installers and service providers are located throughout North America and much of the rest of the world. Research, product development, manufacturing, marketing and sales support are conducted inside our offices and factory in Norwalk, Ohio USA. Everyone at Norweco is committed to shaping the future of our industry.

engineering the future
of water and wastewater treatment

Specify Singulair Green®

Your local Norweco distributor is fully trained to install your Singulair Green system and any other Norweco product you choose to protect your environment. Each of our dealers has completed a nationally accredited Singulair Green factory-training program.

The Singulair Green system comes to you complete, including delivery, tank setting, equipment installation, plant start-up and service. A series of service and adjustment inspections are scheduled for the first two years of operation at the time your system is installed. These inspections are included in the sale so that your system continues to perform at the highest level to protect you and your investment. Extended service contracts are also available from your Norweco distributors and dealers.

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Install with confidence when using a Singulair Green® complete onsite wastewater treatment package



Inlet

Untreated wastewater enters the system here.

Pretreatment Chamber

Wastewater enters at the Singulair inlet and is equalized here as anaerobic bacteria and gravity precondition it.

Aeration Chamber

Here, safe, living aerobic bacteria convert the wastewater into stable substances. Flow equalization maximizes this biological oxidation and assures 24-hour retention and treatment of all wastewater flow.

Clarification Chamber

Flow equalization enhances settling of biologically active substances inside the Clarification Chamber where wastewater is converted to a clarified liquid.

Bio-Kinetic System

Combines filtration, settling, flow equalization, optional disinfection, adjustable outlet weir and optional dechlorination features into a single, revolutionary package. Liquids exit the perimeter settling zone through the flow equalization ports. These ports control the flow through all upstream and downstream processes and regulate the amount of liquid that can enter the Bio-Kinetic system.

Outlet

A flow equalized, treated, clear, safe and odorless liquid exits the system for return to your environment.

Aerator provides complete treatment

Powered by our 1725 RPM, 115 volt, fractional horsepower motor, the quiet, reliable aerator is economical to operate, reduces heat build up and dramatically increases bearing life. Each aerator is ANS/NSF certified to operate only 30-minutes per hour.

Polyethylene Tank

Rotationally molded, UV stabilized high density polyethylene, plus strategically located ribs, result in uncompromising tank integrity. Installation is quick and easy, with long term performance assured.



UV Protected Molded Risers with Sealed or Vented Lids

INJECTION MOLDED RISERS AND LIDS ARE INCLUDED WITH EVERY SYSTEM. ALL RISERS AND COVERS ARE SEALED TO THE TANK WITH O-RINGS AND TAMPER RESISTANT FASTENERS. ADDITIONAL RISERS CAN BE ADDED TO FIT SPECIFIC JOBSITE REQUIREMENTS.

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Progress Through Service Since 1906. Ultimately, our success over all these years boils down to perceived, appreciated and consistently delivered service to our customers.

customer
focus



Consider the facts:

- The Singulair Green treatment unit is certified to NSF Standard 40 and our Bio-Kinetic system is certified as a chlorine dosing system to NSF Standard 46. Underwriters Laboratories (UL) and the Canadian Standards Association (CSA) have certified and/or listed all electro-mechanical equipment and components. These listings provide you the highest safety, reliability and quality.
- Contained in a rugged, heavy duty, UV protected polyethylene tank, the Singulair Green treatment system weighs less than 900 pounds and can easily be installed with a backhoe.
- 48-hour retention in the Singulair Green system reduces tank pumping frequency as compared to other systems that have a smaller capacity.
- System operating costs are low. The only electrical component is our low RPM Singulair aerator.
- Durable, reliable components are safely installed out of sight, below grade. No exposed power cords, compressors, equipment or air lines that are above ground and accessible to children or pets.
- The patent-pending internal and external ribbed design assures long term tank integrity and minimizes the potential for tank damage due to careless pumping or hydraulic forces.
- The robust tank design and integrally molded internal walls allow Singulair Green to be installed up to three feet below grade. Injection molded risers and lids, with tamper resistant fasteners, provide security, strength and safety.
- Single tank convenience; the Singulair Green contains pretreatment, aeration, clarification, filtration, flow equalization, optional disinfection and dechlorination all in one compact treatment unit. The need for additional treatment system tankage is eliminated.
- The inherently strong ribbed-arch shape of the Singulair Green tank allows the use of most native soils for backfill and minimizes the need for water during the installation process.
- The Singulair Green system automatically equalizes influent and effluent flow through all stages of the treatment process. Even during periods of extreme hydraulic or organic overload, effluent quality is maintained. Variations in flow do not affect treatment performance or system operation.
- Your local, factory-trained, certified and licensed Singulair Green dealer sells, installs and services every wastewater treatment system with pride. You'll find their name and address conveniently posted on the control center cover.



SERVICE PRO Control Center

EVERY SINGULAIR AERATOR IS INSTALLED WITH A SOLID STATE ELECTRICAL CONTROL CENTER. EACH IS EQUIPPED WITH RESETTABLE CURRENT SENSOR, ON/OFF SELECTOR SWITCH, RED WARNING LIGHT, TIME CLOCK, AUDIBLE ALARM AND OPTIONAL FCC LICENSED AUTODIALER FOR REMOTE MONITORING OF INDIVIDUAL SYSTEM COMPONENTS.



Blue Crystal® Residential Disinfecting Tablets and Bio-Max® Dechlorination Tablets

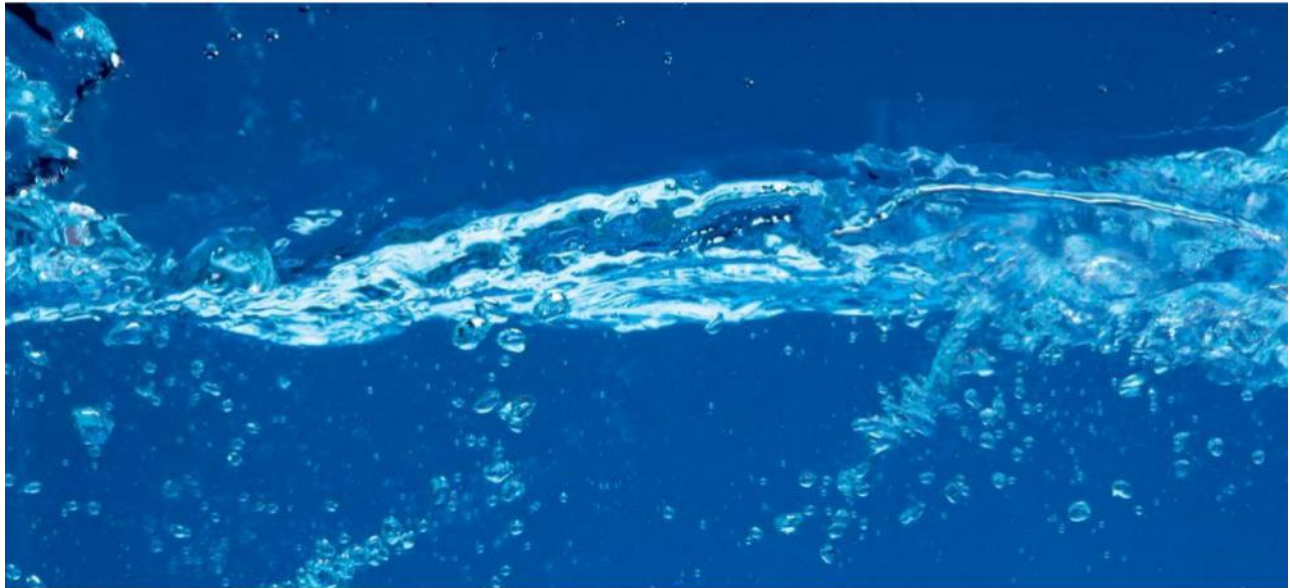
PURE CALCIUM HYPOCHLORITE TABLETS FORMULATED FOR USE IN RESIDENTIAL SYSTEMS, BLUE CRYSTAL TABLETS CONTAIN 70% AVAILABLE CHLORINE. BIO-MAX TABLETS PROVIDE A CONVENIENT SOURCE TO INSTANTLY REMOVE CHLORINE. EACH TABLET CONTAINS 92% SODIUM SULFITE.

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Today's Answer for the Protection of Tomorrow's Environment



comprehensive protection, guaranteed



Singulair Green is warranted against defects in material and workmanship under normal use and service by a comprehensive Lifetime Warranty and Exchange Program. The 3 year Limited Warranty and Lifetime Exchange program covers all electro-mechanical components in the system.

An impressive list of installations including the Army Corps of Engineers, FHA, Department of Energy, numerous Fortune 500 firms, the Atomic Energy Commission, Department of Defense, U.S. Department of Natural Resources and USEPA funded projects demonstrate the field proven acceptability of Norweco's products. Quality products, serviced by local experts, have earned Norweco a long-standing reputation for excellence.

Other Products

Modulair® Wastewater Treatment Plants

FOR SEMI-COMMERCIAL APPLICATIONS

Travalair® Wastewater Treatment Plants

FEATURING AUTO SLUDGE AND SKIMMER SYSTEM

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and wastewater treatment

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FAX: 419.663.5440
www.norweco.com

The Singulair Green Bio-Kinetic System components have been listed, licensed and/or certified by each of the following agencies and organizations.



Progress Through Service Since 1906

We engineer, manufacture, install and maintain advanced water and wastewater treatment technologies for residential properties, communities and commercial properties that are not connected to sewer lines. Norweco treatment systems are in service all over the world.

Norweco®, Norweco.com®, Singulair®, Modulair®, Travalair®, Singulair Green®, Ribbit Rivet®, Lift-Rail®, Microsonic®, Bio-Dynamic®, Bio-Sanitizer®, Bio-Neutralizer®, Bio-Kinetic®, Bio-Static®, Bio-Gem®, Bio-Max®, Bio-Regeneration®, Bio-Perc®, Blue Crystal®, ClearCheck®, ChemCheck®, Tri-Max®, Hydra-Max®, Service Pro®, MCD®, TNT®, Grease Buster® and "BUSTER" logo are all registered trademarks of Norwalk Wastewater Equipment Company, Inc.

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SINGULAIR GREEN® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM

MODELS 960 AND TNT WITH SERVICE PRO® CONTROL CENTER

SPECIFICATIONS

GENERAL SPECIFICATIONS

The contractor shall furnish and install one complete Singulair Green Bio-Kinetic wastewater treatment system with all necessary parts and equipment as described in the following specifications. Treatment of the domestic wastewater shall be accomplished by the extended aeration process with non-mechanical flow equalization, pretreatment of the influent and filtration of the final effluent. The treatment system shall provide primary, secondary and tertiary treatment of the wastewater flow, and if required, chlorination and dechlorination of the effluent prior to discharge. All treatment processes shall be contained within a single tank which shall be manufactured using high density polyethylene resin. The wastewater treatment system shall be a Singulair Green as manufactured by Norweco, Inc., Norwalk, Ohio, USA. Systems not including integral pretreatment or non-mechanical flow equalization shall not be considered for this application.



The wastewater treatment system shall include high density polyethylene tankage providing separate pretreatment, aeration and final clarification chambers. The tankage shall be furnished with a Schedule 40 PVC inlet hub, removable sealed pretreatment cover, submerged transfer ports, aerator mounting riser with removable vented cover, molded outlet coupling, Bio-Kinetic system mounting riser with removable sealed cover and Schedule 40 PVC outlet hub. Principal items of electro-mechanical equipment supplied with the Singulair Green wastewater treatment system shall be a UL Listed 1725 RPM mechanical aerator, UL Listed Service Pro electrical control center, Bio-Static sludge return and a Bio-Kinetic tertiary treatment device for flow equalization and final filtration of system effluent.

SPECIFICATIONS



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SINGULAIR GREEN® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM

TANK DELIVERY AND SETTING

To insure that all work proceeds safely and efficiently, check these items prior to delivery of the Singulair Green tank.

- ✓ Does the driver have complete and accurate directions to the installation?
- ✓ Does the driver have the Singulair installer's tool kit?
- ✓ Are the appropriate aerator mounting riser, vented access cover, Bio-Kinetic system mounting riser, pretreatment riser, sealed access covers and extension risers included?
- ✓ Are additional anti-flotation measures required for this installation?
- ✓ Is a sufficient amount of water and gravel available for the installation?
- ✓ Is an adequate supply of sealing material available for all plumbing connections?
- ✓ Does the delivery vehicle have the proper pick-up bar, cable, straps and/or chain?
- ✓ Is the proper Service Pro control center available for delivery with the tank?
- ✓ Is there sufficient underground electrical cable to reach from the control center to the tank?

PLEASE NOTE: The Singulair Green tank is constructed of high density polyethylene. All joints have been factory sealed for your convenience. This will minimize tank loading, unloading and setting time at the site. The Singulair Green tank has been designed for underground use only. Do not install the tank in a location that is subject to vehicular traffic.

CHECKING THE EXCAVATION

Before tank setting begins, verify that the excavation is level and free of sharp stones and construction debris.

Clear out any objects that could come in contact with the tank.

The length, width and depth of the excavation should be checked. The excavation should have sufficient overdig to allow between 18" to 24" of clearance on both sides and 6" to 12" of clearance on the inlet and outlet ends of the Singulair Green system. In addition, the excavation should allow for a minimum of 6" and a maximum of 16½" of cover over the top of the tank. For deeper installations, consult the Deeper Burial Requirements section of this guide. Failure to follow the excavation and backfilling guidelines may result in tank damage and will void the system warranty.

Check the influent and effluent sewer line trenches. The trench depth should correspond with the Singulair Green system inlet and outlet connections and the trenches should be smooth to prevent damage to the sewer lines.

A tank leveling pad should be installed in the bottom of the excavation. The leveling pad should be a minimum of 4" thick and leveled to within ¼" from side to side and end to end. The elevation of the top of the leveling pad should

correspond to the outside bottom of the Singulair Green tank when installed. In areas with unstable soil conditions, a reinforced concrete pad may be required under the Singulair Green tank.

Safe working conditions must be established and maintained during the entire installation procedure. Unstable soil conditions require constant monitoring of the site to insure safety. Installation procedures, equipment and personnel should always comply with applicable safety regulations as well as all federal, state and local codes.



Do not install the Singulair Green tank in saturated clay, areas with a high water table, bogs, swampy areas, landfills where the soil is soft or wet, areas containing expansive soils or soils with an ultimate bearing capacity of less than 1,500 psf. Failure to follow these directions may result in damage to the tank and will void the system warranty.



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TEMPORARY UNIT STORAGE

If a Singulair Green tank is delivered before installation can occur, store the tank on smooth ground with no rocks or sharp objects against the tank. Chock the tank with sandbags to prevent tank movement. If high winds are anticipated, tie the tank down to prevent any damage.

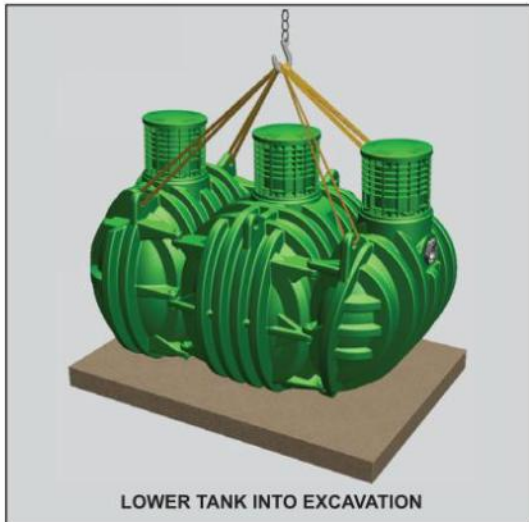
PREPARING THE SINGULAIR GREEN® TANK

Before installing the Singulair Green tank, inspect for signs of damage that may have occurred during transportation or handling. Damaged tanks could leak and should not be installed. Check the inlet and outlet couplings for any signs of damage that would prevent solvent welding to the plumbing. Inspect all risers and access covers to insure no damage has occurred. Verify that all riser and access cover fasteners are securely attached.

CAUTION: Extreme care should be used in the vicinity of any excavation. A delivery vehicle can place excessive loading on excavation sidewalls and care must be taken in its positioning. Once installed, no vehicle should operate over the tank or any other part of the treatment system.

TANK SETTING AND SAFETY

Make sure the delivery vehicle outriggers are firmly placed on stable soil at the excavation site. All personnel must be out of the excavation area and at a safe distance from the tank. Before lifting the tank, check all lifting chains, straps or cables to be sure they are properly secured. Lift the tank using at least four of the molded lifting lugs located on the Singulair Green tank. Carefully lower the tank into the excavation. Stop the tank several inches above the excavation floor and position it in the desired location. Lower the tank carefully until all tension is off the lifting device. Do not remove the lifting chains, straps or cables until tank leveling has been completed.



LEVELING THE TANK

Remove the access covers and place a level on the risers to verify that the tank is level within 1/4" from side to side and end to end. If the tank needs to be raised more than 6" to apply leveling material, all personnel should move to a safe location so the tank can be fully removed from the excavation. Fall through the system from inlet invert to outlet invert is 4". Therefore, the outlet invert of the system must be installed 4" lower than the inlet invert.



MOUNTING RISER AND OPTIONAL EXTENSION RISER INSTALLATION

If extension risers are required, install them as needed above each mounting riser. To insure a watertight seal, install an o-ring gasket in all joints between the risers.

Access to the pretreatment chamber can be developed to grade or below grade as required by local regulation or owner preference. The access cover on the pretreatment chamber must be developed to within 12" of finished grade. Place a sealed access cover on the pretreatment chamber access opening. Place a vented access cover on the aerator mounting riser and a sealed access cover on the Bio-Kinetic system mounting riser before backfilling.

SEWER LINE INSTALLATION

Sewer lines may be installed as soon as the Singulair Green tank has been leveled. Sewer line trenches must be smoothly excavated and free of debris or sharp objects. The trenches must allow sewer lines to be laid with 1/8" of fall per lineal foot. Influent and effluent sewer lines must be at least 4" in diameter. The influent and effluent lines should be PVC pipe and solvent welded into the Singulair Green tank inlet and outlet couplings. Influent and effluent lines must be laid continuously and unspliced from the tank to the undisturbed earth beyond the tank excavation site.

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Underground electrical cable for electrical service to the Singulair aerator should be installed in the influent sewer line trench before backfilling the Singulair Green tank. Refer to the "ELECTRICAL WIRING AND CONTROL CENTER INSTALLATION" instructions for complete details.

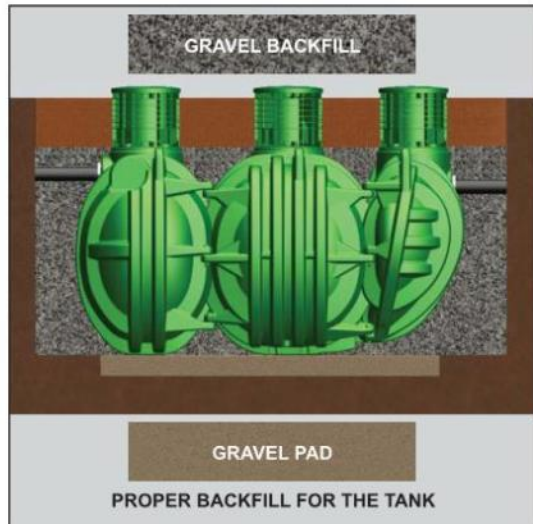
CAUTION: Do not attempt to adjust the position of the tank or sewer lines with the backhoe bucket. Excessive force may damage the inlet and/or outlet couplings.

GROUND WATER RELIEF POINT

The effluent sewer line should be installed with a ground water relief point to prevent back-up into the system if the effluent discharge point is blocked or flooded. This device can be constructed by installing a pipe tee in the effluent sewer line and extending it to grade. The relief point must be at a lower elevation than the outlet invert of the Singulair Green tank. The extension to grade should be installed with a suitable screen to prevent access to the sewer line.

BACKFILLING THE GREEN SYSTEM

Prior to backfilling, add a minimum of 12" (250 gallons) of ballast water to the Singulair Green tank to prevent shifting in the excavation. Fill each chamber to an equal level. Do not add water through the clarifier access opening. The clarification chamber will be filled through the transfer opening between the aeration and clarification chambers as the aeration chamber is filled. The Singulair Green tank must be backfilled immediately after the sewer lines, underground electrical cable and ballast water are in place.

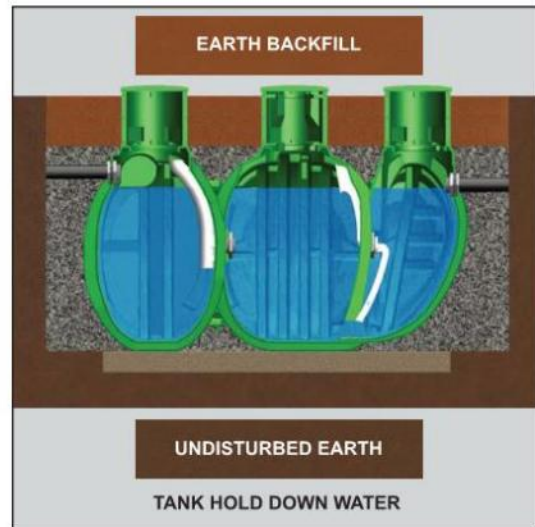


Cover all openings, then begin backfilling with gravel under and around the sloped clarifier. Continue to add gravel until the discharge line from the Singulair Green tank is covered. Proceed to the inlet end of the pretreatment chamber and add gravel until the inlet line is covered. Fine, loose earth may be used to backfill the remainder of the excavation.

Be sure that the backfill is free of rocks, sharp objects, large clumps of earth and construction debris. Never use clay for backfill material. The backfill must flow freely and care should be taken to insure that all recesses formed between the ribs and beneath the area between the pretreatment and aeration chambers are completely filled. Add backfill evenly around the entire perimeter of the Singulair Green tank in 12" increments. Hand tamp each layer of fill to compact soil. When backfilling over the tank, add fill to the area between the risers first. Final grading should be 3" to 6" below the top of each access cover and should slope away from the tank so surface runoff will drain away from the Singulair Green system. Use extreme care when backfilling the excavation. Do not allow dirt or mud to enter any part of the Singulair Green system or sewer lines.

TANK HOLD DOWN WATER

The Singulair Green tank must be filled with clean water to the outlet invert immediately following backfilling. The water must be free of leaves, mud, grit or other materials that might interfere with system operation.



When pumping or dewatering the Singulair Green tank, only pump the pretreatment chamber. Then, promptly refill the tank to capacity with clean water. Dewatering and leaving the Singulair Green tank empty will effect tank integrity and void the Singulair Green warranty.

DEEPER BURIAL REQUIREMENTS

Special consideration should be taken if the Singulair Green tank is buried deeper than 16 1/2" below grade. However, the tank should never be buried deeper than 34 1/2" below grade. If deep burial is required, first fill the tank with 12" of clean ballast water. Next, backfill the entire tank with gravel up to the base of the risers. Once gravel is in place, fill the tank with clean water to the design flow line. Finally, backfill to grade with native soil.



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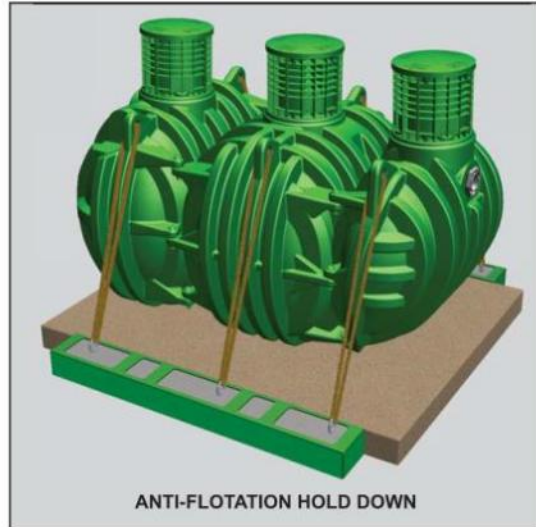
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SPECIAL ANTI-FLOTATION SYSTEM

In areas where high water is a concern, it may be necessary to provide additional anti-flotation measures to secure the Singulair Green tank. Anti-flotation is not required when the tank is installed with at least 16" of fill over the tank and the soil density of the backfill is at least 100 pounds per cubic foot. Failure to follow the anti-flotation recommendations provided in this document may result in damage to the Singulair Green tank or shifting in the excavation and may void all or part of the limited warranty.

If anti-flotation is required, consult a soil scientist to measure soil density. Once soil density is defined, refer to the SHALLOW BURIAL AND REDUCED SOIL DENSITY HOLD DOWN REQUIREMENTS chart below. After the amount of additional hold down weight is determined, it is recommended that a pair of concrete beams of appropriate size be placed at the base of the excavation. Alternately, plastic anti-flotation beams are available from Norweco. Plastic anti-flotation beams must be filled with concrete prior to installation. Beams must not be placed directly under the perimeter of the Singulair Green tank. The weight of the soil over the beams significantly contributes to the tank hold down forces. Placing beams under the tank will limit the amount of soil anchoring the beams into the excavation and should never be done.

Secure the anti-flotation beams to the Singulair Green tank with properly rated hold down straps that attach to the lifting lugs located at the top of each of the three chambers. The weight of the beams plus the weight of the soil over the beams must be greater than the required hold down weight shown in the table below.



ANTI-FLOTATION HOLD DOWN

COMPLETING THE INSTALLATION

Once backfilling has been completed and the tank has been filled with clean water, the access openings must be secured. Install a sealed access cover on the pretreatment and clarification chamber risers. Install a vented cover on the aeration chamber riser. Secure all access risers with the fasteners that have been provided. Installation of the control center and underground electrical cable are normally completed before leaving the site. Refer to "ELECTRICAL WIRING AND CONTROL CENTER INSTALLATION" instructions for details.

SHALLOW BURIAL AND REDUCED SOIL DENSITY HOLD DOWN REQUIREMENTS						
Soil Density (lbs. per cu.ft.)	80	90	100	110	120	130
Fill Over Tank (Inches)	Additional Weight Required (lbs.)	Additional Weight Required (lbs.)	Additional Weight Required (lbs.)	Additional Weight Required (lbs.)	Additional Weight Required (lbs.)	Additional Weight Required (lbs.)
6	6,915	5,935	4,956	3,976	2,996	2,017
8	6,091	5,008	3,926	2,843	1,761	678
10	5,267	4,081	2,896	1,710	525	*
12	4,443	3,155	1,866	578	*	*
14	3,619	2,226	836	*	*	*
16	2,796	1,301	STANDARD INSTALLATION	*	*	*
18	1,972	374	*	*	*	*
20	1,148	*	*	*	*	*
22	324	*	*	*	*	*
24	*	*	*	*	*	*

* HOLD DOWN WEIGHT NOT REQUIRED

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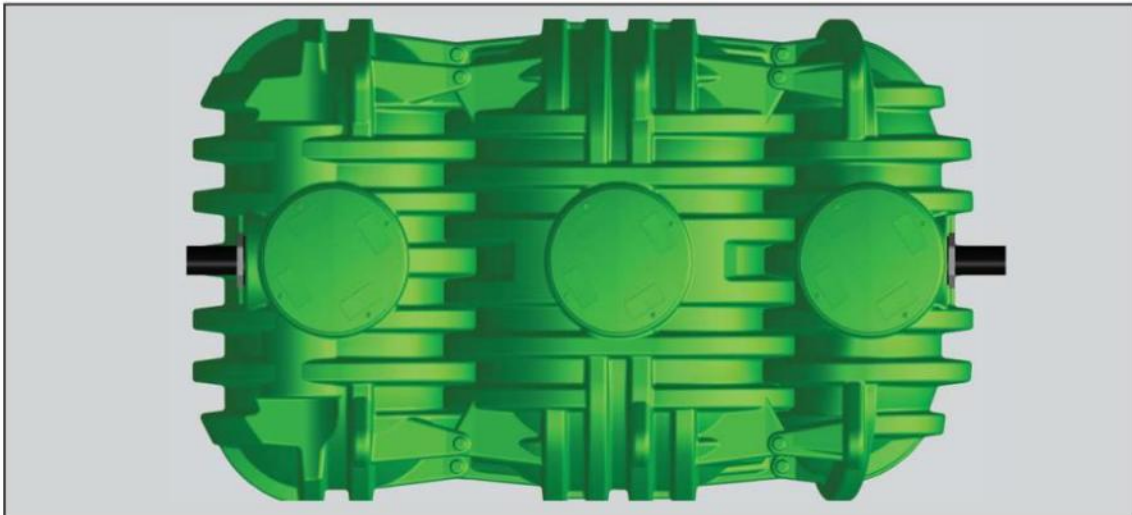
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OPERATING CONDITIONS

The Singulair Green system shall be certified to treat up to 600 GPD (gallons per day) of domestic wastewater. Total holding capacity of the system shall provide a minimum of 48 hour retention of the daily flow. The pretreatment chamber shall provide at least 18 hour retention, the extended aeration chamber shall provide at least 24 hour retention and the clarification chamber shall provide at least 6 hour retention. The non-mechanical flow equalization device shall increase each individual chamber and total system retention time in direct proportion to loading. Design of the system shall include a compartmented tank and a non-mechanical flow equalization device to insure successful treatment performance without upset even when the significant runoff period is six hours. Hydraulic design considerations of the system and flow equalization device shall be such that intermittent peak flow factors as high as four shall not upset hydraulic reliability within the system. Capability of the system to perform as outlined shall be certified by an independent testing laboratory and approved for use by the local governing regulatory agency.

PRETREATMENT CHAMBER

The pretreatment chamber shall be an integral part of the wastewater treatment system. All domestic wastewater shall be preconditioned and flow equalized while passing through the pretreatment chamber prior to being introduced to the extended aeration chamber. The outlet of the pretreatment chamber shall be equipped with a discharge tee that extends vertically into the liquid so that only the preconditioned equalized flow from the center area of the chamber is displaced to the extended aeration chamber. The discharge tee and transfer port shall be of adequate size to handle a peak flow factor of four without restricting the outlet and disturbing hydraulic displacement to the extended aeration chamber. A removable inspection cover shall be incorporated into the top of the pretreatment chamber to allow tank and transfer tee inspection.



AERATION CHAMBER

The extended aeration chamber shall provide in excess of 24 hour retention of the equalized daily flow. The chamber shall be of sufficient size to provide a minimum of 80 cubic feet of tank capacity per pound of applied BOD. The aeration chamber shall be an integral part of the system flow path and configured to insure effective mixing of microorganisms, wastewater and fresh air. No area of the chamber shall be isolated from process mixing, thereby eliminating dead or quiescent areas of the treatment chamber which are detrimental to the treatment process. Influent into the aeration chamber shall be preconditioned, equalized flow from the pretreatment chamber and settled solids via the Bio-Static sludge return.

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FINAL CLARIFICATION CHAMBER

The final clarification chamber shall consist of 5 functionally independent zones operating together to provide satisfactory settling and clarification of the equalized flow. An inlet zone shall be provided and shall dissipate transfer turbulence at the flow inlet of the clarification chamber. Its performance shall also eliminate turbulence in other zones of the clarifier. Liquid shall be hydraulically displaced from the inlet zone to the sludge return zone. Hydraulic currents shall sweep settled sludge from the hopped walls and return these solids via the inlet zone to the aeration chamber. As solids are removed, liquid is displaced to the hopper zone of the clarifier. In this zone, settling by gravity takes place. Three of the four sidewalls are slanted to form a hopper which directs all settled material back to the sludge return zone. Clarified liquid from the hopper zone shall be displaced into the final settling zone to provide additional clarification of the liquid. The liquid is displaced to the outlet zone for final filtration and discharge from the system. Non-mechanical equalization of the flow, through all 5 zones, shall provide optimal settling and clarification.

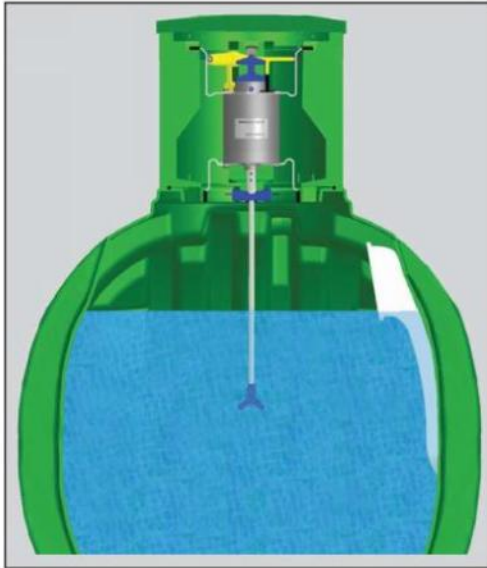


BIO-STATIC® SLUDGE RETURN

A Bio-Static sludge return shall be mounted into the opening in the aeration/clarification chamber wall to provide positive return of settled solids. Aeration chamber hydraulic currents shall enter the sludge return and be directed through the Bio-Static device into the second zone of the clarification chamber. The Bio-Static sludge return shall accomplish resuspension and return of settled solids without disturbing the clarified liquid in the final settling zone and outlet zone.

MECHANICAL AERATOR

The Singlair aerator shall be installed in an injection molded, heavy duty, glass-filled polypropylene aerator mounting riser above the aeration chamber. Fresh air shall be supplied through an injection molded, heavy duty, glass-filled polypropylene



access cover above the aerator. The vented access cover shall be secured to the mounting riser with four fasteners. The aerator shall be UL Listed and include plated mounting brackets, NEMA 6 rated electrical connector, fractional horsepower motor, molded plastic lifting handle, molded plastic air intake screens, molded plastic foam restrictor, stainless steel aspirator shaft and molded glass-filled nylon aspirator tip. The motor shall contain precision manufactured o-ring type seals installed between the motor shell and the machined aluminum endbells to insure watertight integrity. Molded Viton elastomer shaft seals shall protect the bearings from contamination. Only the stainless steel aspirator shaft and glass-filled nylon aspirator tip shall be in contact with the liquid. There shall be no submerged electrical motors, bearings or fixed air piping in the aeration system. The Singlair aerator motor shall not exceed the motor nameplate rating when installed and operated as recommended. The fractional horsepower aerator motor shall be equipped with a foam restrictor to protect the motor against high water and foam. The motor shall be 4 pole, 1725 RPM, 115 volt, 60 hertz, single phase, ball bearing constructed with a 1.0 service factor. It shall draw 4.0 amps when operating at the rated nameplate voltage. Aerators without UL listing have not demonstrated compliance with international electrical standards for safety and reliability and shall not be considered for this application.

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BIO-KINETIC®

SERVICE PRO® CONTROL CENTER

The Service Pro electrical control center shall control all aspects of treatment plant operation using a microprocessor based platform. The prewired control center shall contain nonvolatile memory to prevent the loss of programming in the event of a power failure. For protection of wiring and components, the electrical controls shall be mounted in an injection molded, lockable, corrosion proof, NEMA rated enclosure designed specifically for outdoor use. The enclosure shall be equipped with a tamper evident seal to discourage unauthorized access. The Service Pro control center shall be a UL Listed assembly and shall include a time clock, alarm light, audible alarm, reset button and power switch. The control center shall monitor all treatment system operating conditions including aerator over current, aerator under current and open motor circuit. In the event the control center detects one of these conditions, power to the aerator shall be interrupted, a diagnostic sequence shall begin and the visual alarm shall activate. After a programmed recovery interval, an automatic restart attempt shall be initiated. If normal aerator operation does not resume during 24 programmed recovery and restart cycles, the audible alarm shall activate.



TIME CLOCK

The aerator run cycle shall be controlled by an adjustable, prewired time clock. The minimum setting shall not permit the aerator to be "off" for more than 30 minutes per hour. It shall be adjustable in 5 minute increments and designed such that any adjustment results in additional run time up to "continuous" operation (60 minutes per hour). The Service Pro TNT controls shall include a non-adjustable time clock. Use of a time clock can seriously affect system performance and operating cost. Systems that have not been performance certified at the minimum time clock setting by an independent testing laboratory shall not be considered for this application.

SERVICE PRO® ADVANCED CONTROLS (Optional)

Advanced system control options shall be available for all Singulair Green Bio-Kinetic wastewater treatment systems. Service Pro control center options include the Service Pro control center with Monitoring, Compliance and Diagnostic (MCD) technology and the Service Pro control center with Total Nitrogen Treatment (TNT) technology.

The Service Pro control center with MCD technology shall be a UL Listed assembly and shall include a time clock, integral telemetry system, main alarm light, power light, phone light, aerator alarm light, three auxiliary alarm lights, reset button and power switch. The control center shall monitor all treatment system operating conditions including aerator over current, aerator under current and open motor circuit. In the event the control center detects one of these conditions, power to the aerator shall be interrupted, a diagnostic sequence shall begin and the visual alarm shall activate. After a programmed recovery interval, an automatic restart attempt shall be initiated. If normal aerator operation does not resume during 24 programmed recovery and restart cycles, the audible alarm shall activate and the telemetry system shall report the specific condition to the Service Pro monitoring center. In the event that any of the auxiliary inputs detect abnormal operation of the treatment system auxiliary equipment, the audible and visual alarms shall immediately activate and the telemetry system shall report the alarm condition to the monitoring center.

The Service Pro TNT control center shall provide the same Monitoring, Compliance and Diagnostic functions as the Service Pro control center with MCD technology. However, the Service Pro TNT control center shall include a non-adjustable time clock. The non-adjustable time clock shall create a 60 minute aeration cycle followed by a 60 minute anoxic cycle during which the aerator shall be off. This aeration cycle shall insure Total Nitrogen Treatment of the wastewater.

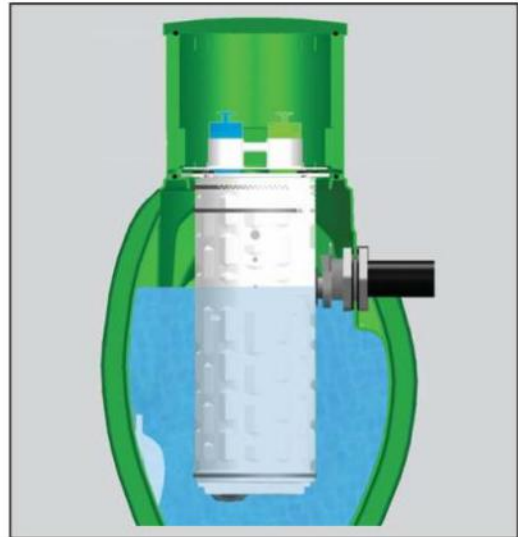
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SPECIFICATIONS

BIO-KINETIC® SYSTEM

A Bio-Kinetic system shall be installed in the mounting riser above the clarification chamber. The Bio-Kinetic system shall provide non-mechanical flow equalization through all plant processes including pretreatment, aeration, clarification, tertiary filtration, chlorination and dechlorination. The assembly shall be supplied with locking lugs and removable moisture/vapor shield and shall consist of a design flow and peak flow micronically molded filter, baffled perimeter settling zone, flow distribution deck, lifting handles, level indicator, adjustment lugs, optional chlorination feed tube, unbaffled perimeter settling zone, solids contact zone, vertical inlet zone, compartmented settling zone consisting of 42 baffled chamber plates, effluent stilling well, final discharge zone, adjustable outlet weir, optional dechlorination feed tube, outlet zone and gasketed discharge flange. All components shall be manufactured from inert synthetic materials or rubber, assembled in circular fashion and connected to a plastic outlet coupling. The outlet coupling shall accept a 4" diameter, Schedule 40 PVC pipe. The Bio-Kinetic system shall be installed with the invert of the design flow equalization ports located at the normal liquid level of the clarifier. If intermittent flow rates exceed the capacity of the design flow ports, flow shall be held upstream until the intermittent flow dissipates. If the intermittent flow continues to increase, the liquid level may reach a pair of sustained flow equalization ports. With four ports in use, flow through the system increases while continuing to provide flow equalization to all upstream and downstream processes. Peak flow equalization ports are supplied but should not be required. Optional Blue Crystal and Bio-Max tablet feed tubes shall be positioned such that the flow-activated chemical cannot contact the liquid upstream of the feed tubes.



FLOW EQUALIZATION

The wastewater treatment system shall include a demand use, non-mechanical, flow equalization device. The device shall control normal residential flow rates and reduce typical residential flow surges. The flow equalization rate shall be dependent upon the specific loading pattern and the duration of flow surges. At the 600 GPD (gallons per day) NSF Standard 40 design loading schedule, minimum performance of the device shall equalize daily flow an average of 50%.

SERVICE PRO® MONITORING CENTER

The Service Pro monitoring center shall include a 128 bit encrypted password protected website for interface with the monitoring center database. Access to the secure website shall be obtained through a unique user name and password that provides tiered access to data from monitored treatment systems. Access level tiers shall include dealers, service providers, regulatory agencies and individual system owners. Dealers and service providers shall be able to create accounts, maintain service records and grant regulatory agencies access to the information. Individual system owners shall be able to view information regarding their own systems, as well as download instructional information. Integrity of stored data shall be maintained through the use of multiple servers operating in geographically isolated locations.



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BLUE CRYSTAL® CHLORINATION SYSTEM (Optional)

The Singulair Green system shall be furnished complete with a tablet feed tube and a six month supply of Blue Crystal disinfecting tablets. Blue Crystal tablets shall be specifically formulated for consistent chlorine dosage and effluent disinfection to the sustained, variable and intermittent flows that are typical of domestic wastewater treatment systems. The tablets shall be manufactured from pure calcium hypochlorite and contain a minimum of 70% available chlorine. Each tablet shall be 2⁵/₈" diameter, compressed to a 1" thickness, weigh approximately 5 ounces and be white in color with blue crystals for easy identification. The tablets shall dissolve in direct proportion to the flow rate, releasing controlled amounts of chlorine.

BIO-MAX® DECHLORINATION SYSTEM (Optional)

The Singulair Green system shall be furnished complete with a tablet feed tube and a six month supply of Bio-Max dechlorination tablets. The dechlorination tablets shall contain 92% sodium sulfite as the active ingredient and shall be specially formulated to chemically neutralize both free and combined chlorine. Each tablet shall be 2⁵/₈" diameter, compressed to a 1³/₁₆" thickness, weigh approximately 5 ounces and be green in color for easy identification. The tablets shall dissolve slowly, releasing controlled amounts of chemical for the instantaneous removal of residual chlorine from the system effluent.

WARRANTY AND EXCHANGE PROGRAM

The manufacturer shall provide a three year limited warranty for each Singulair aerator, control center, Bio-Kinetic system and any other electro-mechanical components purchased from the manufacturer. The comprehensive aerator exchange program offers a lifetime of equipment protection. The dealer shall provide warranty and exchange information to the regulatory agency, contractor and customer as required.



EQUIPMENT MANUFACTURER

The equipment specified herein shall be the product of a manufacturer having a minimum of seven years experience in the construction of prefabricated wastewater treatment equipment and systems. Bids shall be prepared on the basis of the equipment and material specified herein for purposes of determining the low bid. This is not done, however, to eliminate other products or equipment of equal quality and efficiency. If equipment is to be substituted, approval of such substitution must be made prior to execution of any order. It is assumed that substitution will result in a reduction of cost to the contractor and that if accepted, these savings will be passed along by a reduction in the base bid.

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and wastewater treatment*

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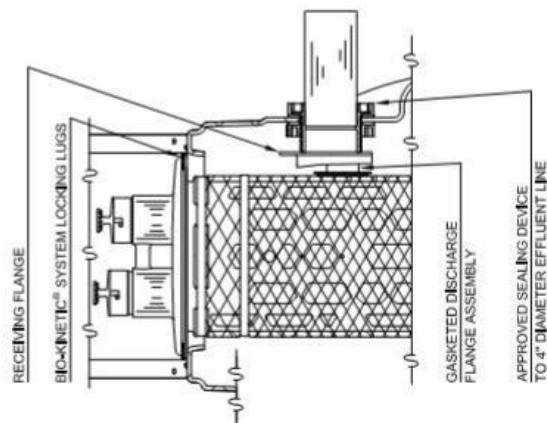
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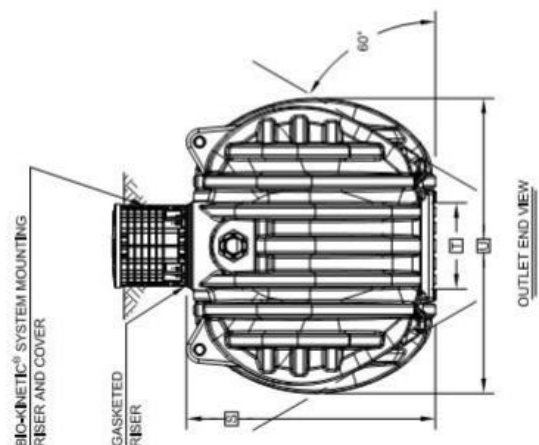
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GENERAL NOTES:

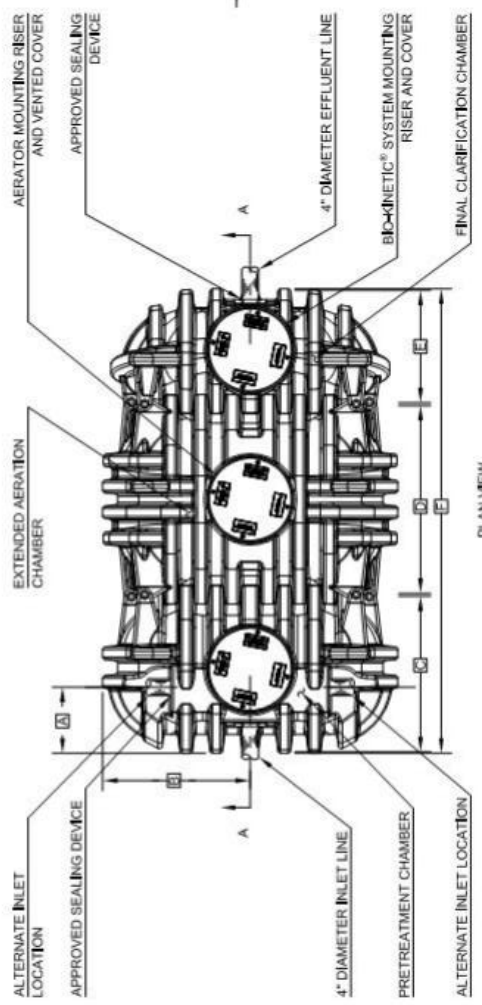
- ① SINGULAR[®] AERATOR, AS TESTED AND ACCEPTED BY NSF.
- ② FALL THROUGH SINGULAR[®] PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TEN AND ONE HALF INCHES BELOW TANK TOP.
- ③ ON DEEPER INSTALLATIONS, RISERS MUST BE USED TO EXTEND AERATOR MOUNTING RISER AND BIO-KINETIC[®] SYSTEM MOUNTING RISER TO GRADE. INSPECTION COVER ON PRE-TREATMENT 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.



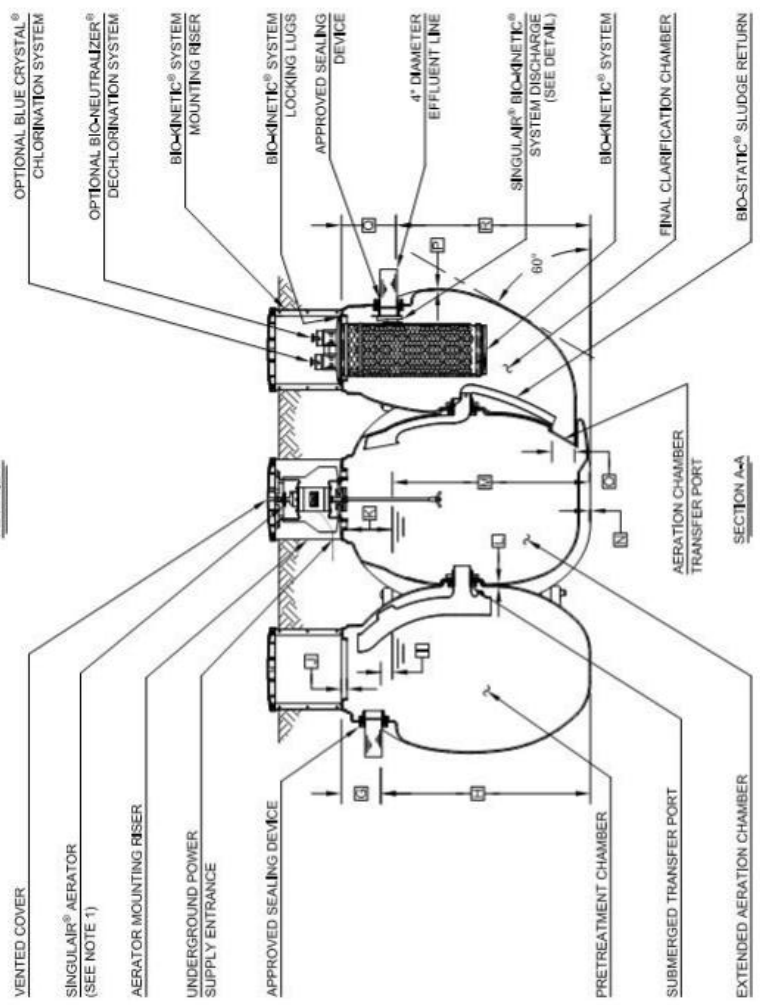
BIO-KINETIC[®] SYSTEM DISCHARGE DETAIL



NOTE: TOTAL SYSTEM CAPACITY: 1,300 GALLONS
RATED SYSTEM CAPACITY: 500 GALLONS PER DAY



PLAN VIEW



SECTION A-A

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

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