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ExtremeSTP™ Sewage Treatment Plant Operation & Maintenance Instructions for Residential XSTP Models

NOTE: Incorporated into and provided with this O&M manual are the Bio-Microbics® Incorporated Owner's Manual and Service Manual. It is the Owner's responsibility to read and follow the instructions in all documents.

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1. Daily Operational Checks

The OWNER must, at least daily, verify that the blower is operating properly and air is bubbling into the system. This is especially important after a power outage. The sound of air bubbling inside the treatment plant (much like the sound of a Jacuzzi®) is an indication that the blower is working properly.

If your blower controller has a timer, the timer may be set so that the blower does not run continuously. In this case you may have to check several times throughout the day to be sure that the blower comes on and off as it should. The best way to keep track of how the timer is set is to keep a log in a place where you will readily see it when checking the system. If you are mechanically and electrically inclined and want to see how the timer is set or change the settings, follow the instructions for doing so in the section on setting or checking the blower timer.

> NOTICE!! It is highly recommended that you take extreme caution in working around this equipment. There is a risk of electrical shock if the proper safety precautions are not followed. Vapors and liquids contained in this system may be harmful, and extreme caution is recommended. It is highly recommended that you wear rubber gloves when servicing this system and wash your hands and any body parts that come in contact with sewage solids or liquids. Beware of splashes, particularly when the blower is operating.

The OWNER must also look for visual alarms, listen for audible alarms, and MUST TAKE APPROPRIATE ACTION if any of the following alarms or conditions occurs:

- The red light on the Bio-Microbics control panel begins flashing and/or the audible alarm sounds.
- The UV lamp beacon illuminates and/or the alarm sounds (if so equipped).
- The high water alarm illuminates and/or sounds (if so equipped).
- A power outage occurs.
- Anything out of the ordinary is noticed about the unit.

If the ExtremeSTP™ is covered under a MAINTENANCE INSPECTION AGREEMENT the OWNER must notify Lifewater Engineering Company, or its designated representative, immediately if any one of the above conditions occurs.

> NOTE: The alarms will not function during an interruption of power, so the lack of a visual or audible alarm does not necessarily mean that all is well with your system. During your daily checks be sure that there is power to the ExtremeSTP™ sewage treatment plant.

NOTE: ExtremeSTP™ sewage treatment plants are designed to operate at temperatures as cold as -60°F providing there is no interruption of electric power. If the electric power to the ExtremeSTP™ is off for any period of time during freezing conditions, it is the OWNER'S responsibility to take immediate appropriate action. Such action must include monitoring the temperatures inside the system and taking whatever action is necessary to prevent freezing of any part of the system. This may include providing power to the unit by means of an auxiliary generator, or otherwise protecting the unit from freezing.

Each day, upon initial walk around of treatment unit, look for anything out of the ordinary including: leaking fittings, broken pipes, visible leaks of the containment vessel, vapor leaks, ice build up, or water overflowing.

For ExtremeSTP™ treatment systems with a surface discharge inspect the discharge area for excessive ice build up. Excessive ice could obstruct the flow of effluent and may indicate that the automatic dosing siphon needs attention. Also inspect the effluent pipeline for dips that could trap water or otherwise restrict the flow of effluent, because these conditions can cause a freeze up.

The automatic dosing siphon normally continues to function properly with no attention, but if it ceases to dose properly a shot of air under the bell will normally restore proper dosing. See the dosing siphon troubleshooting section.

Inspect the discharge area for color and odor of effluent. With a properly operating system you will find that the color of the effluent is clear and there will only be a small amount of suspended particles visible. The color of the effluent will typically be similar to the coloration of the source water. The effluent should be essentially odorless; typically it will have a slight "earthy" odor that is comparable to the smell of a handful of moss or dirt. If the effluent smells of a sewer or septic nature, your treatment plant may not be functioning properly. Please check to make sure that the blower is operating and that you hear the bubbling sound described above.

2. Maintenance Checks at the Beginning & End of Winter

The following maintenance must be performed at the beginning and end of winter (unless otherwise recommended by Lifewater Engineering Company or its designated representative):

2.1. Blower and air-filter maintenance

2.1.1. Remove the blower access cover

2.1.2. Inspect the blower for any loose fasteners or fittings

2.1.3. Remove, clean or replace the fresh air filter

2.1.4. For summer operation (April through September in Alaska), install a plastic bag around the return air filter and insert filter into the return air pipe, make sure that the filter is installed below the blower air intake.

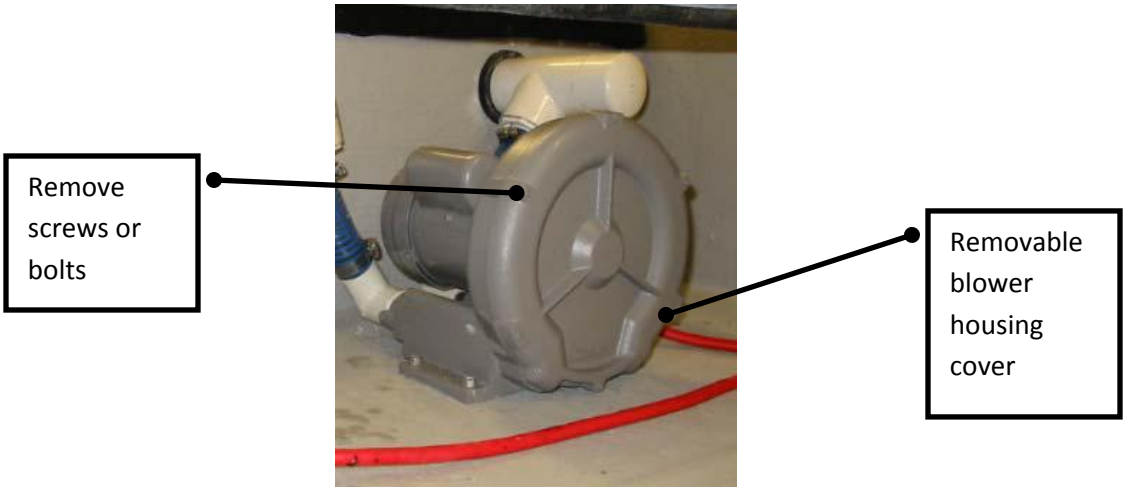
For winter operation (October through April in Alaska) Remove the plastic bag that covers the return air filter and re-insert the return air filter into the return air pipe, make sure that the filter is installed below the blower air intake.

2.1.5. Remove the return air filter and clean or replace it as necessary. A Tuffy® type cleaning pad with a plastic wire tie as a handle is used as a return air filter element.

NOTE: A dark brown/black tar like residue is commonly found on the return air filter. Typically, return air filters are replaced (or sometimes cleaned) before this tar-like residue accumulates to the point where it begins to restrict return air flow.

2.1.6. Shut off all power to the blower and control panel.

2.1.7. Locate the removable portion of the blower housing (the large round part – see picture)



2.1.8. Remove all the screws or bolts that secure the impeller cover to the impeller housing. (See picture)

NOTE: Wear rubber gloves and eye protection for the following cleaning procedure.

2.1.9. Open the blower housing being careful not to cut yourself on the sharp edges. Clean the cover with a suitable cleaner and brush (a kitchen cleaner similar to 409® and an old toothbrush are recommended). Remove accumulations of the brown, tar-like residue.

2.1.10. Clean the inside of the blower housing, especially the area on the bottom of the housing between the inlet and outlet pipes, with the same brush and cleaner. This area must be free of the tar like buildup, as the clearances are very tight. When performing this cleaning under winter conditions, careful use of a heat gun or other heater is recommended.

2.1.11. Clean the impeller blades as necessary with the same cleaner and brush.

2.1.12. Reassemble the blower, and test.

2.1.13. Reinstall the blower access cover

2.2. Setting or checking the blower timer (if so equipped)

2.2.1. Turn off the power to the blower control

2.2.2. Remove the four screws holding the blower control cover (being careful not to drop them)

NOTE: During cold weather you should use a hair dryer or heat gun to carefully warm the wires inside the blower control before bending them back to move the cover out of the way.

2.2.3. Look at the dipswitches inside and compare the dipswitch settings to the chart on the inside of the cover that gives on/off times for each possible dipswitch setting

2.2.4. Adjust the dipswitches if needed

2.2.5. Write down the new timer setting on a log that is kept in a conspicuous place so it's easy to find when performing daily checks

2.2.6. Replace the blower cover and gently tighten the four screws that secure it

2.2.7. Turn the power back on and make sure that the blower operates properly

NOTE: The power to the blower control must be cycled off then on again in order for new dipswitch settings to take effect.

2.3. UV Disinfector maintenance (if so equipped)

NOTICE!! UV light can cause skin and eye damage! Use caution when working around ultra-violet (UV) light. Avoid looking directly at the UV bulb when it is turned on. Briefly look only in the general direction of the UV bulb to determine if it is operating. The power source should be disconnected and extreme caution should be used when servicing the unit.

2.3.1. The UV bulb should be cleaned every three to four months and replaced every one to two years.

2.3.2. Remove the access cover to gain access to the UV bulb

2.3.3. Check to see that the UV bulb is working

2.3.4. Disconnect the power from the UV unit

2.3.5. Disconnect the UV bulb from the power/sensor wire.

2.3.6. Gently lift the UV bulb from its holder and remove it from the disinfector unit.

NOTE: Do not force the UV bulb in any way while removing it or it may break

2.3.7. Clean the UV bulb by carefully wiping it with 409® cleaning solution to remove any residue present on the outside of the bulb. It is common to find some scale buildup and discoloration on the outside of the bulb covering. Scrubbing with a plastic bathroom-type scrubby may be required to remove this buildup.

2.3.8. Gently reinstall the UV bulb into the disinfector unit in the center hole. Pay special attention as you lower the UV bulb into the disinfector unit that the bottom of the bulb rests in the lower bulb-holding fixture of the UV disinfector. The bulb will slide into the receptacle and seat on the rubber stop attached onto the bulb.

NOTE: Do not force the UV bulb in any way while reinstalling it or it may break.

2.3.9. Reconnect the UV bulb to the power/sensor cable

2.3.10. Reconnect the UV unit to the power source.

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2.3.11. Inspect the bulb for proper operation (make sure it lights up).

2.3.12. Place all switches in the run position.

2.3.13. Reinstall the access covers

2.4. Dosing siphon maintenance (if so equipped)

2.4.1. Remove the access cover to the dosing compartment.

2.4.2. Inspect the compartment for any floating debris, or sediment, also inspect the water quality, it should have little to no odor (Odor should smell "earthy") and it should be clear.

NOTE: Some sediment is normal but the presence of any floating debris or more than a small amount of sediment in the dosing compartment may indicate that the sewage treatment plant needs to have solids removed from the pretreatment, intermediate treatment (if so equipped), FAST®, and dosing compartments.

2.4.3. Inspect the overflow float to make sure that it is in place and functions freely.

2.4.4. Re-install the dosing compartment access cover.

2.5. Effluent pump/ high water alarm maintenance (if so equipped)

2.5.1. Remove the blower base to gain access to the effluent pump.

2.5.2. Inspect the compartment for any floating debris or sediment. Also inspect the water quality. It should have little to no odor (if it has any odor the odor should be "earthy") and it should be essentially clear with no more than a trace of suspended solids.

NOTE: Some sediment is normal but the presence of any floating debris or more than a small amount of sediment in the pump compartment may indicate that the sewage treatment plant needs to have solids removed from the pretreatment, intermediate treatment (if so equipped), FAST®, and dosing compartments.

2.5.3. Inspect the float switches (if so equipped). If able, actuate the switches to ensure proper functioning and to ensure that the float switches do not encounter anything that will prohibit their proper operation.

2.5.4. Inspect the slip joint and make sure that the pump slip plate if fully seated.

2.5.5. Depress the "test" switch on the high water alarm and wait until the alarm sounds, then release.

2.5.6. Place all switches in the run position.

2.5.7. Re-install the blower base and take careful consideration to not kink any wires or air lines when re-installing the unit.

2.6. Foam control system maintenance (if so equipped)

The foam control system (FCS) consists of a pump, spray bar assembly, spray nozzle(s), pump mount, and switch. The FCS is installed as a precautionary measure to help control and reduce the amount of foam in the treatment unit. This foam is a natural byproduct of the treatment process, especially during startup and periods when the hydraulic and organic loadings are changing. Lifewater Engineering will recommend operating intervals for the FCS.

2.6.1. To operate the FCS, turn on the appropriate switch below the Bio-Microbics control panel. It is normal to hear the pump and sprayer making some noise.

2.6.2. During the periods when the FCS is operating, a daily visual inspection is recommended to check how the pump and sprayer are functioning. To perform a visual inspection, with the FCS turned on lift the blower housing and riser lid assembly vertically and shift it to the side approximately 4 inches.

2.6.3. Looking down into the riser you should see water spraying out of the spray nozzle.

2.6.4. If so, replace the riser cover and blower assembly.

2.6.5. If not, disconnect the power source and carefully remove the FCS assembly mount and remove the assembly from the treatment unit. Repair or replace it as necessary.

2.6.6. If the pump runs but the nozzle does not spray, the nozzle could be plugged. In this case, remove the pump and sprayer assembly as stated above and clean or replace the nozzle as necessary.

2.6.7. Reinstall the pump and sprayer assembly in the same manner that it was removed.

2.6.8. Test to ensure proper operation, and then reinstall the blower housing and riser lid assembly.

3. Troubleshooting

3.1. When audible alarm begins sounding

With each audible alarm there is a corresponding visual alarm. When you hear an audible alarm, visually determine which alarm light is flashing to identify which system component is in the alarm mode, then proceed to the appropriate subsection below.

3.2. The red light on the Bio-Microbics control panel begins flashing

3.2.1. Listen to see if the blower is operating.

- If not, make sure that the Bio-Microbics blower switch is turned on. After the switch is turned on the alarm will continue to sound and/or flash for 15 seconds.
- If the Bio-Microbics switch is on and the blower is not operating, it may be because the timer is at an “off” portion of its cycle. See the section on the timer, or check the blower a short time later when the timer is scheduled to have it operating.
- If the blower is not operating when it should be, proceed to Section 2.1 for procedures on cleaning the inside of the blower housing.
- If the blower is operating and the alarm still sounds or flashes, call your service representative (there may be a fault in your blower motor control).

3.3. The UV lamp alarm sounding or beacon illuminating

NOTICE!! UV light can cause skin and eye damage! Use caution when working around ultra-violet (UV) light. Avoid looking directly at the UV bulb when it is turned on. Briefly look only in the general direction of the UV bulb to determine if it is operating. The power source should be disconnected and extreme caution should be used when servicing the unit.

3.3.1. Remove the access cover for UV disinfector control panel.

3.3.2. Silence the alarm by pushing the run switch to MUTE.

3.3.3. With power applied to the UV control panel, inspect to see if the UV bulb is operating. You should see a blue glow when looking in the general direction of the area where you access the UV bulb to clean and change it.

- If not, proceed to step 3.4
- If so, contact your service representative

3.3.4. Disconnect the power to the UV control panel.

3.3.5. Inspect the connection of the power/sensor cable to the UV light bulb. Ensure that the bulb is plugged in. Check for any corrosion in the connector body and if present scrape or sand it out.

3.3.6. Clean the photo-eye that is in the upper UV bulb holding fixture.

3.3.7. Reinstall the UV bulb.

3.3.8. Reconnect power to the UV control panel and place the switch in the RUN position.

3.3.9. Inspect to see if the bulb glows and the visual and audible indicators stop.

NOTICE!! UV light can cause skin and eye damage! Use caution when working around ultra-violet (UV) light. Avoid looking directly at the UV bulb when it is turned on. The power source should be disconnected and extreme caution should be used when servicing the unit.

3.3.10. If the visual and audible indicators are still present, replace the bulb with a new one. Contact your service representative for replacement parts.

3.4. High water alarm sounding or beacon illuminating

3.4.1. Activate the silent/mute position on the alarm panel.

3.4.2. Check the electrical circuits for the effluent pump to see if the breakers have been tripped. If so, reset.

3.4.3. If the effluent pump begins pumping, you have achieved your objective. Monitor to see if the problem reoccurs.

3.4.4. If the effluent pump still does not work, remove the access cover to the effluent chamber.

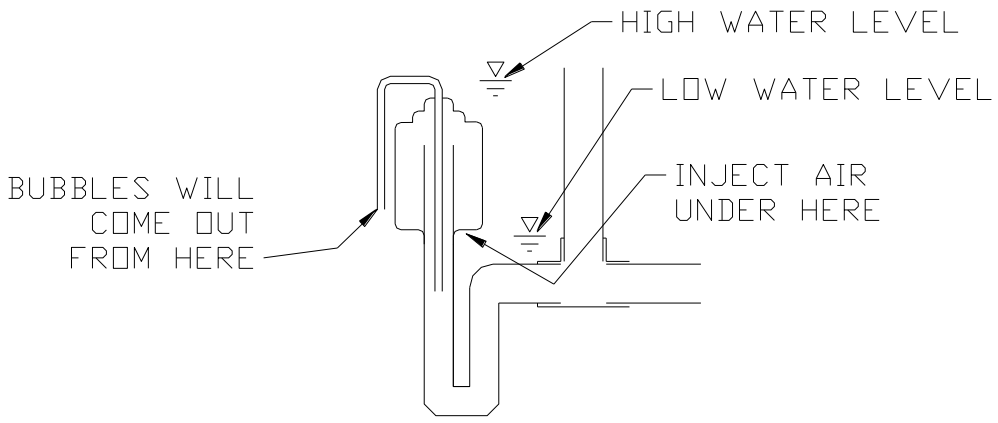
3.4.5. If the water level is high in the effluent chamber, see the appropriate section under Heavy Maintenance.

3.5. Dosing siphon not functioning

3.5.1. Inspect the effluent line to ensure that it has no “dips” in the line.

3.5.2. If the effluent line has dips in it, adjust it so that it slopes uniformly away from the treatment unit

3.5.3. Open the access cover on the dosing siphon compartment. Look for the “bell” of the dosing siphon. This is a large round black object with concentric circles that form “steps” on its top. There will also be a U-shaped piece of PVC pipe exiting the top of the bell (see diagram below).



AUTOMATIC DOSING SIPHON CROSS-SECTION

3.5.4. Using a piece of hose or small diameter pipe and a squeeze bulb (or some other method) bubble air under the bell until it is full of air and you see it begin to bubble up inside the dosing compartment from underneath the bell.

3.5.5. You have now re-primed the dosing siphon and it will either trigger a dosing cycle or it will begin to build up enough water to trigger a cycle later.

4. Heavy Maintenance

4.1. Effluent pump removal and reinstallation

4.1.1. Disconnect the electrical source before servicing.

4.1.2. Remove the blower base to access the effluent pump compartment.

4.1.3. Pump out the excess effluent so that the water level is at a workable height.

4.1.4. Remove the pump slip plate by grasping the provided handle, disconnect electrical wiring (paying special attention to the location of the float switches), and remove the pump.

4.1.5. Replace or repair the pump as necessary.

4.1.6. Reinstall the pump in reverse order of removal paying special attention to the location of the float switches.

4.1.7. Reinstall the access cover.

4.2. Blower removal and reinstallation

4.2.1. Disconnect the electrical source before servicing.

4.2.2. Remove the access cover to the blower compartment.

4.2.3. Disconnect the airlines to and from the blower.

4.2.4. Remove the blower mounting hardware.

4.2.5. Disconnect the electrical connection to the blower.

4.2.6. Remove the blower and repair or replace as necessary.

4.2.7. Reinstall the blower in the reverse order paying special attention to the electrical connections.

5. Replacement Parts

5.1. UV Bulb

Follow the operation and maintenance instructions for cleaning the UV bulb every 3 to 4 months. Replacement UV bulbs are available from Lifewater Engineering Company or directly from the manufacturer:

UV "The Disinfector", Inc.	1-877-770-1500
P.O. Box 203	www.onsitewtc.com
Puyallup, WA 98371	onsitewtc@aol.com

5.2. Return Air Filter Element

Tuffy® cleaning pads are used as return air filter elements. Typically, a handle consisting of a plastic wire tie is placed on the cleaning pad to facilitate its removal. Replacement cleaning pads with wire ties are available from Lifewater Engineering Company, or you may purchase cleaning pads at your local supermarket or convenience store. Please use only plastic Tuffy® pads exactly like the original ones used in your system because these have large openings for air passage.

5.3. Fresh Air Filter Element

Fresh air filter elements can normally be cleaned and reused. If needed, a replacement fresh air filter element is available from Lifewater Engineering Company.

5.4. Blower

Follow the operation and maintenance instructions for cleaning the blower housing every 3 to 4 months. If needed, a replacement blower is available from Lifewater Engineering Company.