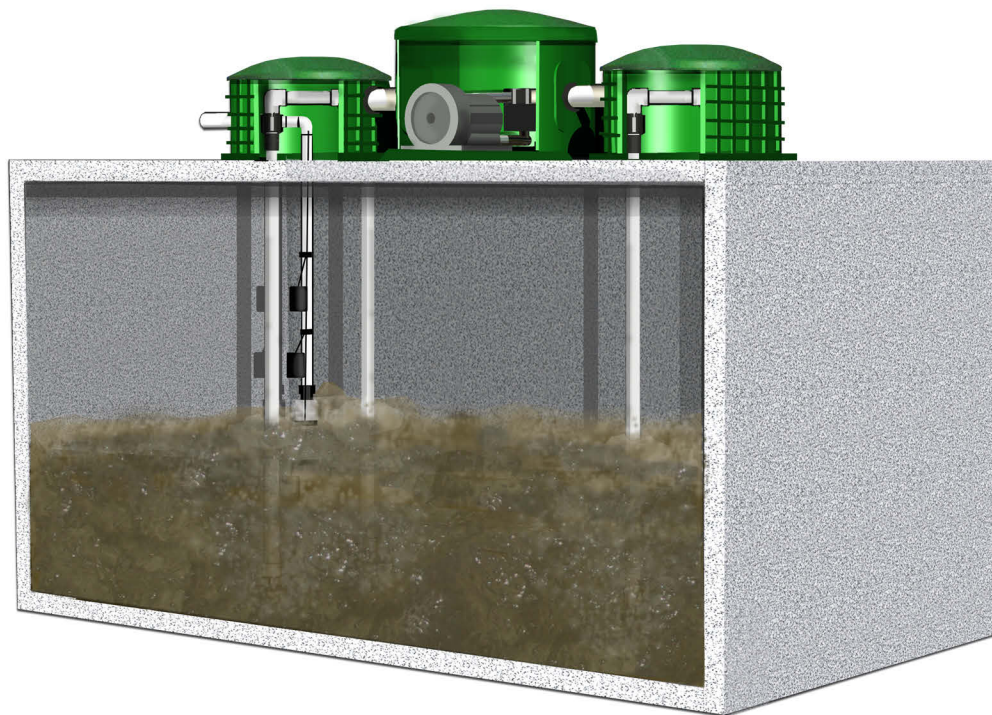




OPERATION AND MAINTENANCE AND TROUBLESHOOTING GUIDE

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I. BASIC OPERATION AND MAINTENANCE REQUIREMENTS

The following is a description of the normal maintenance required to insure continuous satisfactory operation of the **SYBR-AER** Advanced Wastewater Treatment:

START UP:

Allow 6-8 weeks for sufficient numbers of bacteria to develop in the **SYBR-AER** in order to provide proper treatment of the wastewater.

PUMPING EXCESS SOLIDS:

Due to the normal accumulation of inorganic solids and dead bacterial cells it is necessary to pump out the excess solids periodically in order to maintain adequate aeration capacity. For a typical single family residence, the **SYBR-AER** will require pumping at 2-4 year intervals. **SYBR-AER** representatives should advise customers when the **SYBR-AER** should be pumped. On heavily used systems or residences with garbage disposals, pumping frequencies may be increased.

* NOTE: Pumping should be based upon a settleable solids test and is site specific.

BLOWER REPLACEMENT:

The normal life expectancy of the blower is 3-5 years. For all new installations, there is a two-year warranty on the blower. For replacement blowers, there is a two year warranty period. Blowers can also be repaired and/or rebuilt onsite.

ALARM:

The **SYBR-AER** alarm system indicates both loss of air and high water conditions. To prevent unnecessary maintenance costs, the homeowner should contact the service representative as soon as the alarm is activated or unusual odors are noticed.

SERVICE CONTRACT:

The **SYBR-AER** system requires periodic servicing to prevent major operational difficulties. With the purchase of each **SYBR-AER**, the owner receives a two-year service contract that provides warranty on all parts and service, including a minimum of two inspections of the unit each year. After the initial two years of operation, the homeowner is urged to maintain a service contract to insure regular inspection and service of the **SYBR-AER** system.

REPLACEMENT PARTS/SERVICE:

Contact the factory for the name of the closest sales/service representative.

SUMMARY OF RESIDENTIAL MAINTENANCE REQUIREMENTS

Start up period.....6-8 weeks after sewage first enters unit

Pumping frequency.....2-4 years

Compressor service/ replacement.....3-5 years

Routine inspection frequency.....every 6 months or as required by state/local regulatory authorities

NOTE: Due to differences in raw wastewater strength, increased user abuse and hydraulic surges, additional pre-treatment facilities and/or increased maintenance may be required on non-residential or commercial facilities. Please check with your **SYBR-AER** representative.

II. EQUIPMENT AND MATERIAL ESSENTIAL FOR SERVICING THE SYBR-AER SYSTEM

Pliers - standard with insulated handles

Wiping rags

Pliers - channel lock

Sample collection jars (quart size)

Caulking gun

Volt ohm amp meter

Caulking, silicone

#2 Square-head screwdriver bit

Hammer

Electrical tape

Wire nuts

Knife

Screwdriver

Replacement parts:

Blower Quick disconnect fittings

Diffusers Air filter for the blower

Floats Alarm parts

Pump

III. PROCEDURES FOR ROUTINE INSPECTION AND MAINTENANCE

The **SYBR-AER** system requires routine, periodic inspection and maintenance to insure continuous, trouble-free operation. At a minimum, the **SYBR-AER** should be inspected every six (6) months, assuming it is serving a typical single family residence. More frequent inspections may be required if mandated by local or stated regulatory authorities; or, if the **SYBR-AER** is used on a non-residential application.

During the routine inspections, the following items are checked:

Blower

1. Check filter for cleanliness. Clean or replace if the filter is dirty
2. Check housing and airline fittings for signs of overheating.
3. Check for air leakage at fittings and air supply line.
4. Check for excessive noise or vibration.
5. Check for moisture or mud accumulations, which could indicate possible water infiltration.

ALARM

1. Check "test" button to insure proper operation.
2. Check alarm function by raising floats in tank.
3. Check alarm function by shutting off the blower breaker.

TREATMENT PLANT

1. Check for presence of septic odor.
2. Check for color of the mixed liquor.
3. Check for excessive sudsing or foaming.
4. Check for excessive accumulation of grease and non-biodegradable material. Using a wire skimmer basket, remove such material and dispose of it in a proper manner.
5. Check air supply at aeration chamber, especially if odors or septic conditions exist. Air check can be performed by observing amount of turbulence; or, by using an air flow meter. If necessary, check diffuser for clogging.
6. Check the tank for solids (MLSS) by collecting a sample of the tank contents while compressor is running. Observe rate of settling, volume of settled solids and clarity of supernatant.

MISCELLANEOUS ITEMS TO BE CHECKED

1. Check access cover to insure that it is properly fastened.
2. Check all peripheral equipment such as chlorinators, dosing pumps, etc.
3. Check effluent disposal system.

LABORATORY OR FIELD TESTS

Normally, laboratory testing is not required for the routine operation and maintenance of the **SYBR-AER** system. Occasionally testing may be necessary to identify the source of an operational problem or to satisfy the requirements of the state or local regulatory agency.

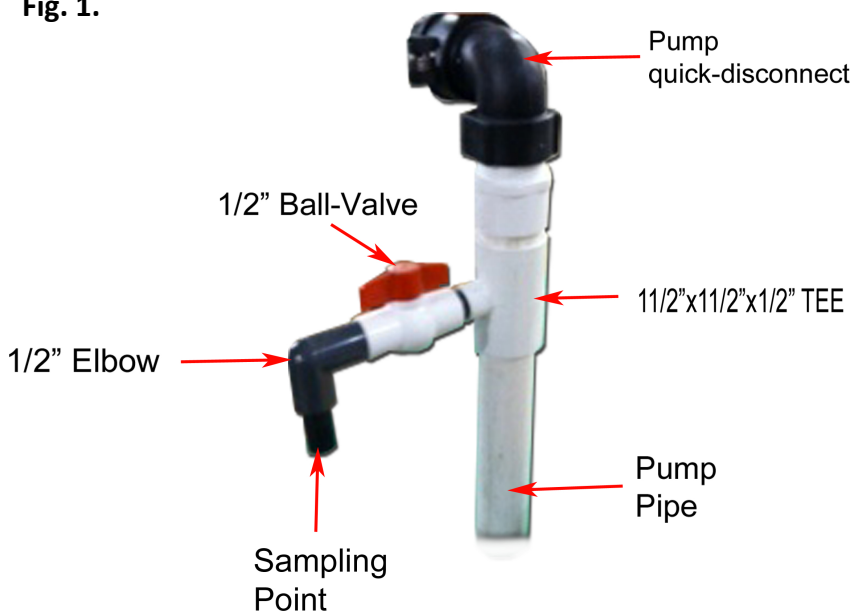
SAMPLE COLLECTION

The **SYBR-AER**, when properly sized and maintained, will produce an effluent exceeding the performance requirements of NSF Standard 40 (Class I) for aerobic treatment plants: 30 day average of <25 mg/l CBOD and <30 mg/l TSS.

To collect sample from the **SYBR-AER**, care must be taken to get a reliable and uncontaminated sample of the **effluent that is being discharged from the plant at the time of the sampling**. To accomplish this, the following steps must be taken:

1. Install a 1 1/2" x 1 1/2" x 1/2" Tee in the pump line inside the tank just below the quick release elbow. Glue a 1 1/2" inch long 1/2" nipple into the tee, glue a 1/2" ball-valve onto the nipple followed by another 1 1/2" inch long 1/2" nipple and a 1/2" elbow facing down into the tank followed by another 2 inch long 1/2" nipple. This completes the sampling spicket. See Fig. 1
2. Samples must be taken during the pump out cycle after the unit has completed its settling cycle.

Fig. 1.



Sampling Tips

Here are some guidelines to remember when samples are collected. The guidelines are intended to be used in conjunction with *Standard Methods* and or specific instructions provided by the certified testing laboratory:

- ◆ Understand and follow all applicable OSHA and safety standards. Wear protective gear, including gloves and eye protection. Keep hands below shoulders. Disinfect after sampling.
- ◆ Calibrate instruments. Different approaches can be used to take measurements. Be sure that electronic instruments are properly calibrated. Chemicals should be “fresh” and appropriate for the measurements to be undertaken.
- ◆ Collect samples from cleared, piping or appurtenances. Remove items that may have been deposited and do not reflect the sample to be collected.
- ◆ Allow piping to drain for at least 30 seconds before collecting a sample. Draining piping should flush extraneous items and reflect effluent as it is discharged from the system.
- ◆ Collect only free-flowing samples.
- ◆ Sterilize piping and appurtenances before collecting fecal coliform or *E. Coli* samples. Bacterial samples are the most sensitive of all samples. Extreme care must be exercised in collecting bacterial samples as contamination can easily occur.
- ◆ Maintain a flow of 5 gpm or less when collecting samples. Typical wastewater flow will be 5 gpm or less; higher flows can unintentionally affect results by dislodging otherwise settled solids, short-circuiting flow paths, and/or depressing D.O. levels.
- ◆ Do not stir tanks containing settled solids. Tanks are designed to capture and retain solids. Stirred wastewater will not reflect the operation of the system.
- ◆ Collect samples and take measurements at or in proximity to treatment. Some systems may be spread apart or contain remote components. Contamination may occur between treatment tanks. While non-compliant results may indicate a need for repairs or maintenance, practical systems cannot be sealed against vermin, insects, and small animals that can pass through meshes or chew their way through gaskets and other soft parts.
- ◆ Keep notes related to sampling events and note items that may have a bearing on the results.

IV. MAINTENANCE PROCEDURES: Pumping (wasting) sludge

Bacteria and other microorganisms present in the wastewater utilize the soluble organic material as a food source, converting it into a non-soluble mass. This non-soluble mass or floc is comprised of living microorganisms, sewage particles, as well as inert (non-biodegradable) material. As the process matures, the numbers of micro-organisms increase until there is an adequate biomass to metabolize or digest all of the soluble organic material in the incoming sewage. At this point, competition for food results in the dying (due to starvation) of organisms as new organisms are formed. These dying organisms, in turn are metabolized, thereby reducing the overall sludge volume.

The volume of solids will gradually increase due to the accumulation of the inert remains of dead organisms (ash), combined with the non-degradable material in the raw wastewater. As the solids increase, the mixed liquor (i.e., contents of the tank) becomes thicker, developing an increasing darker brown color. Periodically, the excess solids must be pumped (wasted) from the **SYBR-AER** in order to insure continued plant efficiency.

PUMPING FREQUENCY

The rate at which the solids (biomass) accumulates in the **SYBR-AER**, and the subsequent rate at which the excess solids must be pumped out, is dependent upon the total volume and strength (i.e., BOD) of the wastewater entering the plant. The typical residential system will need to be pumped every 2-3 years. Commercial systems or systems that receive close to their design loading may need to be pumped every 1-2 years. Conversely, weekend cottages or systems serving only 1 or 2 people may go 4-5 years or longer.

DETERMINING PUMPING FREQUENCY

In order to insure optimum treatment efficiency and effluent quality, it is necessary to maintain the level of aeration solids (MLSS) within a suitable range.

A low level of solids in the tank (i.e., during the plant start-up) reduces the treatment plant's ability to provide adequate treatment during peak operating periods. Excessive solids, on the other hand, may result in poor settling during periods of hydraulic surges; or, in the development of septic conditions in the plant. In order to determine when the **SYBR-AER** system should be pumped it is necessary to perform a settleable solids test (30-minute) during each semi-annual service check:

Procedure:

1. Mark a quart jar into 10 equal portions
2. While the Blower is running, fill the jar with the liquid (MLSS) from the tank. This sample should be collected at mid-depth in the tank.
3. Allow the sample to sit for 30 minutes. If the sample settles slowly, allow it to sit for 24 hours in order to ensure complete settling.
4. Measure the volume of settled sludge as a percentage of the total volume of the sample. Occasionally, after the sample sits, a portion of the settled sludge may float to the top of the sample. If this occurs, add together the volume of settled sludge and the volume of floating sludge.
5. The optimum level of settleable solids is normally between 5-50%. Whenever the sludge volume exceeds 50% the plant should be pumped.

PROCEDURE FOR PUMPING THE SYBR-AER

1. Turn off the blower and allow to settle.
2. Remove 24" access covers.
3. Pump solids from the bottom of the tank.
4. **In areas with a high-water table, immediately re-fill the tank with clear water to prevent shifting or floatation.**

SLUDGE CHARACTERISTICS

It is important to observe the MLSS (mixed liquor suspended solids) sample that is collected from the tank. As the sample settles you should note the following:

1. What is the color of the sludge?
2. Do the sludge particles clump together in a dense floc, which settles rapidly?
3. Is the liquid above the settled sludge (supernatant) clear?
4. Does the sample have a noticeable odor?

A good healthy sludge should have a chocolate brown color. It should form a dense floc that settles rapidly leaving a clear, odorless supernatant. A sludge sample that has a grey/black color, settles slowly, has a cloudy supernatant, or has a supernatant containing very fine, suspended particles, usually indicates poor treatment plant operation.

BLOWER REPLACEMENT

Procedure:

1. Turn off electricity
2. Remove the three wire nuts and disconnect the blower cord from the main power cable.
3. Loosen the 1 1/2" rubber connectors and slide over the PVC airline.
4. Loosen and remove the air filter assembly
5. Unbolt the mounting hardware.
6. Lift out the blower and remove the iron fittings.
7. Change the blower and follow the above procedures in reverse.

Alarm Replacement

Procedure:

1. Turn off the electricity
2. Disconnect the main power supply and remove.
3. Loosen the terminal strips and remove the individual component wires
4. Remove the mounting hardware and disconnect the old panel.
5. Install the new control panel.
6. Reinstall the individual component wires into their respective terminals.
7. Reinstall the main power supply.
8. Test the new control panel.

Pump Replacement**Procedure:**

1. Turn off the electricity.
2. Remove the wire nuts and disconnect the pump electrical cord from the main power cable.
3. Disconnect the quick release coupling and grasp the pump pipe and raise the pump up out of the tank.
4. Loosen and remove the pump pipe.
5. Change the pump and replace in the tank by following the above procedures in reverse

Float Replacement**Procedure:**

1. Turn off the electricity
2. Remove the wire nuts and disconnect the float from the main power cable.
3. Change the float and re-wire nut to the main power cable.

Diffuser Replacement**Procedure:**

1. Turn off blower.
2. Disconnect the airline quick-release coupling.
3. Lift the airline drop leg out of the tank.
4. Unscrew the diffuser and replace with a new one
5. Lower the airline drop leg back into the tank and reconnect to the manifold.

*Replacement parts can be purchased through SBR Wastewater Technologies Inc.

Troubleshooting Guide			
Problem	Possible Causes	What to Do	Notes
Power out at SYBR-AER Control Panel	(1) Tripped circuit breaker in main panel inside building	Check circuit breaker. Reset if tripped. If the breaker stays on, proceed to step 2 below. If the breaker continues to trip, immediately call the nearest SYBR-AER service representative.	
Alarm Sounds	(2) Tripped circuit breaker in SYBR-AER control panel	Reset tripped breaker(s). If the breakers stay on proceed to step 3 below. If breaker continues to trip, check for clogged blower air filter (replace if clogged). If problem persists, immediately call the nearest SYBR-AER service representative.	IMPORTANT: The blower automatically stops when the EPC float rises and the high water alarm is activated. (wastewater treatment ceases) and the settling cycle begins. Pump out occurs 1 hour after the blower stops.
	(3) Excessive water use	Stop water use. Wait for pump out cycle to complete. Switch alarm back on. If the alarm immediately sounds again, call an authorized SYBR-AER service representative. If not, resume normal use.	Look inside the treatment tank for high water level (usually caused by excess water usage) at the time of the alarm. Look again after the pump out cycle to see if the water level has gone down as usual. If not there is a problem in the pump out system.
	(4) Pump failure, clogged pump, clogged discharge lines.	Call an authorized SYBR-AER service representative for troubleshooting.	If a problem with the pump or discharge lines has caused a high water condition, the condition may persist after the normal pump out period has passed.
	(5) Power failure during pump out cycle.	Stop water use. Wait for next pump out cycle to complete. Switch alarm back on. If alarm does not sound, resume normal use. If alarm sounds, call an authorized SYBR-AER service representative.	If it is not practical to wait until the next pump out cycle completes before resuming use, call an authorized SYBR-AER service representative for assistance.
	(6) Leaking tank (taking in rainwater or groundwater)	If the alarm sounds only during times of rainfall, the tank may be leaking. Check for high water in the tank. If this problem is suspected, call an authorized SYBR-AER service representative for assistance.	As with other high water alarm situations, water use should be stopped until the next pump out cycle has completed.
Flooding	Any one or more of items 1-6 above	Stop water use. Check possible causes 1-6 above and perform associated troubleshooting steps. If problem is identified, take prescribed action above. If problem isn't identified immediately call an authorized SYBR-AER service representative for assistance.	The alarm should have sounded before flooding occurred. If it didn't sound, it has either been switched off or isn't working properly.
Foaming & Scumming	Excessive detergent or bleach use.	Reduce amount of detergent used. If problem persists, call an authorized SYBR-AER service representative for assistance.	White billowy foam is caused by high concentrations of surfactants such as detergents and bleach. Dark brown, thick, scummy foam indicate old sludge (need to pump out tank). Slimy foam may indicate nutrient deficiencies.
Lights off on control panel	(1) System is in settling or pump out cycle (2) No power to the SYBR-AER Control Panel (3) Burned out light bulbs	Determine if lights are supposed to be off (see note at right). If there is problem, make sure power is on to control panel (check breakers in control panel in building). Check light bulbs. Replace burned out bulbs.	When operating normally, the "run" light is off during the settling and pump out cycles. The alarm light is normally always off. The power light should always be on.

Service Policy

During your initial two-year warranty, an authorized service representative will inspect your unit at six-month intervals and make necessary adjustments to the system. The only exception is for the replacement of “out of warranty” and “physically abused” parts or abuse to the treatment and dispersal components and devices, such as pre-tanks, drain fields, pump station, and the like.

In the event a problem arises or service is required, refer to the unit’s data plate (located on the alarm and access lid) or the service label for instructions on contacting your closest service provider. Occasional pumping is required, due to the accumulation of solids. The pumping cost may not be covered under your maintenance and service program. If you need parts or service, please contact the factory for the name of the service provider nearest you. The owner shall be notified in writing by the service provider about improper system operations that cannot be remedied at the time of the inspection

Before the initial two-year warranty expires, your service provider will notify you in writing, that an extended service agreement may be purchased. This extended service agreement will have terms, conditions, and limitations comparable to the initial agreement. If the service provider does not provide extended service agreements, the service provider will refer you to an authorized service provider who provides extended service agreements. You may also contact the factory for assistance in locating an authorized service provider.

Items not covered under warranty that will generate service charges for your residential SYBR-AER wastewater treatment equipment.

1. Use of unauthorized component parts in your SYBR-AER unit.
2. Repairs made by other than factory trained and authorized personnel.
3. Failure to maintain proper electric power to the SYBR-AER unit.
4. High water alarms due to clear water discharges including, but not limited to, backwash from water treatment systems, water softeners, swimming pools, footing drain sump pumps, down spouts, hot tubs, dehumidifiers, air conditioners, and leaking plumbing fixtures.
5. Discharge into the SYBR-AER unit of non-biodegradable materials such as paints, grease, or any other materials that are toxic.
6. Emergency service calls for alarms due to items 1 thru 5 above in addition to the following:
 - a. Water usage that exceeds the total daily flow for which your aerobic plant is rated
 - b. The septic system becoming flooded during periods of heavy rainfall.

Listed above are some of the most common items that are not covered by warranty. Specific items not herein listed. Also, please note that the warranty covers parts only. Labor will be billed at the rate in effect at time of service.

Permit# _____

SYBR-AER

SERVICE/INSPECTION FORM

Name of Owner: _____ Serial Number: _____

Name of Resident (if different than owner): _____

Address: _____

City: _____ County: _____ State: _____ Zip: _____

Phone: (home) _____ (business) _____

☐ Residential ☐ Commercial ☐ Warranty ☐ Service Contract

REASON FOR SERVICE CALL: ☐ Routine ☐ Owner Request ☐ Complaint

☐ Alarm Activated ☐ Sewer Back-up

☐ Septic Odor ☐ Poor Effluent Quality

☐ High Water Level ☐ Other: _____

Date Service Requested: _____

INSPECTION RESULTS:

I. Checked ALARM ☐ YES ☐ NO

☐ Alarm Working Properly ☐ Faulty Alarm

II. Checked Blower ☐ YES ☐ NO

☐ Blower Working Properly

☐ Blower Not Running ☐ Air Leakage @ _____

☐ Insufficient Air Pressure: _____psi ☐ Blower is Noisy

☐ External Filter Dirty ☐ Blower is Overheating

III. AERATION CHAMBER

☐ Brown ☐ Clear ☐ Grey/Black (Septic)

☐ White Suds ☐ Thick, Brown Foam ☐ Grease Balls

% Settled Solids = _____

Odor: ☐ None ☐ Slight ☐ Septic

Scum Layer = ☐ 0" - 2" ☐ 2" - 4" ☐ 4" - 6" ☐ > 6"

Effluent Quality = ☐ Clear ☐ Turbid ☐ Septic, Grey

V. Other Observations: _____

SERVICE OR REPAIR PERFORMED: Date Performed: _____

☐ Pumped SYBR-AER

☐ Removed Scum/ Grease Balls

☐ Repaired/Replaced Alarm Warranty: ☐ YES ☐ NO

☐ Repaired/Replaced Blower Warranty: ☐ YES ☐ NO

☐ Peripheral Equipment (i.e. Pumps, Chlorinator, etc.): _____

☐ Other: (describe) _____

☐ Service Work To Be Performed At A Later Date: _____

☐ Additional Comments: _____

Service Performed By: _____

Signature of Owner Date _____

Signature of Serviceman Date _____

Authorized SYBR-AER Service Representative