



SINGULAIR GREEN® BIO-KINETIC® WASTEWATER TREATMENT SYSTEM WITH INTEGRAL PUMP CHAMBER

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 the Singulair installer's tool kit and complete and accurate directions to the installation?
- ✓ Are the appropriate aerator mounting riser, vented access cover, Bio-Kinetic system mounting riser, pretreatment riser, pump chamber riser, non-vented access covers and extension risers included?
- ✓ Are additional anti-flotation measures required for this installation?
- ✓ Is a sufficient amount of water, gravel and sealing material available for the installation and plumbing connections?
- ✓ Does the delivery vehicle have the proper pick-up bar, chains, straps and/or cables?
- ✓ 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. **DANGER:** All access covers must be secured with the screws provided. Never allow access risers to be left uncovered or partially covered. Failure to secure access covers and safety nets could result in bodily injury, illness or death. Riser safety nets are available from Norweco for concrete or plastic risers.

CHECKING THE EXCAVATION

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 around the entire perimeter of the system. In addition, the excavation should allow for a minimum of 6" and a maximum of 18 1/2" 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 system inlet and outlet connections and the trenches should be smooth to prevent damage to the sewer lines. The elevation of the pump chamber outlet will be determined by the project designer and should be confirmed before installation.

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 1/4" 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.

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.

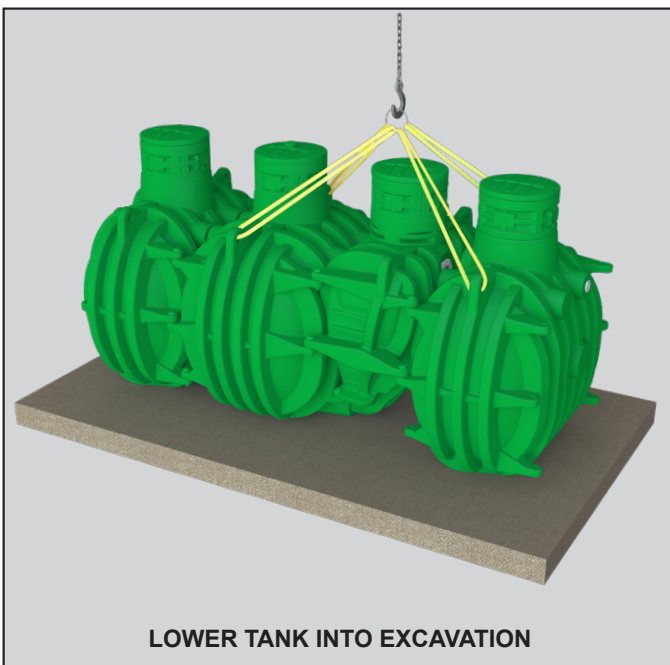
PREPARING THE SINGULAIR GREEN® TANK

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. Remove all stretch wrap and instructions from the risers. Inspect all risers and access covers to insure no damage has occurred. Verify that all access covers are secured and the safety screws are installed.

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

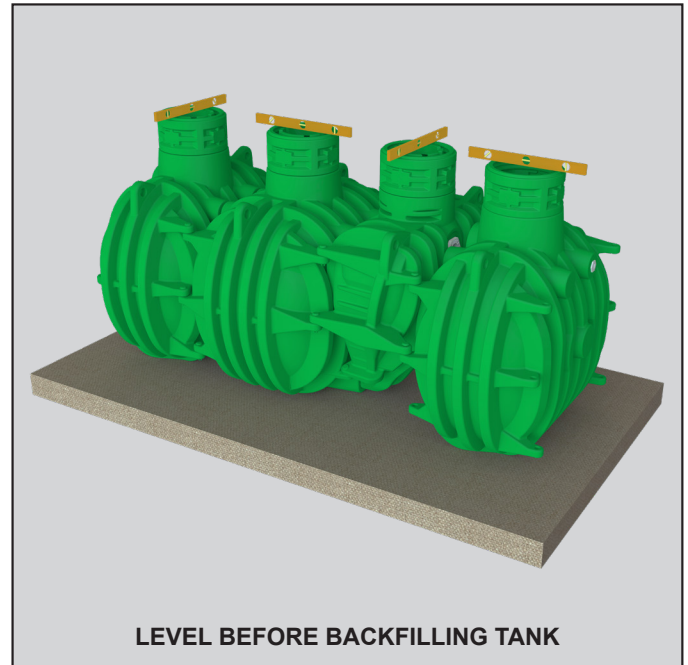
Make sure the delivery vehicle outriggers are firmly placed on stable soil at the excavation site. All personnel must be out of the excavation area and at a safe distance from the tank. Before lifting the tank, check all lifting chains, straps or cables to be sure they are properly secured. Lift the tank using at least four of the molded lifting lugs located on the 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 leveling has been completed.



LOWER TANK INTO EXCAVATION

LEVELING THE TANK

Remove the access covers and place a level on the risers to verify that the tank is level within $\frac{1}{4}$ " 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 removed from the excavation.



LEVEL BEFORE BACKFILLING TANK

MOUNTING RISER AND OPTIONAL EXTENSION RISER INSTALLATION

If required, install extension risers as needed above each mounting riser. To insure a watertight seal, install a 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 non-vented access cover on the pretreatment chamber access opening. Place a vented access cover on the aerator mounting riser and non-vented access covers on the Bio-Kinetic system mounting riser and pump chamber 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 $\frac{1}{8}$ " of fall per lineal foot. Influent sewer lines must be at least 4" in diameter. The size of the effluent line will depend on the pump that is installed. The elevation of the pump chamber outlet invert will vary based on the dosing equipment installed and the configuration of the discharge plumbing. 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.

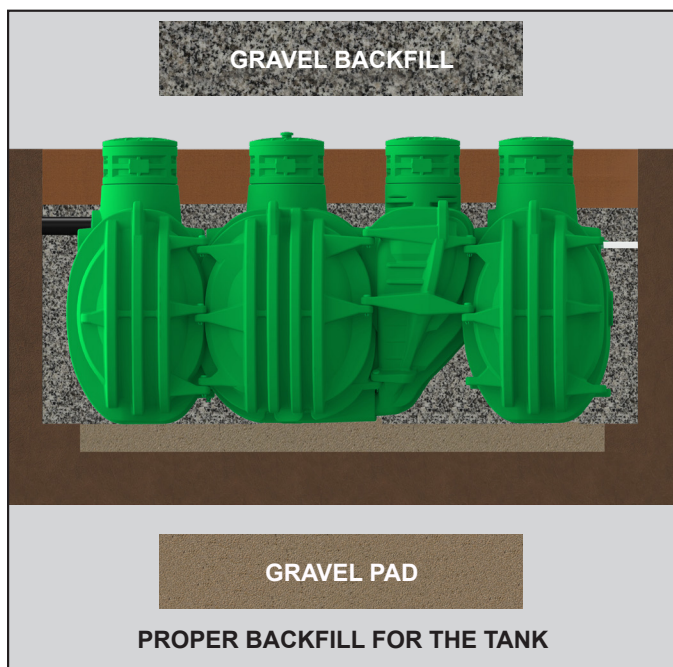
Underground electrical cable for electrical service to the Singulair aerator should be installed in the influent sewer line trench before backfilling the Singulair Green tank. Refer to the "ELECTRICAL WIRING AND CONTROL CENTER INSTALLATION" instructions for complete details. **CAUTION:** Do not attempt to adjust the position of the tank or sewer lines with the backhoe bucket. Excessive force may damage the inlet and/or outlet couplings.

EFFLUENT PUMP INSTALLATION

The effluent pump and plumbing should be installed at this time, before hold down water is added and the tank backfilled. The configuration of the effluent pump, plumbing and floats will be determined by the project designer. After the pump and plumbing have been installed, replace all access covers before proceeding.

BACKFILLING THE GREEN SYSTEM

Prior to backfilling, add a minimum of 12" (350 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.

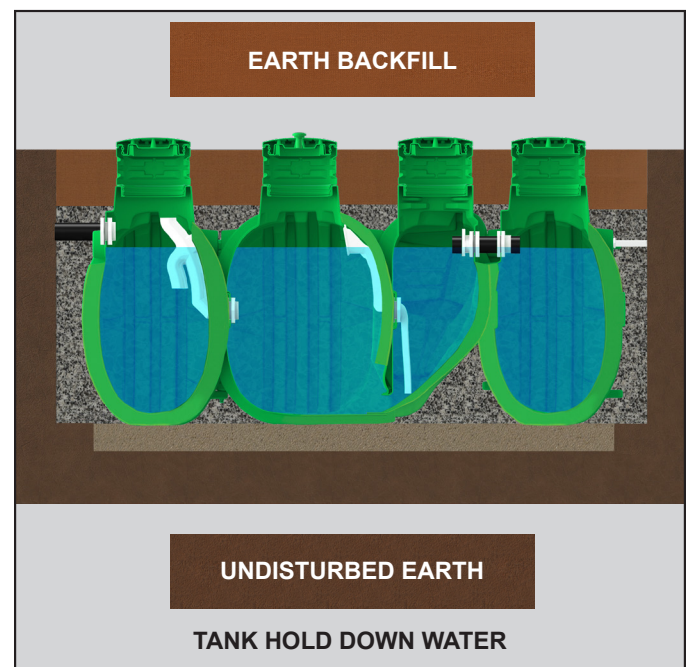


Cover all openings. It is critical to begin backfilling with gravel under the sloped clarifier, then completely backfill the space between the sloped clarifier and pump chamber with gravel. **CAUTION: Failure to backfill the space between the sloped clarifier and pump chamber with gravel could adversely affect the structural integrity of the tank and void the warranty.** Add gravel to the outlet side of the pump chamber until the effluent line 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 between the ribs and beneath the areas between each chamber are completely filled. Add backfill evenly around the entire perimeter of the tank in 12" increments. Hand tamp each layer to compact soil. When backfilling over the tank, add fill to the area between the risers first. Final grading should be 3" to 4" 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 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.



During routine service only the pretreatment chamber should be pumped. When pumping or dewatering the Singulair Green tank, promptly refill the tank. Dewatering and leaving the tank empty will affect tank integrity and void the warranty.

DEEPER BURIAL REQUIREMENTS

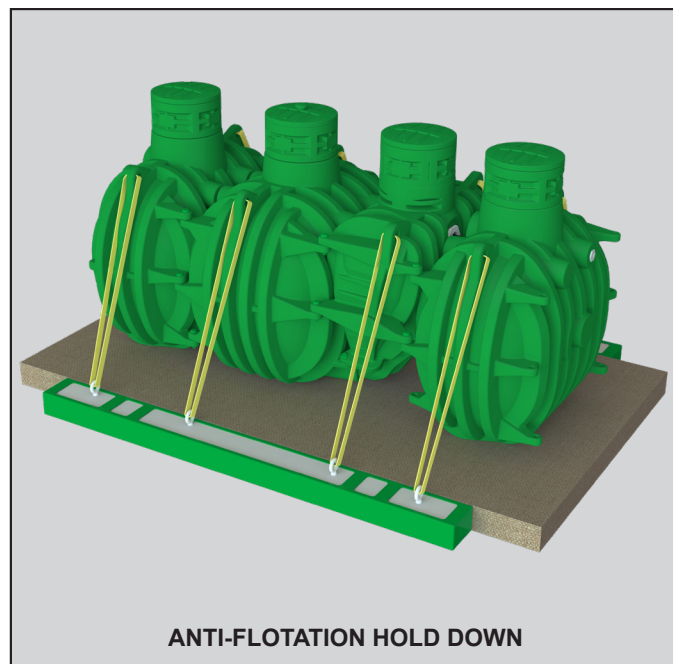
Special consideration should be taken if the Singulair Green tank is buried deeper than 18 1/2" below grade. However, the tank should never be buried deeper than 36 1/2" below grade. If deep burial is required, first fill the tank with 12" of clean ballast water. Next, backfill around the entire tank 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.

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 18" 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, 0.60 CCA treated lumber beams may be used. Treated lumber beams and anti-flotation strap assemblies are available from Norweco. 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 four 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.



COMPLETING THE INSTALLATION

Once the tank has been filled with clean water, secure the access openings. Install a non-vented access cover on the pretreatment, clarification and pump chamber risers. Install a vented cover on the aeration chamber riser. **CAUTION: All access covers must be secured with the screws provided. Failure to secure covers could result in injury or death.** 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.

SINGULAIR GREEN® WITH INTEGRAL PUMP CHAMBER 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	11,018	9,837	8,657	7,476	6,296	5,116
8	9,820	8,490	7,160	5,830	4,500	3,170
10	8,623	7,143	5,664	4,184	2,704	1,224
12	7,426	5,796	4,167	2,538	908	*
14	6,228	4,449	2,670	891	*	*
16	5,031	3,102	1,174	*	*	*
18	3,834	1,755	STANDARD INSTALLATION	*	*	*
20	2,637	408	*	*	*	*
22	1,439	*	*	*	*	*
24	242	*	*	*	*	*
26	*	*	*	*	*	*

* HOLD DOWN WEIGHT NOT REQUIRED

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