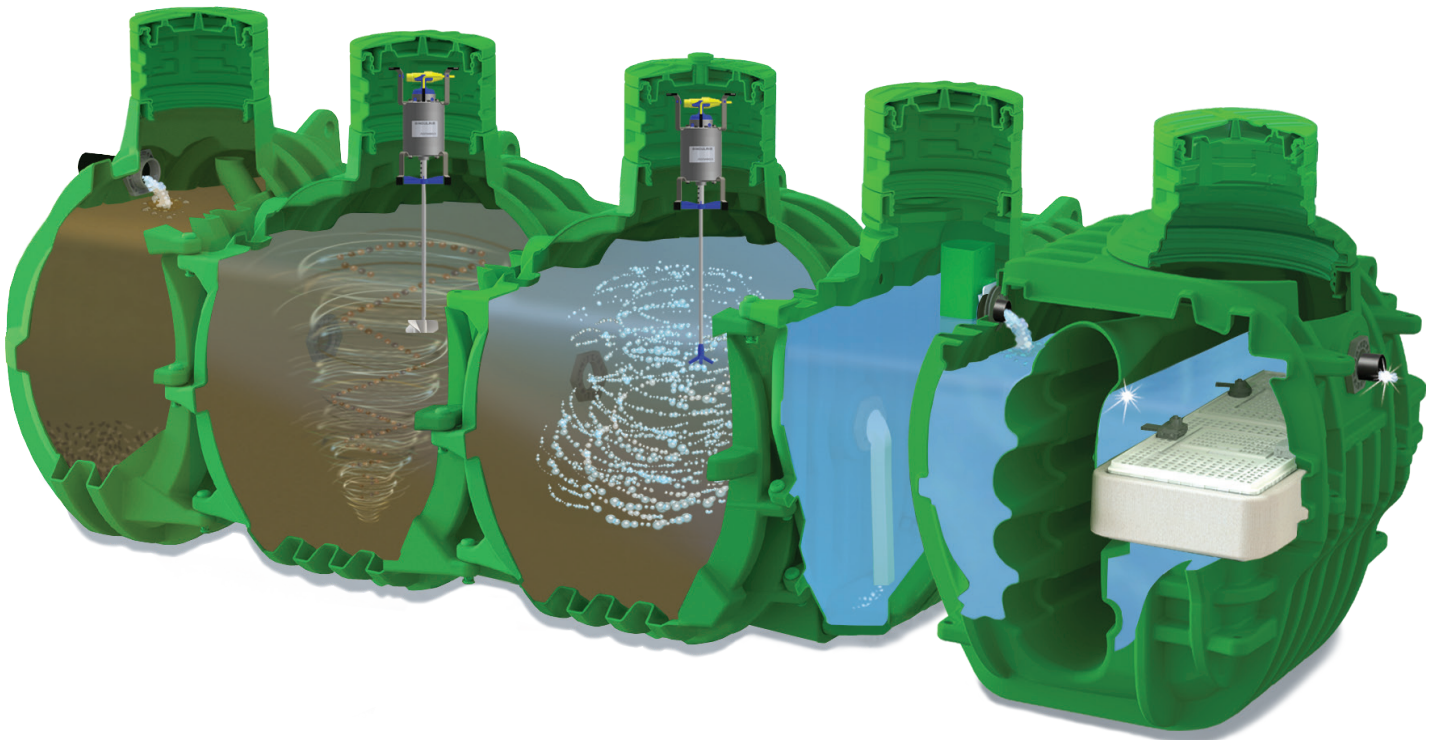


norweco[®]
SINGULAIR HK[™]

**GREEN WASTEWATER TREATMENT SYSTEM
MODEL 600**



INSTALLATION AND OPERATION MANUAL

Singular HK™ Green Installation and Operation Instructions

Introduction

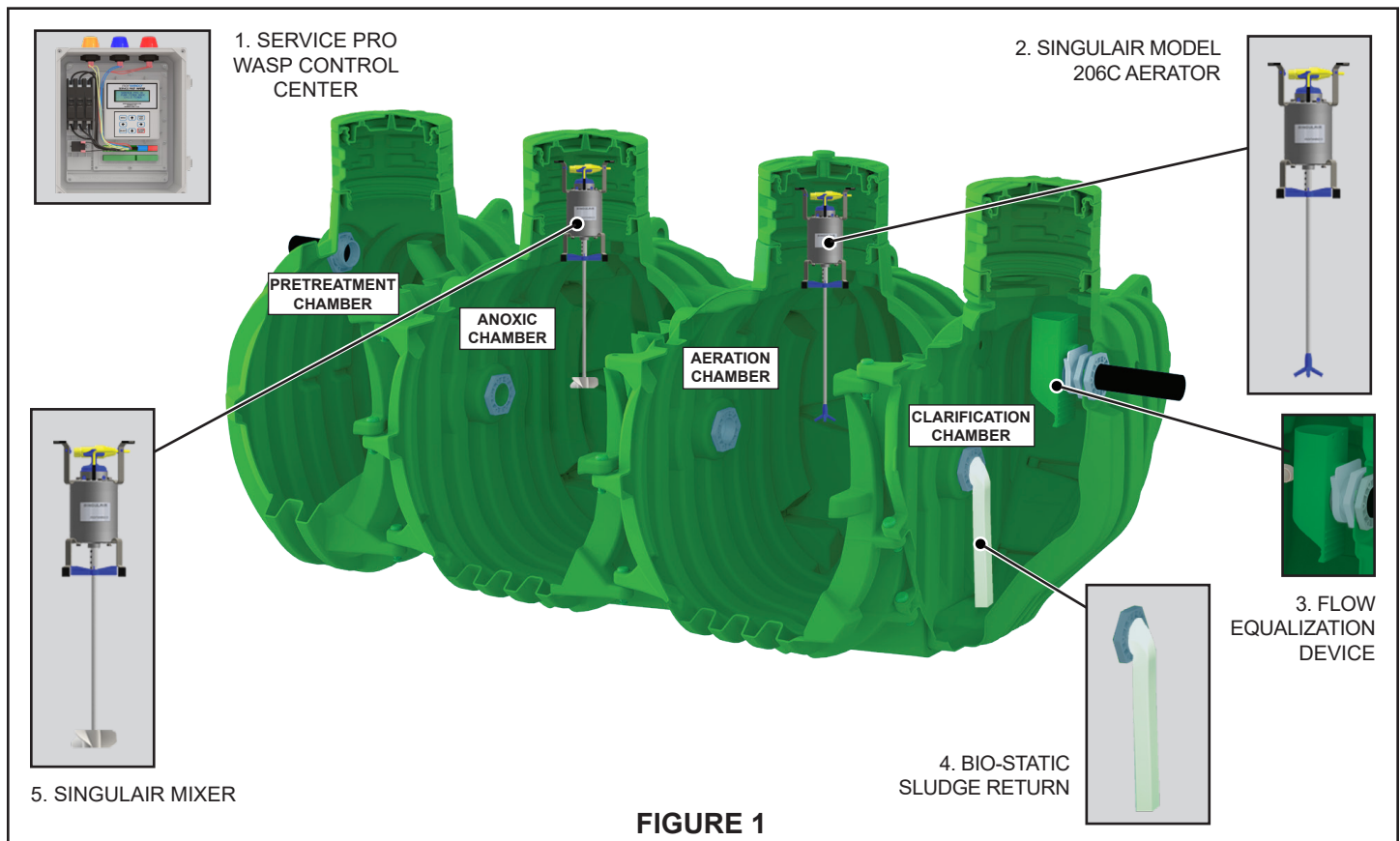
The Singular HK Green system complies with USEPA wastewater treatment guidelines for secondary treatment systems and meets all requirements of NSF/ANSI Standards 40 and 245. The system completed three consecutive NSF/ANSI Standard 40 and 245 evaluations without routine service. The system is rated Class I, averaging 3.0 mg/L CBOD, 4.4 mg/L TSS and 7.2 mg/L TN, a TN reduction of 84% for the first 6 month evaluation. A separate 18 month evaluation was subsequently completed without any service performed and yielded results of 4.0 mg/L CBOD, 6.8 mg/L TSS and 11.5 mg/L TN, a TN reduction of 74%.

Wastewater enters the pretreatment chamber to precondition the waste before it flows into the anoxic chamber where facultative anaerobes digest organic matter. Flow then enters the aeration chamber where aerobic bacteria biologically convert the waste into stable substances and oxidize ammonia into nitrite and nitrate. Next, liquids flow to the clarification chamber where gravity settles out biologically active material. The Bio-Static sludge return in the clarifier transfers a portion of the wastewater back to the aeration chamber. Aeration chamber currents transfer a portion of the wastewater back to the anoxic chamber where nitrogen compounds are converted to harmless nitrogen gas. From the clarifier, treated liquids pass through the flow equalization device and into the Bio-Film Reactor for final treatment.

Before You Start

Prior to installation of the Singular HK Green system, the installer must confirm that the water chemistry at the site is adequate to allow the system to perform properly. This should include an evaluation of the carbon (C), nitrogen (N), phosphorus (P) and alkalinity parameters in the wastewater. To provide optimal results, the ratio of C:N:P in the wastewater should ideally be between 100:5:1 to 100:10:1 for aerobic treatment. In addition, the ratio of alkalinity to ammonia should be approximately 7:1. If the ratios are not met, it may be necessary to supplement the wastewater in order to allow proper treatment to occur. Installation procedures, equipment and personnel should always comply with applicable safety regulations as well as all federal, state and local codes. The Singular HK Green system must be installed according to these instructions to insure safe, reliable and efficient operation. The system must be installed by an authorized representative of Norweco. Carefully inspect the system components. Make sure all components are in good condition. If the Singular HK 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. Read all instructions before beginning installation. The Singular HK Green system components include:

1. Service Pro WASP Control Center
2. Singular Model 206C Aerator
3. Flow Equalization Device
4. Bio-Static Sludge Return
5. Singular Mixer



Tank Delivery and Setting

1. 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. When installing the Singulair HK Green system, first check the length, width and depth of the excavation. Insure the excavation is long enough to allow at least 2' between the treatment tank and the Bio-Film Reactor for installation of the interconnect plumbing and backfill between the tanks. The excavation should have sufficient overdig to allow between 18" to 24" of clearance around the entire perimeter of the Singulair HK Green system. In addition, the excavation should allow for a minimum of 6" and a maximum of 18 ½" 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. Safe working conditions must be established and maintained during the entire installation procedure. **PLEASE NOTE:** The Singulair HK 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 HK Green tank has been designed for underground use only. Do not install the tank in a location that is subject to vehicular traffic.
2. Prepare the excavation to the appropriate depth based on the elevation of the building sewer line. Allow ⅛" of fall per foot from the building to the system. Fall through the system is 5" from inlet invert to outlet invert. Therefore, the outlet line from the system must be installed 5" lower than the inlet sewer line. The bottom of the excavation must be level and smooth. 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 HK Green tank when installed. In areas with unstable soil conditions, a reinforced concrete pad may be required under the Singulair HK Green tank. Do not install the Singulair HK 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.
3. Before installing the Singulair HK 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.
4. 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 HK 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.
5. Cut a 4" Schedule 40 PVC pipe (distributor to provide) 6" longer than the distance between the tanks for the interconnect plumbing. Insert the interconnect pipe into the inlet of the Bio-Film Reactor prior to tank installation. This allows the interconnect pipe to be backed straight out, and solvent welded into the cast-in outlet coupling of the clarification chamber when the tank is set. Place the Bio-Film Reactor in the excavation allowing at least 2' between the treatment tank and the Bio-Film Reactor. Remove the access covers and place a level on the risers to verify that the tank is level within ¼" 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 5". Therefore, the outlet invert of the system must be installed 5" lower than the inlet invert. Insure tanks are installed square and level.
6. Connect the building sewer line to the pretreatment chamber inlet. Sewer line trenches must be smoothly excavated and free of debris or sharp objects. The trenches must allow sewer lines to be laid with ⅛" 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 HK Green tank inlet coupling and the Bio-Film Reactor tank outlet coupling. Influent and effluent lines must be laid continuously and unspliced from the tank to the undisturbed earth beyond the tank excavation site.
7. Back the interconnect pipe out of the Bio-Film Reactor and solvent weld the pipe to the outlet hub installed in the clarification chamber. Then, connect the discharge sewer line to the Bio-Film Reactor outlet continuously and unspliced from the tank to undisturbed earth beyond the limits of the tank excavation. **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.
8. Install risers as required to bring the access covers to grade.

Plant Wiring and Control Center Installation

1. Electrical work must be performed in accordance with the latest edition of the National Electrical Code as well as applicable local codes.
2. Route the conduits and cables as directly as possible to the control center mounting location.
3. A separate underground electrical service cable must be installed from the main electrical panel in the home to the Service Pro WASP control center. The electrical service cable must be UL or CSA approved, type UF, #12/2 AWG minimum and must have a full-size center ground. Larger cable is required if the underground service needs to be run more than 80 feet.
4. A separate underground electrical service cable must be installed to the Singulair mixer within the anoxic chamber of the system. The electrical service cable must be UL or CSA approved, type UF, #14/2 AWG minimum and must have a full-size center ground. Larger cable is required if the underground service needs to be run more than 80 feet.
5. A separate underground electrical service cable must be installed to the Singulair aerator within the aeration chamber of the system. The electrical service cable must be UL or CSA approved, type UF, #14/2 AWG minimum and must have a full-size center ground. Larger cable is required if the underground service needs to be run more than 80 feet.
6. Each underground cable must be continuous and unspliced from the Service Pro WASP control center to the main electrical panel in the home, mixer and aerator. Underground cable must be protected in conduit anytime the cable path passes directly across a tank or underground structure.
7. Uncoil the electrical service cables into the influent sewer line trench. Extend the mixer cable to the mixer mounting riser. Extend the aerator cable to the aerator mounting riser. NOTE: Leave sufficient slack in the cables so they will not be stressed during backfilling or settling.
8. Inspect the power cable entrance in the side of the anoxic riser. Insert the free end of the power cable through a pre-formed ½" conduit ell (2' by 1'), then into the power cable entrance of the anoxic riser. Guide the power cable into the riser. Pull enough cable through the riser to reach 36" above the riser top. Coil and secure the cable in the anoxic riser so that it will not hang down into the tank.
9. Lay the conduit ell with anoxic power cable directly across the top and down the tank side. Do not allow the power cable to be laid across the end of the tank or any removable access cover. Seal the connection between the conduit and the anoxic riser with an approved fitting.
10. Inspect the power cable entrance in the side of the aeration riser. Insert the free end of the power cable through a pre-formed ½" conduit ell (2' by 1'), then into the power cable entrance of the aeration riser. Guide the power cable into the riser. Pull enough cable through the riser to reach 36" above the riser top. Coil and secure the cable in the aeration riser so that it will not hang down into the tank.
11. Lay the conduit ell with aeration power cable directly across the top and down the tank side. Do not allow the power cable to be laid across the end of the tank or any removable access cover. Seal the connection between the conduit and the aeration riser with an approved fitting.
12. Check the excavation and sewer line trenches to be sure they are free of debris, rocks and any sharp or abrasive objects that could damage electrical cables during backfill or settling. Always encase the electrical cables and alarm leads in conduit any time they are above finished grade.
13. All underground cables should have at least two feet of earth cover to prevent damage from landscaping, trenches, etc. or be installed in an approved conduit.

Required Prior to Backfilling

1. On the Bio-Film Reactor Elements, use the universal tool to insure each of the slide locks is rotated until they are fully extended.
2. Add a minimum of 12" (350 gallons) of ballast water to the Singulair HK Green tank and Bio-Film Reactor tank to prevent shifting in the excavation. Fill each chamber to an equal level.

Backfilling

1. The Singulair HK Green tank and Bio-Film Reactor 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 at the outlet end

of the excavation under the effluent plumbing. Continue to add gravel until the effluent line from the Hydro-Kinetic Bio-Film Reactor is covered. Add gravel to each side of the Bio-Film Reactor tank until the open center area is completely filled. Failure to properly fill the open center area will reduce the structural integrity and void the Hydro-Kinetic Bio-Film Reactor warranty. Continue to add gravel under and around the sloped clarifier of the Singulair HK Green tank until the interconnect plumbing 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, anoxic and aeration chambers are completely filled. Add backfill evenly around the entire perimeter of the Singulair HK Green tank in 12" increments. Hand tamp each layer of fill to compact soil. Use fine granular material when backfilling around electrical cables and conduits. The underground electrical cables should have at least 2' of earth cover. If the proposed finished grade will not permit this coverage, the cables should be installed in approved conduit from the tank to the building foundation. When backfilling over the tank, add fill to the area between the risers first.

2. 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 HK Green system. Use extreme care when backfilling the excavation. Do not allow dirt or mud to enter any part of the Singulair HK Green system or sewer lines. If dirt or mud enters any portion of the system, it must be removed to insure proper system operation. Removing the dirt or mud may require repeated flushing and tank pumping.
3. Before filling the system with hold down water, confirm that both of the Bio-Film Reactor Elements are resting properly on the ledge molded into the outlet chamber. The Reactor Elements have been factory installed with the media service hatch oriented toward the middle of the tank and facing up. Using the universal tool, turn the locking mechanisms outward on each Reactor Element to insure they are locked into the recesses formed into the tank. The locking mechanisms secure the Reactor Elements into position in the Bio-Film Reactor and prevent flotation.
4. All chambers of the entire system 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 HK Green tank, follow the instructions outlined in the "System Pumping" section of this document. After pumping, promptly refill the tank to capacity with clean water. Dewatering and leaving the Singulair HK Green tank empty will affect tank integrity and void the Singulair HK Green warranty.

Mixer Installation

1. Be certain the circuit for the Singulair HK Green system in the main electrical service panel is de-energized and that the circuit breakers in the Service Pro WASP control center are placed in the "off" position. Explain to the owner that you will be installing the electrical components into the tank and you will need access to the main electrical service panel for system start-up after the components have been installed. Place the Singulair Tool Kaddy nearby for easy access to tools and test equipment. Remove the cover from the mixer mounting riser. Carefully remove the mixer from the mixer mounting riser. Do not bump or bend the shaft. Lay the mixer on its side with the brackets resting on the sealed cover near the mixer mounting riser. Uncoil the underground electrical service cable from inside the mixer mounting riser and extend it out of the riser. Test the exposed leads with the electrical multi-meter from the Tool Kaddy before proceeding. The circuit should not be energized and voltage should not be evident when the leads are tested with the multi-meter.
2. The moisture resistant electrical connector must be properly wired to insure system operation and protect components. Uncouple the two halves of the electrical connector on the mixer. Unscrew the three captive stainless steel screws from the face of the female half of the assembly. They will stay in the body of the receptacle. Lift out the rigid internal receptacle body.
3. Unscrew the compression nut on the strain relief connector assembly at the small end of the female half of the connector. Do not misplace the compression ring. Insert the electrical service cable through the compression nut, compression ring and neoprene grommet, which is contained in the molded plastic sleeve of the female connector.
4. Strip the outer insulation back 1¼" on the underground electrical service cable and expose the three individual leads. Use extreme care to be sure the insulation jackets on the individual black and white leads are not scarred or damaged while stripping the outer jacket. Check carefully. If even slight damage is noticed, cut off the end of the cable just below your work and begin again.

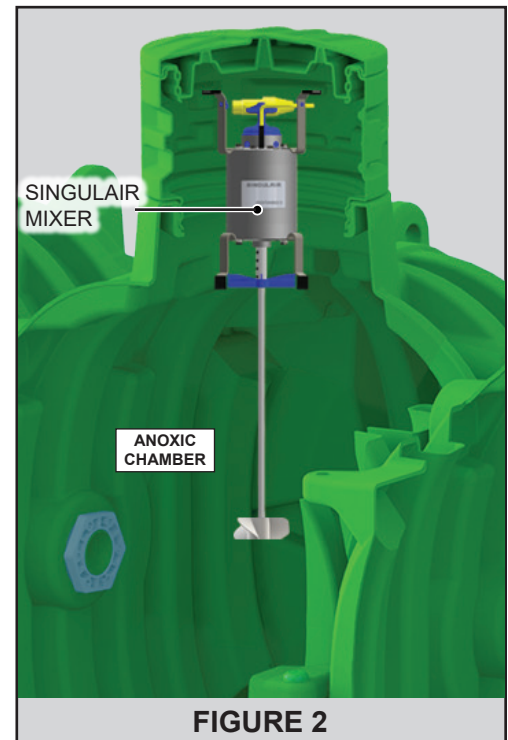


FIGURE 2

5. Strip off the insulation jackets $\frac{3}{16}$ " from the ends of the black and white leads.
6. Insert the black lead end into the hole adjacent to the brass-colored screw and tighten the screw securely.
7. Insert the white lead end into the hole adjacent to the silver-colored screw and tighten the screw securely.
8. Insert the bare copper ground lead into the hole adjacent to the green screw and tighten the screw securely.
9. Inspect your work to see that no two uninsulated leads are in contact with each other and that all screws are tight. Also be sure the wire insulation is not captured in the terminal. All power cable leads must be connected to the correct terminals in the female receptacle for proper mixer operation. The back of the insert body is clear, making it easy to verify that each wire is in place before tightening the terminal screws. Improper wiring or electrical hook-up will void the warranty.
10. Locate the insert key above the grounding pole on the side of the rigid receptacle body and align it with the keyway molded on the inside of the rubber receptacle sleeve. Grasp the connector and insert the receptacle body fully into the sleeve.
11. Engage the three captive stainless steel screws on the face of the receptacle body and tighten them.
12. Press the neoprene grommet into the small end of the female half of the electrical connector. Tighten the compression nut and clear plastic compression ring against the grommet. The compression nut achieves maximum torque by hand-tightening. Do not over-tighten the compression nut. **NOTE:** Any time the female connector is not in use, secure the closure cap in the end of the receptacle.
13. Each mixer is manufactured and tested to a critical straightness tolerance from the mixer motor to the mixing shaft. Remember that the operating life of the mixer often depends on the straightness of the shaft. It must not be bumped or allowed to contact anything except the anoxic tank liquid. With the mixer lying on its side and the brackets propped up on the cover, rotate the foam restrictor until the stainless steel set screws in the intermediate shaft are facing up.
14. Examine the upper end of the mixing shaft and locate the alignment mark that is permanently affixed during factory testing. Confirm the alignment mark on the mixing shaft meets the corresponding mark on the intermediate shaft.
15. If the alignment marks do not meet, reposition the mixing shaft by loosening the set screws that are located closest to the foam restrictor and remove the mixing shaft. Reinsert the mixing shaft into the intermediate shaft so that the alignment mark on the mixing shaft meets the corresponding mark on the intermediate shaft. The mixing shaft must be fully inserted to the depth of the stop shoulder machined into the mixing shaft. Use the tee-handle allen wrench to tighten both set screws finger tight only. Overtightening may dish the side of the mixing shaft and compromise the straightness tolerance.
16. Lower the mixer into the mixer mounting riser carefully to avoid any contact between the mixing shaft, mixing tip and tank side walls.
17. Make sure that the weight of the mixer is evenly distributed on all four mounting brackets and that the brackets are seated in the four grooves on the top of the anoxic mounting riser.
18. Arrange the underground power cable in the mounting riser so that it does not touch or come into contact with the side of the mixer.
19. Make sure the blades on the male half of the electrical connector are clean and dry. Plug the two halves of the watertight electrical connector together making sure the multiple lip seal is securely engaged. Arrange the mixer power cord, electrical connector and underground electrical cable around the mixer, and secure them into the mounting clips attached to the mixer upper brackets. Before replacing the mixer mounting riser lid, make sure these electrical connections are not resting against the top of the mixer. **DANGER: Make sure the system access cover is in good condition and securely installed on the mounting riser with safety 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.**

Aerator Installation

1. Be certain the circuit for the Singulair HK Green system in the main electrical service panel is de-energized and that the circuit breakers in the Service Pro WASP control center are placed in the "off" position. Place the Singulair Tool Kaddy nearby for easy access to tools and test equipment. Remove the vented cover from the aerator mounting riser. Carefully remove the aerator from the aerator mounting riser. Do not bump or bend the aspirator shaft. Lay the aerator on its side with the brackets resting on the vented cover near the aerator mounting riser. Uncoil the underground electrical service cable from inside the aerator mounting riser and extend it out of the riser. Test the exposed leads with the electrical multi-meter from the Tool Kaddy before proceeding. The circuit should not be energized and voltage should not be evident when the leads are tested with the multi-meter.

2. The moisture resistant electrical connector must be properly wired to insure system operation and protect components. Uncouple the two halves of the electrical connector on the Singulair aerator. Unscrew the three captive stainless steel screws from the face of the female half of the assembly. They will stay in the body of the receptacle. Lift out the rigid internal receptacle body.
3. Unscrew the compression nut on the strain relief connector assembly at the small end of the female half of the connector. Do not misplace the compression ring. Insert the electrical service cable through the compression nut, compression ring and neoprene grommet, which is contained in the molded plastic sleeve of the female connector.
4. Strip the outer insulation back 1¼" on the underground electrical service cable and expose the three individual leads. Use extreme care to be sure the insulation jackets on the individual black and white leads are not scarred or damaged while stripping the outer jacket. Check carefully. If even slight damage is noticed, cut off the end of the cable just below your work and begin again.
5. Strip off the insulation jackets ⅞" from the ends of the black and white leads.
6. Insert the black lead end into the hole adjacent to the brass-colored screw and tighten the screw securely.
7. Insert the white lead end into the hole adjacent to the silver-colored screw and tighten the screw securely.
8. Insert the bare copper ground lead into the hole adjacent to the green screw and tighten the screw securely.
9. Inspect your work to see that no two uninsulated leads are in contact with each other and that all screws are tight. Also be sure the wire insulation is not captured in the terminal. All power cable leads must be connected to the correct terminals in the female receptacle for proper aerator operation. The back of the insert body is clear, making it easy to verify that each wire is in place before tightening the terminal screws. Improper wiring or electrical hook-up will void the warranty.
10. Locate the insert key above the grounding pole on the side of the rigid receptacle body and align it with the keyway molded on the inside of the rubber receptacle sleeve. Grasp the connector and insert the receptacle body fully into the sleeve.
11. Engage the three captive stainless steel screws on the face of the receptacle body and tighten them.
12. Press the neoprene grommet into the small end of the female half of the electrical connector. Tighten the compression nut and clear plastic compression ring against the grommet. The compression nut achieves maximum torque by hand-tightening. Do not over-tighten the compression nut. **NOTE:** Any time the female connector is not in use, secure the closure cap in the end of the receptacle.
13. Each Singulair aerator is manufactured and tested to a critical straightness tolerance from the aerator motor to the aspirator. Remember that the operating life of the aerator often depends on the straightness of the aspirator shaft. It must not be bumped or allowed to contact anything except the aeration tank liquid. With the Singulair aerator lying on its side and the brackets propped up on the vented cover, rotate the foam restrictor until the stainless steel set screws in the intermediate shaft are facing up.
14. Examine the upper end of the aspirator shaft and locate the alignment mark that is permanently affixed during factory testing. Confirm the alignment mark on the aspirator shaft meets the corresponding mark on the intermediate shaft.
15. If the alignment marks do not meet, reposition the aspirator shaft by loosening the set screws that are located closest to the foam restrictor and remove the aspirator shaft. Reinsert the aspirator shaft into the intermediate shaft so that the alignment mark on the aspirator shaft meets the corresponding mark on the intermediate shaft. The aspirator shaft must be fully inserted to the depth of the stop shoulder machined into the aspirator shaft. Use the tee-handle allen wrench to tighten both set screws finger tight only. Overtightening may dish the side of the aspirator shaft and compromise the straightness tolerance.
16. Lower the aerator into the aerator mounting riser carefully to avoid any contact between the aspirator shaft, aspirator tip and tank side walls.

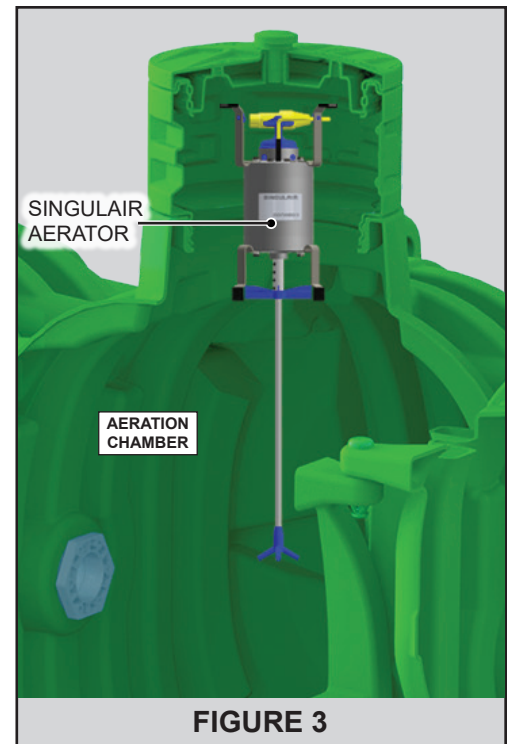


FIGURE 3

17. Make sure that the weight of the aerator is evenly distributed on all four mounting brackets and that the brackets are seated in the four grooves on the top of the aerator mounting riser.
18. Arrange the underground power cable in the mounting riser so that it does not touch or come into contact with the side of the Singulair aerator.
19. Make sure the blades on the male half of the electrical connector are clean and dry. Plug the two halves of the watertight electrical connector together making sure the multiple lip seal is securely engaged. Arrange the aerator power cord, electrical connector and underground electrical cable around the aerator, and secure them into the mounting clips attached to the aerator upper brackets. Before replacing the aerator mounting riser lid, make sure these electrical connections are not resting against the top of the aerator. **DANGER: Make sure the system access cover is in good condition and securely installed on the mounting riser with safety 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.**

Completing the Installation

1. The flow equalization device will be installed in the tank receiving flange in the clarification chamber as shown in Figure 4.

2. The control center should be wired for operation when the tankage and underground electrical cables are installed. The Service Pro WASP controls should be located so that all warning lights can be readily seen and the audible alarm heard. The mounting location should minimize exposure to direct sunlight, freezing rain or conditions that might prevent routine inspection or access. The control center should always be mounted out of the reach of children.

3. Remove the control center insert and all packaging from the enclosure. Drill the appropriate openings in the bottom of the enclosure and install a conduit connector in each opening. Exposed wiring to or from the control center should always be encased in conduit. Mount the control center securely using masonry nails, wood screws or common nails as appropriate. Install the control center insert into the enclosure and secure with the four screws provided. The alarm light wires on the insert must now be connected to the alarm lights. Connect the yellow wires to the yellow light, the blue wires to the blue light, and the red wires to the red light.

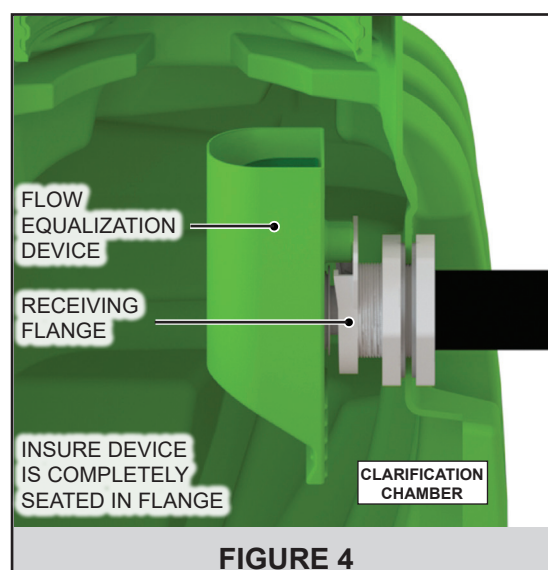


FIGURE 4

4. Use a dedicated 120 volt AC, 20 amp, single-phase circuit breaker in the main electrical panel for service to the Service Pro WASP control center. **CAUTION: Make sure the breaker is de-energized. Check it with an electrical multi-meter before proceeding with installation of the control center. Remember that other circuits in the service panel may remain energized as you are working. Use only tools with insulated handles, stand in a dry location and work with extreme care.**
5. Wire from a dedicated breaker in the main service panel to the "INCOMING" power terminal marked "L1" in the control center using copper wire with black insulation.
6. Wire from the neutral in the main service panel to the "INCOMING" power terminal marked "N" in the control center using copper wire with white insulation.
7. Connect the ground conductor from the main service panel to the "INCOMING" power terminal marked "G" in the control center using bare copper wire. **IMPORTANT: Never allow the white neutral leads and ground leads to be spliced together or connected to common terminals.**
8. Connect the power wire from the mixer to the "MIXER" power terminal marked "P1" in the control center using copper wire with black insulation.
9. Connect the neutral wire from the mixer to the "MIXER" power terminal marked "N" in the control center using copper wire with white insulation.
10. Connect the ground wire from the mixer to the "MIXER" power terminal marked "G".
11. Connect the power wire from the aerator to the "AERATOR" power terminal marked "A1" in the control center using copper wire with black insulation.

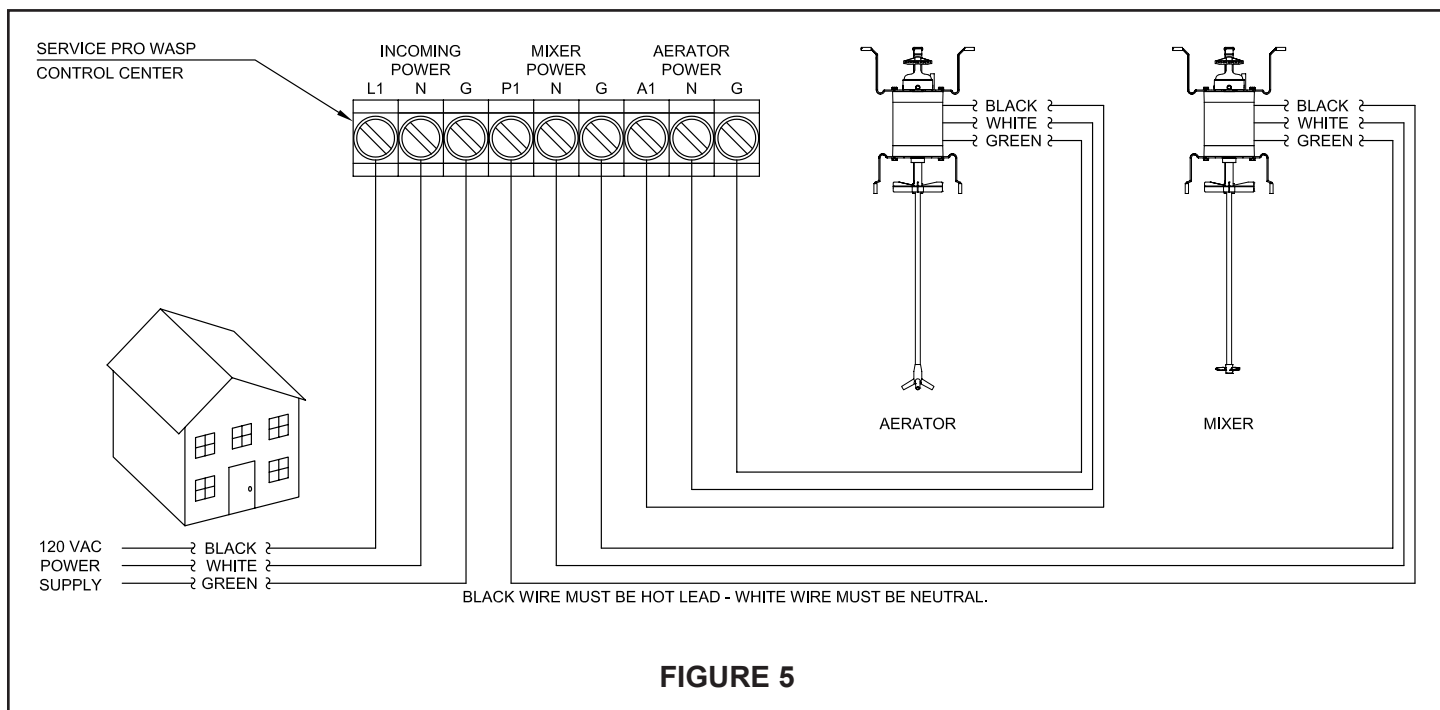


FIGURE 5

12. Connect the neutral wire from the aerator to the "AERATOR" power terminal marked "N" in the control center using copper wire with white insulation.
13. Connect the ground wire from the aerator to the "AERATOR" power terminal marked "G".
14. If auxiliary inputs are being connected to the Service Pro WASP control center, push button style terminals are provided for the auxiliary input connections. Use #16 AWG or smaller wires in the push button terminals.
15. If the auxiliary device uses dry contact (no voltage supplied) to signal an alarm condition, connect the wires from the auxiliary device to the "1", "2" or "3" terminals marked "RELAY AUX" on the blue push button terminal block.
16. If the auxiliary device supplies a voltage (5 to 120 volts) to signal an alarm condition, connect the wires from the auxiliary device to the "1", "2" or "3" terminals marked "AC/DC AUX" on the red push button terminal block. **CAUTION: Do not connect devices to both the "RELAY AUX" and "AC/DC AUX" terminals for a single auxiliary input. Doing so may damage the circuit board.**
17. Inspect your work to make sure that there are no breaks in wiring insulation and that all connections are secure. Tighten all screws on the terminal blocks.
18. Carefully form all wiring neatly into the lower part of the Service Pro WASP control center. Do not allow the wires to make contact with other electrical components.
19. **IMPORTANT:** Seal all conduit openings with duct seal compound or similar appropriate material.
20. Clearly label the dedicated circuit breaker used for the Service Pro WASP control center inside the door of the main service panel.
21. Place all three circuit breakers in the Service Pro WASP control center in the "off" position. Close and secure the control center cover.

Final Check and System Startup

1. Secure the access openings. Install non-vented access covers on the pretreatment, anoxic, clarification chamber and Bio-Film Reactor risers. Install a vented cover on the aeration chamber riser. Secure all access covers with the fasteners provided. **DANGER: All access covers must be secured with fasteners 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.**
2. Place the dedicated circuit breaker for the Singulair HK Green system in the main service panel in the "on" position.

3. To commission the telemetry system (if included), first insure the phone/network cable or cellular module is properly installed. Verify that the control breaker in the Service Pro WASP control center is in the "off" position.
4. Press the "ALARM RESET" button and keep it depressed while turning the control circuit breaker in the Service Pro WASP panel to the "on" position. Once the display reads 'LET GO TO COMMISSION', release the alarm reset button. The display will read 'CALLING...' indicating the Service Pro WASP control center is calling the remote monitoring center to commission the panel. When the display reads 'CALL SUCCESSFUL', the unit has been commissioned. If commissioning is unsuccessful, the display will indicate why the communications failed. Correct the problem and recommission the panel.
5. Conduct an alarm test to verify the Service Pro WASP control panel has been successfully commissioned. To conduct an alarm test, press and hold in the "ALARM RESET" button for at least 5 seconds. After the alarm lights on the control center illuminate and the alarm buzzer sounds, release the "ALARM RESET" button. The display will read 'ALARM TEST' and the panel will call the remote monitoring center to record the manual alarm test. If the display reads 'CALLING...' during the alarm test, this confirms that the panel has been successfully commissioned. Otherwise, it will be necessary to recommission the panel.
6. The system is operational once all installation and startup steps have been completed to this point. It will take 2 to 6 weeks for the system to reach biological maturity, depending upon system loading.

Deeper Burial Requirements

Special consideration should be taken if the Singulair HK Green tank is buried deeper than 18 ½" below grade. However, the tank should never be buried deeper than 36 ½" below grade. Once the tank is set, immediately 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 HK 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 these anti-flotation recommendations may result in damage to the 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 HK Green tank. The weight of the soil over the beams significantly contributes to the tank hold down forces. Never place beams under the tank because it will limit the amount of soil anchoring the beams and tank.

Secure the anti-flotation beams to the Singulair HK Green tank with properly rated hold down straps that attach to the lifting lugs located at the top of each of the five 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.

SINGULAIR HK GREEN 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	11,652	10,316	8,980	7,643	6,307	4,971
8	10,442	8,954	7,467	5,979	4,492	3,004
10	9,231	7,593	5,954	4,315	2,676	1,037
12	8,021	6,231	4,441	2,651	861	*
14	6,811	4,869	2,928	986	*	*
16	5,600	3,508	1,415	*	*	*
18	4,390	2,146	STANDARD INSTALLATION	*	*	*
20	3,179	784	*	*	*	*
22	1,969	*	*	*	*	*
24	759	*	*	*	*	*
26	*	*	*	*	*	*
* HOLD DOWN WEIGHT NOT REQUIRED						

Routine Maintenance

The following should be performed every 18 months (or as required by your local governing regulations) by a qualified service technician:

1. If applicable, inspect the effluent discharge point to make sure there are no restrictions to the effluent flow. If restrictions are present, perform service as needed.
2. If effluent sampling is required, it is recommended that a proper sampling port be installed downstream of the system.
3. Perform service to the Singulair mixer as outlined in the "Singulair Mixer Service" section of this document.
4. Perform service to the Singulair aerator as outlined in the "Singulair Aerator Service" section of this document.
5. Inspect the flow equalization device. Rinse the design flow, sustained flow and peak flow ports with a garden hose and insure they are free of debris. Clean the flow ports with a brush if necessary.
6. Use the hopper scraping tool to gently scrape all surfaces of the clarification chamber hopper.
7. The settled solids should be pumped from the Bio-Film Reactor tank to the pretreatment chamber. With the flow equalization device securely in place, install the outlet blocking tool into the clarifier outlet coupling prior to pumping. Place the intake of the service pump at the bottom of the influent chamber. Pump the contents from the bottom of the Bio-Film Reactor tank until the accumulated solids are withdrawn and the water level is below the bottom of the Bio-Film Reactor elements. Approximately 150 gallons will be removed during service. Rinse the media with a hose during tank pumping. After pumping, remove the outlet blocking tool and allow the Bio-Film Reactor tank to refill to normal operating level. Never leave the Bio-Film Reactor tank empty after pumping.
8. Inspect the system to determine if complete pumping may be required. See "System Pumping" section of this document.
9. Upon completion of the inspection, insure that all access covers are properly reinstalled. Any missing or damaged access covers should be immediately replaced. **DANGER: Make sure the system access covers are in good condition and securely installed on the mounting risers with safety 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.**
10. Approved replacement parts are available from the authorized system dealer listed on the control center cover.

Singulair Mixer Service

1. As you approach the Singulair HK Green tank, listen for excessive noise before removing the cover. Remove the non-vented access cover located above the anoxic chamber and place it aside. Check to insure the mixer is operational. The mixer operates on a pre-programmed on/off cycle, so press the reset button on the Service Pro WASP control panel if necessary to verify operation.
2. Manually check the mixer brackets for excessive vibration.
3. Inspect the outside of the electrical connector assembly for worn spots. Uncouple the connector and check for any evidence of moisture inside. Secure the closure cap over the female half of the connector to keep it clean and dry while you work.
4. Remove the mixer from the mounting riser. **BE CAREFUL** when removing the mixer to see that the shaft does not come in contact with the mounting riser. The mixing shaft is straightened to a critical tolerance before it is shipped from the factory. It must retain this straightness tolerance or vibration may result. Excessive vibration can greatly shorten mixer life and could also cause the unit to consume more electrical power than necessary.
5. Check the rubber shock absorbers on each bracket for wear. Replace any that are missing or worn. Check the power cord from the moisture resistant electrical connector to the mixer. Be sure it is free of nicks or worn spots.
6. Lay the mixer on its side against the mixer mounting riser cover. Check to see if there is a water mark on the outside of the mixer and notify the owner if one is found. The mixer is flood proof and mechanically designed so that it can return to normal operation unharmed after being subjected to intermittent high water. However, a high water mark on the outside

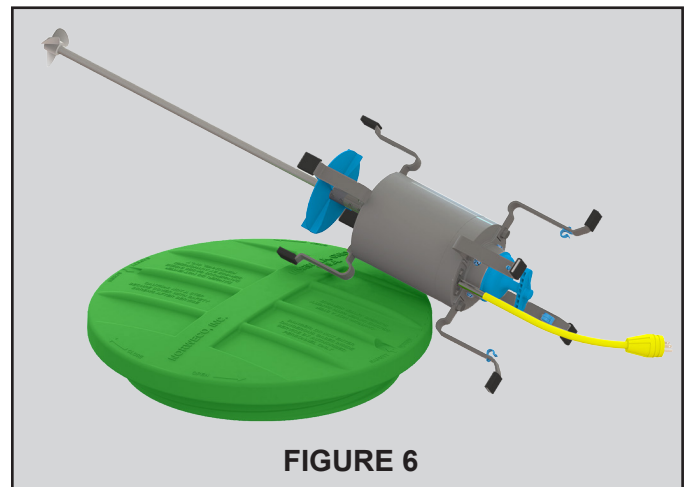


FIGURE 6

of the mixer indicates there is a problem in the effluent disposal line, disposal field or elsewhere in the installation. If the problem is left uncorrected, wastewater could back up into the tank, void the mixer warranty and eventually flood the facility.

7. Thoroughly clean the outside of the mixing shaft and tip.
8. Inspect the underground power cable in the mixer mounting riser for breaks or scars in the insulation. Examine the inside of the mounting riser for evidence of ground water entry.
9. Carefully reinstall the mixer in the mounting riser. Do not allow the shaft to touch the mounting riser side walls. Make sure the weight of the mixer is evenly distributed on the upper end of all four mounting brackets.
10. Using a multi-meter, check the voltage at the electrical connector. The meter should read 115 volts \pm 10% when the circuit breakers in the Service Pro WASP control center have been placed in the "on" position. Record the voltage on the Service Inspection Card.
11. Wipe the mixer electrical connector with a clean, dry cloth to remove moisture or dirt accumulated during service. Plug the electrical test pigtail in between the male and female electrical connectors and check the amperage of the newly serviced mixer. The mixer should not draw more than 4.2 amps. Record the amperage on the Service Inspection Card.
12. Reinstall the access cover on the mounting riser. **DANGER: Make sure the system access cover is in good condition and securely installed on the mounting riser with safety 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.**

Singular Aerator Service

1. Open the control center and push the reset button on the Service Pro WASP control panel. As you approach the Singular HK Green tank, listen for excessive noise before removing the vented cover. Remove the vented access cover located above the aeration chamber and place it aside. The aerator should be operating normally.
2. Make sure the debris screens are in place in the air intake ports. Manually check the aerator brackets for excessive vibration.
3. Check the aeration chamber for odor. A musty odor indicates the presence of aerobic conditions essential for good treatment. A septic odor indicates inadequate aeration, suggesting that the passage of air into the tank contents has been restricted.
4. Carefully remove the debris screens from the air intake ports. Wipe the aerator air intake ports with a damp cloth being careful not to allow dirt or debris to enter the intake openings. Reinstall debris screens after cleaning.
5. Using the Singular flowmeter, check the air delivery. It should read approximately 3 CFM. Refer to the Singular Aerator Flow meter instruction sheet for complete details.
6. Inspect the outside of the electrical connector assembly for worn spots. Uncouple the connector and check for any evidence of moisture inside. Secure the closure cap over the female half of the connector to keep it clean and dry while you work.
7. Within 2-3 minutes after turning off the aerator, perform a settleable solids test of the aeration chamber contents. Refer to the "System Pumping" section of this document for details.
8. Remove the aerator from the mounting riser. BE CAREFUL when removing the aerator to see that the aspirator shaft does not come in contact with the mounting riser. The aspirator shaft is straightened to a critical tolerance before it is shipped from the factory. It must retain this straightness tolerance or vibration may result. Excessive vibration can greatly shorten aerator life and could also cause the unit to consume more electrical power than necessary.
9. Check the rubber shock absorbers on each bracket for wear. Replace any that are missing or worn. Check the power cord from the moisture resistant electrical connector to the aerator. Be sure it is free of nicks or worn spots.

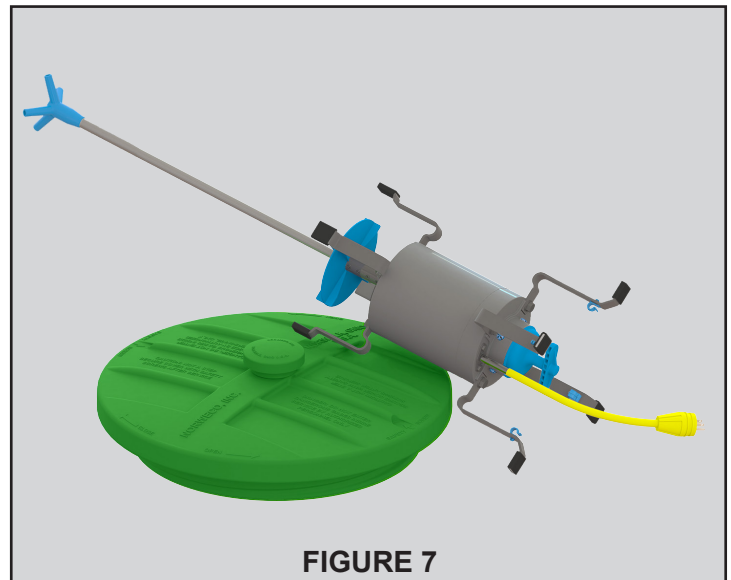


FIGURE 7

10. Lay the aerator on its side against the aerator mounting riser cover. Check to see if there is a water mark on the outside of the aerator and notify the owner if one is found. The aerator is flood proof and mechanically designed so that it can return to normal operation unharmed after being subjected to intermittent high water. However, a high water mark on the outside of the aerator indicates there is a problem in the effluent disposal line, disposal field or elsewhere in the installation. If the problem is left uncorrected, wastewater could back up into the tank, void the aerator warranty and eventually flood the facility.
11. Carefully loosen the two stainless steel set screws on the bottom of the intermediate shaft and remove the aspirator shaft. Remove any internal deposits from the four aspirator orifices with the aspirator shaft cleaning tool. 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 shaft from the cleaning hose and inspect the bore to see that it is clean.
12. Push the stainless steel brush with extension handle through the stainless steel intermediate shaft and hollow motor shaft to dislodge any residue that may have accumulated. **NOTE:** Do not flush the motor shaft with water. Remove any debris from the air intake openings.
13. Thoroughly clean both the bottom and the top surfaces of the foam restrictor.
14. Reinstall the aspirator shaft into the intermediate shaft. Match the permanent alignment marks on the aspirator and intermediate shafts to maintain the original factory balance. Tighten the set screws with a tee-handle allen wrench, finger tight only. Too much pressure may dish the side of the aspirator shaft and compromise the straightness tolerance.
15. Clean or replace the four air intake debris screens. Make sure one screen is placed in each intake opening to prevent debris from entering the aerator.
16. 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. Check the aeration chamber for the presence of non-biodegradable materials. Accumulation of these materials in the aeration chamber indicates the pretreatment chamber should be evaluated. Refer to the "System Pumping" section of this document for details.
17. Inspect the underground power cable in the aerator mounting riser for breaks or scars in the insulation. Examine the inside of the mounting riser for evidence of ground water entry.
18. Carefully reinstall the aerator in the mounting riser. Do not allow the aspirator shaft to touch the mounting riser side walls. Make sure the weight of the aerator is evenly distributed on the upper end of all four mounting brackets.
19. Using a multi-meter, check the voltage at the electrical connector. The meter should read 115 volts \pm 10% when the circuit breakers in the Service Pro WASP control center have been placed in the "on" position. Record the voltage on the Service Inspection Card.
20. Wipe the aerator electrical connector with a clean, dry cloth to remove moisture or dirt accumulated during service. Plug the electrical test pigtail in between the male and female electrical connectors and check the amperage of the newly serviced aerator. The aerator should not draw more than 4.2 amps. Record the amperage on the Service Inspection Card.
21. Inspect the fresh air vent assembly in the aerator access cover and clear the fresh air openings of any debris to insure unrestricted passage of air. Reinstall the access cover on the mounting riser. **DANGER: Make sure the system access cover is in good condition and securely installed on the mounting riser with safety 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.**

System Pumping

1. The Singulair HK Green system is a biological treatment device and will not require pumping as often as a septic tank. Pumping of the system will likely be required at 3 to 5 year intervals depending upon system usage, loading and treatment requirements. If pumping is required more frequently than every 2 years, there is an operational problem with the system and it should be evaluated in greater detail.
2. If the service technician suspects that the system may require pumping, a settleable solids test should be performed on a sample from the aeration chamber. For this test, make sure the aerator has been running for at least 10 minutes. The aerator must be removed from the aeration chamber riser to perform this test.
3. Immediately after removing the aerator, dip a graduated cone or other clear container into the aeration chamber to a depth of 2½ feet. Set the container on a level surface and then allow the solids to settle for 30 minutes while you complete the service inspection. Do not disturb the container during the test.

4. 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. $\frac{1}{2}$ 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 80% indicates no adjustments are necessary. A settled solids level greater than 80% in the aeration chamber indicates excessive solids and that the system should be pumped.
5. If it is determined that pumping is required, contact a tank pumping service licensed by the local regulatory agency. The septage or biosolids from the system must be removed and disposed of in a manner consistent with federal, state and local regulations. Advise the pumping service that they will be pumping approximately 1,500 gallons.
6. Place all three circuit breakers in the Service Pro WASP control center in the "off" position.
7. Remove the access cover from the aeration and clarification chambers. Unplug the aerator and remove the aerator from the aeration riser. Connect the suction hose to the pump being used to evacuate the chamber.
8. Activate the pump and remove the aeration chamber contents. Pump the aeration chamber from the top down, to remove biologically inactive material. Feed the hose down as the liquid is being evacuated from the aeration chamber. It is not necessary to wash down the sidewalls or tank bottom. Pump only 75% of the volume out of the aeration chamber to facilitate plant re-start. Reinstall the aerator. Replace the access cover.
9. The Bio-Film Reactor tank should be pumped after the aeration chamber. Remove the Bio-Film Reactor tank access cover. Lower the hose into the influent chamber until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Completely pump 100% of the contents from the chamber and rinse the media with a hose during tank pumping. Replace the Bio-Film Reactor tank access cover.
10. Next, pump the anoxic chamber. Remove the anoxic chamber access cover. Remove the mixer from the anoxic chamber riser. Lower the hose until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Pump only 75% of the volume out of the anoxic chamber to facilitate plant re-start. Reinstall the mixer and replace the access cover.
11. The final chamber to pump is the pretreatment chamber. Remove the pretreatment chamber access cover. Break up the scum mat to facilitate pumping. Lower the hose until it contacts the bottom of the tank. Withdraw the hose approximately 2 inches. Activate the pump and remove 100% of the chamber contents. It is not necessary to wash down the sidewalls or tank bottom. If solids are so concentrated that the suction hose cannot withdraw them, tank contents may be backflushed to break up the solid matter. Replace the pretreatment chamber access cover.
12. After pumping any portion of the Singulair HK Green tank, it is essential to immediately refill each chamber to capacity with clean water. Dewatering and leaving the tank empty will affect tank integrity and void the warranty. Return all equipment to its properly installed location. Replace any access covers that were removed. **DANGER: Make sure the system access covers are in good condition and securely installed on the mounting risers with safety 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.** Turn on power to all three circuit breakers in the Service Pro WASP control center. Check for proper operation of all equipment.

Troubleshooting

This troubleshooting section provides efficient solutions to the most common problems encountered in the operation of the Singulair HK Green system.

Septic Odor from System

1. **No power to aerator:** check aerator for proper operation. Insure the breaker is in the "on" position, the aerator is plugged in and power is present (check with test light from Tool Kaddy)
2. **Insufficient air delivery by aerator:** service aerator
3. **Aspirator shaft plugged with deposits:** remove from aerator and flush with shaft cleaning hose
4. **Aspirator orifices plugged with deposits:** remove deposits
5. **Improperly installed pretreatment chamber access cover:** tighten pretreatment access cover
6. **Vent assembly restricts fresh air entry:** clean assembly vent
7. **Incomplete treatment due to hydraulic overloading:** see "Hydraulic Overloading of System"

8. **Water softener backwash discharging into system:** notify owner to remove backwash line from system
9. **Excessive solids in aeration chamber:** evaluate chamber and pump if necessary
10. **Excessive solids in anoxic chamber:** evaluate chamber and pump if necessary

Hydraulic Overloading of System

1. **Ground water entering tank through defective inlet or outlet seal:** excavate and repair seal
2. **Ground water entering system through crack in tank:** excavate and repair crack with Norweco repair kit
3. **Ground water entering system through joint between riser and tank:** excavate and completely reseal joint
4. **Roofing down spouts, footer drains or floor drains tied into system:** notify owner to relocate connection downstream of system

Mixer Troubleshooting

1. **Mixer will not operate:**
 - Electrical service to mixer interrupted: see “No electrical power from control center to mixer”
 - Voltage supplied is insufficient to start mixer*: report condition to power company
 - Defective bearing, windings or insulation in motor: return entire mixer to factory
 - Debris wound on mixing shaft: remove debris with knife
 - Mixing shaft bent: return entire mixer to factory
 - Foam restrictor or entire mixer under water: see “Singulair HK Green System Flooded”

*If you suspect low voltage, check the voltage at the watertight electrical connector, not at the Service Pro WASP control center. If voltage above 103 or more is measured, check the other possibilities listed in this section.

2. **Mixer drawing excessive current:**
 - Foam restrictor partially under water: see “Singulair HK Green System Flooded”
 - Debris on mixing shaft: remove debris with knife
 - Motor failure: return mixer to factory
 - Insufficient voltage (less than 103 volts): report condition to power company
 - Excessive voltage (greater than 126 volts): report condition to power company
3. **Mixer making excessive noise:**
 - Rubber shock absorbers on brackets worn: replace shock absorbers
 - Bearing failure in mixer motor: return mixer to factory
 - Noise is generated by excessive vibration: see “Mixer operates with excessive vibration”
4. **Mixer operates with excessive vibration:**
 - Debris on mixing shaft: remove debris with knife
 - Mixing shaft bent: return entire mixer to factory
 - Mixer mounting brackets bent: straighten brackets
 - Top mixer brackets not seated evenly: adjust mounting brackets
 - Mixing shaft installed too tightly on intermediate shaft: reinstall mixing shaft with set screws finger tight only. If condition persists return entire mixer to factory.
 - Mixing shaft installed with improper alignment to intermediate shaft: reinstall mixing shaft to factory alignment marks

Aerator Troubleshooting

1. **Aerator will not operate:**
 - Electrical service to aerator interrupted: see “No electrical power from control center to aerator”
 - Voltage supplied is insufficient to start aerator*: report condition to power company
 - Defective bearing, windings or insulation in motor: return entire aerator to factory
 - Debris wound on aspirator shaft: remove debris with knife
 - Aspirator shaft bent: return entire aerator to factory
 - Foam restrictor or entire aerator under water: see “Singulair HK Green System Flooded”

*If you suspect low voltage, check the voltage at the watertight electrical connector, not at the Service Pro WASP control center. If voltage above 103 or more is measured, check the other possibilities listed in this section.

2. **Aerator drawing excessive current:**
 - Foam restrictor partially under water: see "Singulair HK Green System Flooded"
 - Debris on aspirator shaft: remove debris with knife
 - Motor failure: return aerator to factory
 - Insufficient voltage (less than 103 volts): report condition to power company
 - Excessive voltage (greater than 126 volts): report condition to power company
3. **Aerator making excessive noise:**
 - Rubber shock absorbers on brackets worn: replace shock absorbers
 - Bearing failure in aerator motor: return aerator to factory
 - Noise is generated by excessive vibration: see "Aerator operates with excessive vibration"
4. **Aerator operates with excessive vibration:**
 - Debris on aspirator shaft: remove debris with knife
 - Aspirator shaft bent: return entire aerator to factory
 - Aerator mounting brackets bent: straighten brackets
 - Top aerator brackets not seated evenly: adjust mounting brackets
 - Aspirator shaft installed too tightly on intermediate shaft: reinstall aspirator shaft with set screws finger tight only. If condition persists return entire aerator to factory.
 - Aspirator shaft installed with improper alignment to intermediate shaft: reinstall aspirator shaft to factory alignment marks

Electrical Troubleshooting

1. **No electrical power from electrical service panel to control center:**
 - Circuit breaker in electrical service panel has tripped: turn breaker to "off" position, then turn "on"
 - Fuse in electrical service panel has blown: have owner replace fuse
 - Circuit breaker in electrical service panel turned "off": turn breaker "on"
 - Loose connection in electrical service panel: tighten all connections. First, shut off breaker in main electrical service panel.
 - Defective circuit breaker in electrical service panel: have owner replace circuit breaker
 - Corrosion on contacts prevents flow of current: clean or replace contacts
 - Incomplete circuit - neutral not properly wired: have owner wire directly to neutral bar
 - Power cable from service panel to Service Pro WASP control center severed: have owner locate break and repair
2. **No electrical power from control center to mixer:**
 - No voltage detected at watertight electrical connector: place circuit breaker in "on" position and press reset button. If no voltage can be read, replace control center insert.
 - Over current condition has tripped circuit protection: push reset button
 - Under current condition has tripped circuit protection: push reset button
 - Service Pro mixer circuit breaker turned "off": turn breaker to "on" position
 - Service Pro mixer circuit breaker defective: replace control center breaker
 - Corrosion on connections prevents flow of current: repair or replace connection
 - Power cable from Service Pro WASP control center to mixer damaged: locate damage and repair
 - Loose wiring connection: check all connections
3. **No electrical power from control center to aerator:**
 - No voltage detected at watertight electrical connector: place circuit breaker in "on" position and press reset button. If no voltage can be read, replace control center insert.
 - Over current condition has tripped circuit protection: push reset button
 - Under current condition has tripped circuit protection: push reset button
 - Service Pro aerator circuit breaker turned "off": turn breaker to "on" position
 - Service Pro aerator circuit breaker defective: replace circuit breaker
 - Corrosion on connections prevents flow of current: repair or replace connection
 - Power cable from Service Pro WASP control center to aerator damaged: locate damage and repair
 - Loose wiring connection: check all connections
4. **Mixer will not start:**
 - Over current alarm in Service Pro WASP control center activated: push reset button
 - Loss of power to Service Pro WASP control center: see both "No electrical power" sections
 - Insufficient voltage present at mixer: report condition to power company
 - Watertight electrical connector not properly engaged: remove watertight electrical connector and plug in tightly
 - Watertight electrical connector not properly wired: rewire watertight electrical connector
 - Defective motor: return entire mixer to factory

5. **Aerator will not start:**

- Over current alarm in Service Pro WASP control center activated: push reset button
- Loss of power to Service Pro WASP control center: see both "No electrical power" sections
- Insufficient voltage present at aerator: report condition to power company
- Watertight electrical connector not properly engaged: remove watertight electrical connector and plug in tightly
- Watertight electrical connector not properly wired: rewire watertight electrical connector
- Defective motor: return entire aerator to factory

Singulair HK Green System Flooded

1. **Tank outlet plugged:** clean debris from tank outlet
2. **Groundwater relief point restricted:** remove obstruction
3. **Disposal field plugged:** notify owner immediately
4. **Effluent pump failure:** repair or replace effluent pump
5. **Surface water drains toward Singulair HK Green tank:** have contractor regrade and/or install risers
6. **Outlet line installed with insufficient fall:** have contractor correct
7. **Outlet line crushed or filled with debris:** have contractor clean or replace
8. **Effluent disposal lines have insufficient fall or settled:** have contractor correct or replace

Sampling

Proper sampling techniques are important to ensure that the results are representative of system performance. To ensure an accurate sample is collected, Norweco recommends that a sample port be installed immediately downstream of the treatment system. The sample ports should allow a free falling sample to be collected. Sample ports should be cleaned before attempting to collect a sample.

If a sample port has not been provided, effluent from the Bio-Film Reactor should be evaluated by collecting a sample from inside the outlet tee installed in the Bio-Film Reactor. The sample should be collected from 2-3" below the liquid surface to avoid collection of any floating solids that could interfere with results.

If an influent sample is required, the influent sample should be collected from the pretreatment chamber.