

# AdvanTex® O&M MANUAL

PART 1: START-UP AND ROUTINE MAINTENANCE



## Part 1: Start-Up and Routine Maintenance of AdvanTex® Residential Wastewater Treatment Systems

RESIDENTIAL  
**O&M**  
MANUAL

**Orenco®**

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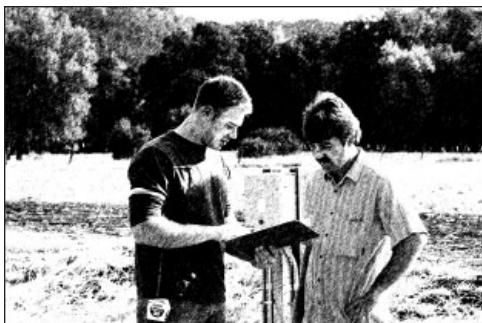
[www.orenco.com](http://www.orenco.com)

[www.vericomm.net](http://www.vericomm.net)

## Introduction

As a trained AdvanTex Service Provider, you play a crucial role in Orenco's AdvanTex Program.

Orenco has always advocated regular, professional servicing of all onsite systems ... not just during the warranty period but for the life of the system. Regular servicing optimizes the treatment process and protects the property owner's investment. It also ensures that onsite systems protect public health, protect the environment, and are viewed as a reliable, sustainable technology.



Orenco relies on you to perform the AdvanTex system start-up, do routine (scheduled) maintenance, and respond to calls for unscheduled maintenance (alarm calls). We also rely on you to keep in contact with the homeowners or property owners, review the *Homeowner's Manual* with them, advise them on preventive maintenance, and work to keep the system under a continuous service contract. Equally important, we rely on you to keep good service records on the system, creating a "history" of its performance.

To make your job easier, Orenco has created one of the most service-friendly and trouble-free onsite systems on the market. Then we paired that system with a remote telemetry control panel, to allow you to "view" the system right from your computer.\* And we've provided a Web-based business tool — [advantextservice.com](http://advantextservice.com) — to help you file and retrieve system data automatically, schedule service events, and manage service technicians.

Finally, we've provided classroom and field training, as well as support materials, like this O&M Manual. Please read this manual thoroughly, for up-to-date information on the best practices for system start-up and routine maintenance. You can find information about troubleshooting in Part 2 of our O&M Manual: *Advanced Service Tips and Troubleshooting Guide*.



We're very proud of our AdvanTex Treatment System. Like all our products, it has gone through extensive research, development, and field-testing. Then each component is built to written specifications and subjected to quality review, before shipping. In addition, our AXN models meet the requirements of NSF-ANSI Standard 40 for Class I Systems. If any component of this system does not meet your expectations, please call your authorized AdvanTex Dealer.

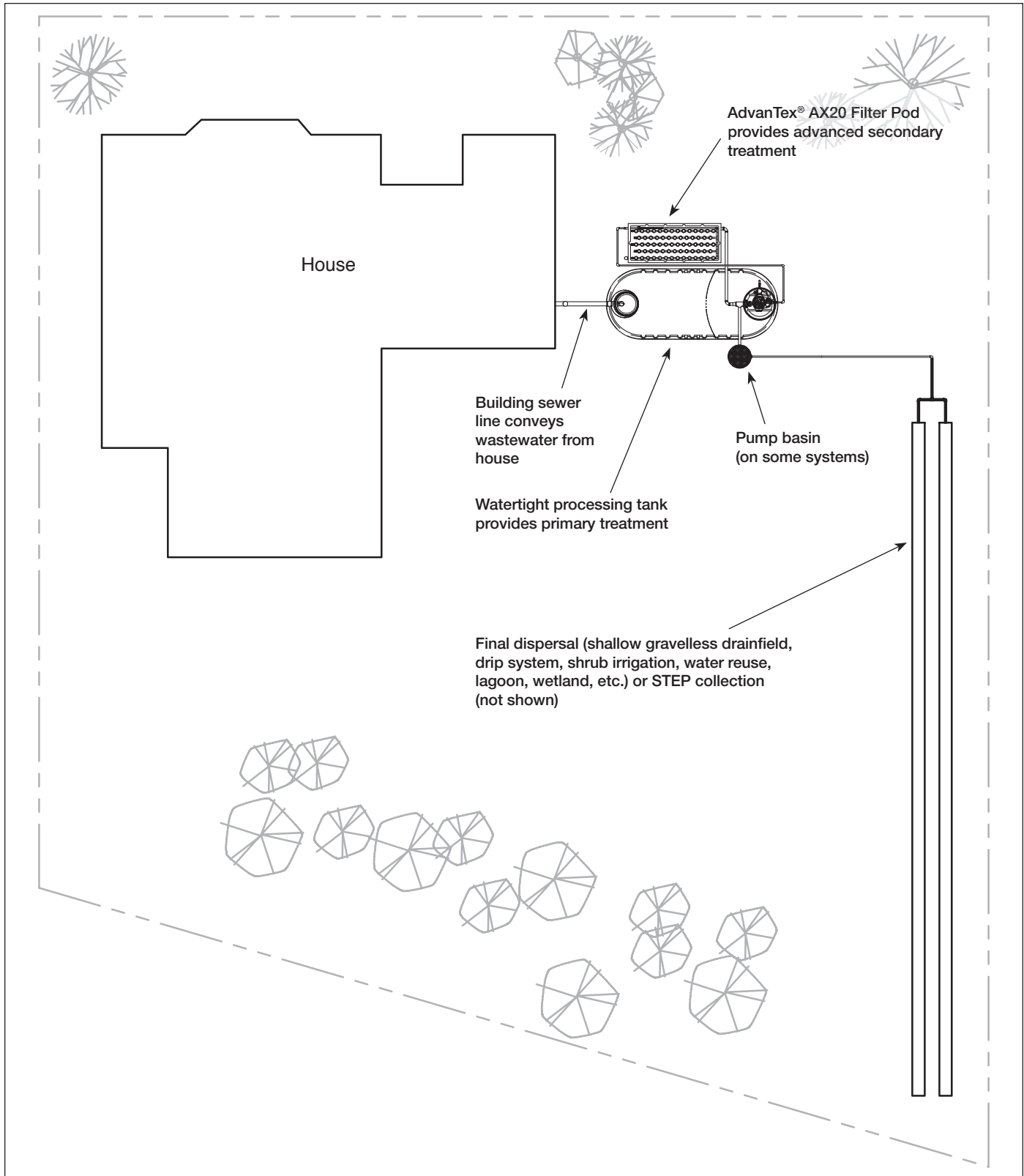
Thank you, in advance, for your knowledge, your conscientiousness, and your good work.

\* Orenco® MVP control panels are available in some markets. For more information, contact your Dealer or Orenco

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## Typical Site Plan for an AdvanTex Treatment System



## How the AdvanTex Treatment System Works

The AdvanTex Treatment System consists of a watertight processing tank and the AX20 textile filter pod. Wastewater from the home flows to the tank, where natural biological and physical processes provide primary treatment. In the primary chamber of the tank, the wastewater separates into three layers: a floating scum layer, a bottom sludge layer, and a relatively clear layer of liquid effluent in the middle.

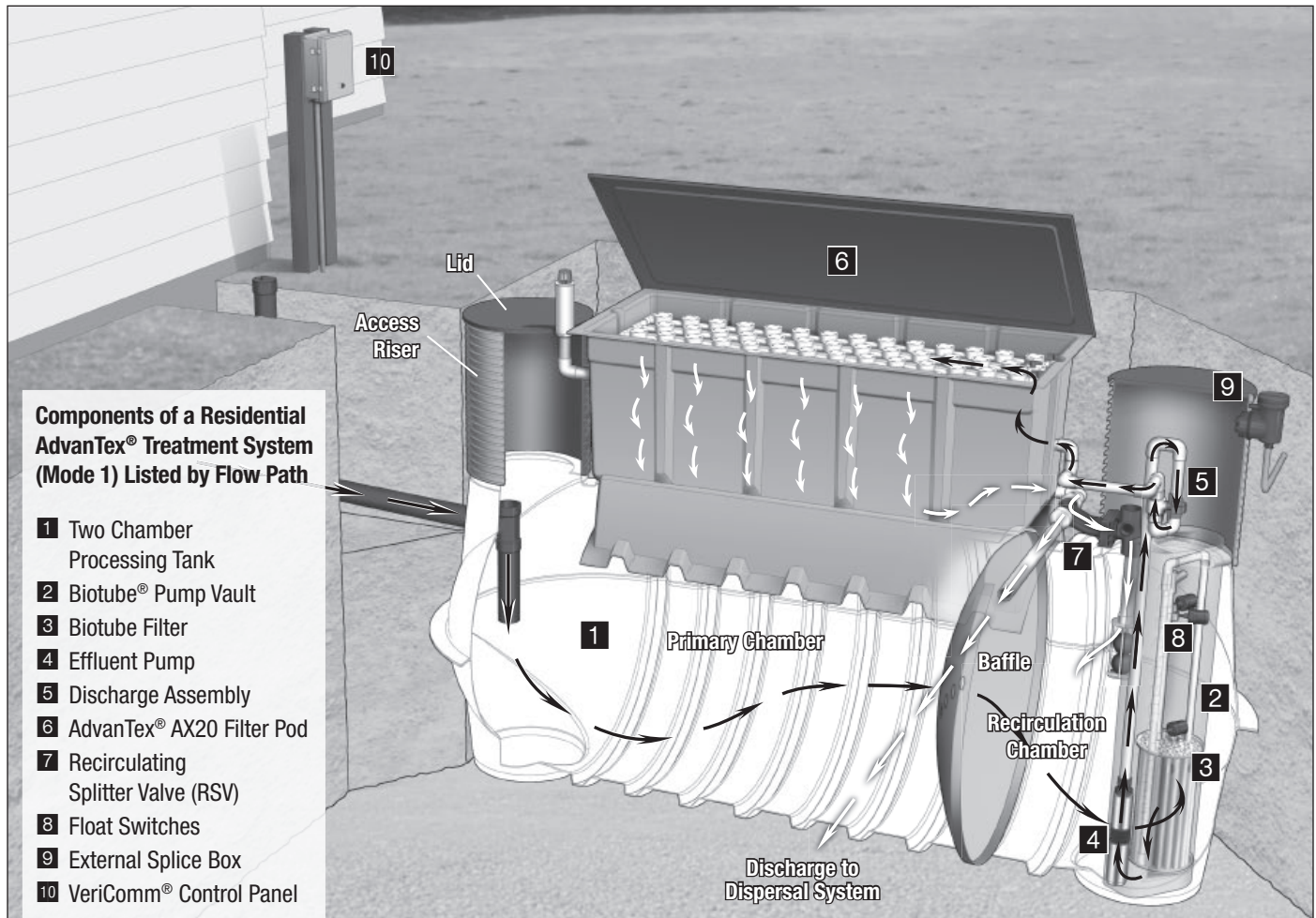
From the secondary chamber, a pump draws liquid effluent through the Biotube® filter and sends it to the AX20 pod. There, the effluent is sprayed over hanging sheets of porous synthetic textile media. Microorganisms live in this moist, oxygen-rich (aerobic) environment. As effluent trickles over and through the sheets, the microorganisms remove impurities from it.

Effluent recirculates between the tank and the AX20 pod. In Mode 1, the most common configuration, the effluent recirculates to the second compartment of the tank. In Mode 3, effluent recirculates to the first compartment. This mode is used where maximum removal of

nitrogen from the effluent is required.

After recirculating several times, the effluent is discharged, either directly from the processing tank or after first being collected in a pump basin. Depending on the design for a particular site, the treated effluent may be discharged to a drainfield, an underground drip irrigation system, a constructed wetland, an effluent sewer (STEP) system, or a reuse system. The system may include equipment for ultraviolet (UV) disinfection before ultimate dispersal of the effluent.

Properly sited, installed, and operated, a Residential AdvanTex Treatment System can treat wastewater to 10 mg/L BOD and 10 mg/L TSS. This level of treatment is better than what municipal wastewater plants provide. The system can also be configured to reduce nitrogen levels as required locally. When effluent treated in this way is dispersed to the soil, natural processes purify it further, and it eventually returns to the underlying water table, where it can be used again.



## Equipment List

Routine maintenance and troubleshooting requires a variety of tools, equipment, and spare parts. We recommend that all trained AdvanTex Service Providers have the following items at hand:

### For Routine Inspection and Maintenance

- Cordless drill with  $\frac{3}{16}$ -inch Allen wrench for lid bolts on risers and pod
- Extra lid bolts
- Sludge and scum measuring device (e.g., Nasco Sludge Judge® for sludge and Orenco SMUG for scum)
- Hook for raising floats to test them
- Biotube® filter cradle (OM-BIOTUBE CRADLE)
- Bronze threaded check valve, for measuring pump flow rate in systems with drainbacks
- Backpack pressure washer
- Trash pump (and generator, if pump is electric) for removing solids from discharge basin
- AX20 manifold brush (AX-LATERALBRUSH)
- AX20 sheet cleaning wand (AX-CLEANINGWAND)
- Handheld computer (PDA) or laptop computer with Bluetooth® Kit and BT-VCOM software (optional, to turn pump on and off at a distance from the panel)
- Electrical tester (voltage and amperage)
- Phone line tester (available from RadioShack®)
- Dissolved oxygen (DO) meter or colorimetric ampoules
- Sample bottles
- Turbidity meter
- pH meter or pH test strips
- Test strips for nitrate, ammonia, alkalinity
- Tape measure
- Calculator
- A copy of the *AX20 Installation Instructions* (NIM-ATX-AX-1), for reference

### For Repairs

- Structural adhesive and adhesive/sealant
- Control panel parts (circuit breakers, motor contactors, relays)
- Effluent pump(s)
- Extension cord
- Flashlight
- Hand tools (pliers, wrenches, screwdrivers, drill bits, hammer, shovel, hand saw, etc.)
- Heat gun or torch for bending conduit
- Inspection mirror (e.g., Prototek "Mirror on a Stick")
- Plumber's snake
- PVC cement and primer
- PVC fittings,  $\frac{3}{4}$ -inch to 2-inch (20-50 mm)
- PVC pipe,  $\frac{3}{4}$ -inch to 2-inch (20-50 mm)
- Spare parts for downstream components (e.g. drip headworks, UV)
- Waterproof wire nuts
- Wire stripping/crimping tool
- Float switches

### For Troubleshooting

- Digital camera
- Watch or timer
- A copy of Part 2 of the AdvanTex O&M Manual: *Advanced Service Tips and Troubleshooting Guide* (AIM-OM-ATX-2)

### For Personal Hygiene and Cleanup

- Bleach/water solution
- Eye protection
- Hand cleanser
- Paper towels
- Protective clothing
- Rags
- Rubber gloves

## Start-Up Checklist

<b>AX20 Start-Up Checklist</b>		Service Provider _____	
Technician _____	Start-Up Date _____	Occupancy Date _____	
<div style="border-bottom: 1px solid black; margin-bottom: 10px;"> <h3 style="margin: 0;">Primary Treatment</h3> <p><b>Process Tank.</b></p> <p><input type="checkbox"/> Proper inlet tee installed.</p> <p><b>Process Tank Pumping Equipment.</b></p> <p><input type="checkbox"/> Discharge plumbing properly installed through watertight grommet, threaded connections tight, ball valve in open position.</p> <p><input type="checkbox"/> Float assembly mounted in Biotube® vault and properly set per AdvanTex Installation Guide. Float cords neatly wrapped around splice box and tied.</p> <p><input type="checkbox"/> Floats operate properly.</p> <p><input type="checkbox"/> Floats set properly (measuring from outside top of tank).</p> <p><input type="checkbox"/> Splice box mounted on access riser. Watertight connectors used.</p> <p><b>Process Tank Pumping System.</b></p> <p><input type="checkbox"/> Pump operates in Manual.</p> <p><input type="checkbox"/> Pump operates in Automatic.</p> <p><input type="checkbox"/> Pump run amps: _____</p> <p><input type="checkbox"/> Pump rest volts: _____ run volts: _____</p> </div> <div style="border-bottom: 1px solid black; margin-bottom: 10px;"> <h3 style="margin: 0;">Secondary Treatment</h3> <p><b>Recirculating Splitter Valve Assembly.</b></p> <p><input type="checkbox"/> Verify proper RSV setting (measuring from top of cage to outside top of tank).</p> <p><b>AdvanTex System.</b></p> <p><input type="checkbox"/> All pods installed level.</p> <p><input type="checkbox"/> All piping properly covered and compacted.</p> <p><b>Ventilation System.</b></p> <p><input type="checkbox"/> Ventilation intake(s) properly located and installed.</p> <p><b>AdvanTex Filter Operation.</b></p> <p><input type="checkbox"/> Squirt height verified.</p> <p><b>Discharge Pump Basin/Tank.</b></p> <p><input type="checkbox"/> Basin/tank inspected for infiltration.</p> <p><input type="checkbox"/> Basin/tank is set level.</p> <p><b>Discharge Basin/Tank Pumping Equipment.</b></p> <p><input type="checkbox"/> Pump and discharge plumbing are compatible (e.g. pressure rating).</p> <p><input type="checkbox"/> Discharge plumbing properly installed through watertight grommet, and ball valve is in open position.</p> <p><input type="checkbox"/> Floats operate properly.</p> <p><input type="checkbox"/> Floats set properly (measuring from outside top of tank).</p> <p><input type="checkbox"/> Splice box mounted in access riser. Watertight connectors used.</p> <p><b>Discharge Basin/Tank Pumping System.</b></p> <p><input type="checkbox"/> Pump operates in Manual.</p> <p><input type="checkbox"/> Pump operates in Automatic.</p> </div>			<p><input type="checkbox"/> Pump run amps: _____</p> <p><input type="checkbox"/> Pump rest volts: _____ run volts: _____</p> <p><input type="checkbox"/> Dose volume verified.</p> <p><input type="checkbox"/> Flow rate verified (draw down test).</p> <hr/> <p><b>Other System Components</b></p> <p><input type="checkbox"/> Disinfection equipment installed properly.</p> <p><input type="checkbox"/> Dispersal equipment operating properly.</p> <hr/> <p><b>Controls</b></p> <p><input type="checkbox"/> Proper timer settings.</p> <p><input type="checkbox"/> Proper wire size used based on information provided by manufacturer.</p> <p><input type="checkbox"/> All electrical connections in panel secured.</p> <p><input type="checkbox"/> Panel wired per manufacturer's wiring diagram.</p> <p><input type="checkbox"/> Service provider name/number written on "For Service Call" label.</p> <p><input type="checkbox"/> Control panel functional test, as detailed in the <i>AdvanTex Installation Instructions</i>, has been followed.</p> <p><input type="checkbox"/> Dial tone verified.</p> <p><input type="checkbox"/> Control panel diagrams left in panel for future review.</p> <hr/> <p><b>Final/Safety Inspection</b></p> <p><input type="checkbox"/> All access riser hardware is in place. Lids are secured.</p> <p><input type="checkbox"/> All splice box lids are secured.</p> <p><input type="checkbox"/> Panel circuit breakers are in the "on" position, panel is set for automatic operation, and panel is latched (or locked if necessary).</p> <hr/> <p><b>Homeowner's Package</b></p> <p><input type="checkbox"/> Homeowner's Package reviewed with homeowner.</p> <hr/> <p><b>Comments</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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## Completing the Start-Up Checklist

### System Start-Up Procedure

Your System Start-Up visit provides final confirmation that the system has been correctly installed and is ready to function properly. It also acquaints you, the service provider, with each individual system, so that you are familiar with any special components or requirements.

The *AX20 Start-Up Checklist* (SCL-ATX-OM-1), shown on the preceding page, will help you remember to complete all the steps needed to check the system's functions. While you don't need to return the *Start-Up Checklist* to Orenco, we recommend bringing a copy to the start-up and checking off the steps to make sure that you perform all of them.

As part of the start-up, you'll also download a computer-generated *Start-Up Summary Report* from [advantextservice.com](http://advantextservice.com) and fax it to the fax number on the bottom of the form. An automated system will add the report to the data file for that system on [advantextservice.com](http://advantextservice.com). This will confirm that the system is ready for operation, so that Orenco and the AdvanTex Dealer can confidently warranty it and your service contract can begin.



A typical start-up visit takes about an hour. Arrange to meet the system installer at the site so that he or she can answer any questions you may have about the installation. The installer should bring the site plan or as-built. If the system owners can be present too, this is a good opportunity for them to learn how the system functions. As part of the start-up, you will need to review the Homeowner Package with the homeowners or, if the house has not yet been sold, with a representative of the homebuilder. You can do this at the start-up visit, or arrange a meeting prior to the start-up.

### Before Leaving the Office

Download the *Start-Up Summary Report* from [www.advantextservice.com](http://www.advantextservice.com). The top of the form should be pre-filled with information about the site.

If any information is missing, fill it in. You will fill out the rest of the form at the site as you go through the start-up procedure.

The image shows a sample of the AdvanTex Field Maintenance Report form. The form is titled "AdvanTex Field Maintenance Report" and "Start-Up Summary Report". It includes fields for site information such as "Site Name", "Address", "City", "State", "Zip", "Phone", and "Fax". It also has sections for "Primary Treatment" and "Secondary Treatment" with checkboxes for various components like "Pump Station", "Discharge Tank", and "Discharge Pump". There is a "Control Panel" section with checkboxes for "Control Panel" and "Control Panel Settings". The form also includes a "Filter Pads" section and a "Comments" section at the bottom.

If the system does not have a discharge tank or basin and discharge pump, note that in the *Start-Up Summary Report*.

### At the Site

Ask the system installer about the size, material, and manufacturer of each primary tank and discharge tank or basin, and record it on the *Start-Up Summary Report*. Also record the serial number(s) of the AX20 pods.

### Planning the Start-Up

When the installer calls to tell you that the system is ready for start-up, ask the following questions:

- Did the electrician connect the panel to the home's electrical service and turn the power on?
- Did the installer test the control panel to make sure it was functional?
- Is there phone service, or, at minimum, is the phone line physically connected to the panel?

If the installer answers "yes" to these questions, then the system is ready for start-up.





## Completing the Start-Up Checklist (continued)

### Primary Treatment

Open the risers of the tank and of any discharge or recirculation tanks or basins.

**WARNING:** Do not enter the tank. Entering a tank without proper confined space procedures and equipment can cause serious injury, asphyxiation, or drowning.

**Proper inlet tee installed.**

In the inlet riser of the primary processing tank, make sure that the inlet tee is present, firmly attached, and plumb.

**Discharge plumbing properly installed.**

In the outlet riser, make sure that the discharge plumbing is properly installed through a watertight grommet. The threaded connections should be hand-tight, and the ball valve should be open. Look at the pump to make sure that it is the model specified on the plans, and record the model on the Start-Up Summary Report.



**Float assembly mounted in Biotube® vault.**

**Floats operate properly.**

Before you test the floats, open the control panel and place it in test mode by pressing and holding the red button on the front for 15 seconds. Inside the panel, the correct yellow digital input LED should light up. Release the button when the audible alarm chirps.

If you can't see the inside of the control panel while you raise and lower the float switches, you may need a helper. Pull the float tree out of the water. The floats will go down, the alarm will sound, and all the yellow LEDs should be off.



Raise the bottom float to stop the alarm. A yellow LED should light up.

Next, raise the middle float, if it is present. No alarm should sound, but another yellow LED should light up.

When you raise the top float, the alarm should sound again and the third yellow LED should light up.

**Floats set properly.**

Replace the float tree in its bracket, making sure it's properly mounted. Neatly coil the float cords, and secure them to the splice box. Measure the float heights from the outside top of the tank and verify that the heights are correct according to the *AX20 Installation Guide*. Record them on the Start-Up Summary Report.

**NOTE:** Orenco provides float and RSV settings for all tanks approved for use with AdvanTex Treatment Systems in your area. At start-up and during annual maintenance, you need only verify that the actual settings on the equipment match Orenco's recommendations. If you need to adjust the settings to solve a problem, see Appendix 2.

**Splice box mounted on access riser. Watertight connectors used.**

Inspect the splice box to make sure that it is securely mounted inside or outside the riser; that connections have been made using watertight wire nuts; and that there is no water in the splice box. We also recommend that you seal the conduit using conduit seals or any electrically approved sealant.



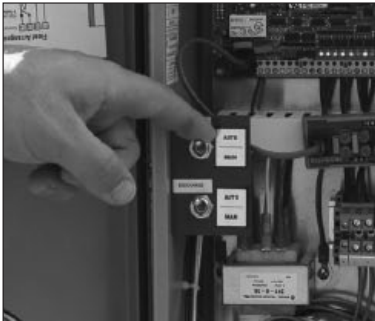
## Completing the Start-Up Checklist (continued)

- Pump operates in Manual.
- Pump operates in Automatic.
- Pump amps and volts checked.

At the control panel, with the panel still in test mode, check the run amperage of the recirculation pump and discharge pump by placing the clamp of an ammeter around the wire to each pump's circuit breaker and reading the amperage while each pump is running. You can run the pump by holding the toggle switch on MAN. Amperage should be no more than the pump's maximum service factor amperage.



First for the recirculation pump and then for the discharge pump, measure the voltage with the pump off, by putting the probes of a voltmeter on each pump's terminals. Then measure the voltage with the pump running. The difference between running and rest voltage should be no more than 3 percent. That is 3.6 volts for a 120-volt system, or 7.2 volts for a 240-volt system.



Release the switch back to the AUTO position. Make sure the pump comes on as the timer cycles. Timer cycles are shortened to about 30 seconds in test mode.

### Secondary Treatment

- Verify proper RSV setting.

Measure the distance from the outside top of the tank to the top of the Recirculating Splitter Valve (RSV) ball cage, and record it on the Start-Up Summary Report.



**NOTE:** Improper RSV settings are a common installation error, so please check them carefully.

- All pods installed level.
- All piping properly covered and compacted.

Check that each AX20 pod is installed level and that all piping is covered with compacted fill.



- Ventilation intake(s) properly located and installed.
- Squirt height verified.

Open each AX20 pod and make sure that the ball valves at the end of the laterals are closed. Remove an orifice cover and measure the squirt height. Record the squirt height on the Start-Up Summary Report as "Residual Head Measurement."



- Discharge basin/tank inspected for infiltration.
- Discharge basin/tank set level.

Inspect the discharge pump basin or tank to make sure that it is set level and there is no sign of water infiltration.

- Pump and discharge plumbing are compatible.
- Discharge plumbing properly installed.

Look at the pump to make sure that it is the model specified on the plans, and record the model on the Start-Up Summary Report. Verify that the discharge plumbing is installed as specified on the plans; that it is properly installed through a watertight grommet; and that the ball valve is open.

## Completing the Start-Up Checklist (continued)



- Discharge floats operate properly.
- Discharge floats set properly.

Check the function and settings of the floats in the discharge basin/tank as described under Primary Treatment Components, and record the float heights on the *Start-Up Summary Report*, as before.

**NOTE:** To ensure proper system operation, check to make sure that floats are Orenco “A” or “V” floats.



- Splice box mounted in discharge access riser. Watertight connectors used.

Inspect the splice box in the discharge basin/tank to make sure that it is securely mounted inside or outside the riser; that connections have been made using watertight wire nuts; and that there is no water in the splice box. Use conduit seals or electrically approved sealant.

- Discharge pump operates in Manual.
- Discharge pump operates in Automatic.
- Discharge pump amps and volts checked.

Test the discharge pump and check running amps, running volts, and resting volts at the same time you check the recirc pump.

- Flow rate verified.
- Dose volume verified.

Determining the discharge pump’s actual flow rate enables you to determine the dose volume (the volume of wastewater being treated in each dose) and to calculate timer settings.

Knowing the dose volume also enables you to determine the volume of wastewater being treated in a given period. To do this, multiply the dose volume by the number of doses.

**To verify the flow rate, follow Steps 1 through 7, then verify the dose volume in Step 8.**

**Step 1.** Determine the gallons per inch (gpi) or liters per centimeter (L/cm) volume of the dosing tank or basin. A 24-inch (600-mm) diameter basin holds 1.88 gpi (2.8 L/cm). A 30-inch (750-mm) diameter basin holds 2.96 gpi (4.4 L/cm). For tanks, consult the manufacturer’s volume chart. For Orenco fiberglass tanks, use Fiberglass Tank Volume Charts, NCH-TNK-1.

**Step 2.** You’ll be running the pump for one minute during the flow rate test, so check the liquid level inside the tank/basin to ensure that there’s enough water above the pump’s minimum liquid level (MLL), or the lowest float (whichever is higher), to complete the test. For example, in one minute, a pump operating at 10 gpm (37.8 L/min) will draw down approximately 5¼ inch (14 cm) of liquid in a 24-inch (600-mm) diameter basin, or

$$10 \text{ gallons} \div 1.88 \text{ gpi} = 5\frac{1}{4} \text{ inch, or}$$

$$37.8 \text{ liters} \div 2.8 \text{ L/cm} = 14 \text{ cm}$$

So, to perform a flow rate test with the pump and basin in this example, you’d need at least 5¼ inch (14 cm) of water above the MLL or the bottom float (whichever is higher). If there is not enough liquid, add some.

**Step 3.** If your system isn’t configured to drain back to the basin after each dose, skip to step 4. If your system is configured to drain back to the basin, you’ll need to account for the drainback volume in your calculations. Or you can stop drainback during the test by temporarily installing a threaded check valve between the pump and the pump discharge assembly. This eliminates the need to measure drainback volume.

**Step 4.** To measure the flow rate, first measure the distance from the top of the tank or basin to the liquid level. Record this as H<sub>1</sub>.

**Step 5.** Using a stopwatch, hold the discharge pump’s toggle switch on MAN for exactly one minute. Then switch off the pump. If the system is configured to drain back into the tank or basin after a dose, wait until drainback is complete.

## Completing the Start-Up Checklist (continued)

**Step 6.** Measure the new distance from the top of the tank or basin to the liquid level. Record this as  $H_2$ .

**Step 7.** To get the pump's flow rate, find the difference between  $H_2$  and  $H_1$ . Multiply this number by the gpi (or L/cm) volume of the tank or basin. Add the drainback volume (DB), if applicable. Then divide by the pump run time in minutes (T). For this test, the pump run time in minutes should equal one minute.

$$\text{Pump flow rate (gpm)} = \frac{[(H_2 - H_1) \times \text{gpi}] + \text{DB}}{T}$$

or

$$\text{Pump flow rate (L/min)} = \frac{[(H_2 - H_1) \times \text{L/cm}] + \text{DB}}{T}$$

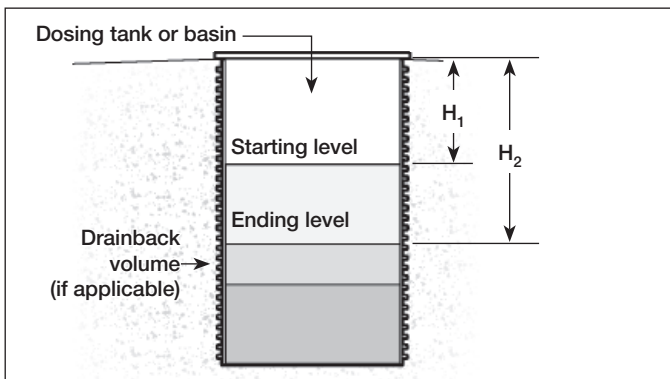
**Important:** For VeriComm® panels, enter the gpm value on the "Site Details" page at [vericomm.net](http://vericomm.net) as "Discharge Pump GPM." The VeriComm panel will use it to automatically calculate and record the system's actual flow rates, which can be used for reports, troubleshooting, and determining timer settings.

**Step 8.** To verify the pump's dose volume, multiply the pump's flow rate (gpm or L/min) by the pump run time in minutes (T) — as determined by float settings or timer operation, depending on panel model — and subtract the drainback volume, if applicable.

$$\text{Dose Volume (V)} = (\text{gpm} \times T) - \text{DB}$$

or

$$\text{Dose Volume (V)} = (\text{L/min} \times T) - \text{DB}$$



### Other System Components

- Disinfection equipment installed properly.
- Dispersal equipment operating properly.

Verify that any disinfection and dispersal equipment specified on the plans is present, and follow the manufacturer's instructions to inspect it for proper functioning. Record the disinfection equipment manufacturer and the dispersal system type on the *Start-Up Summary Report*.

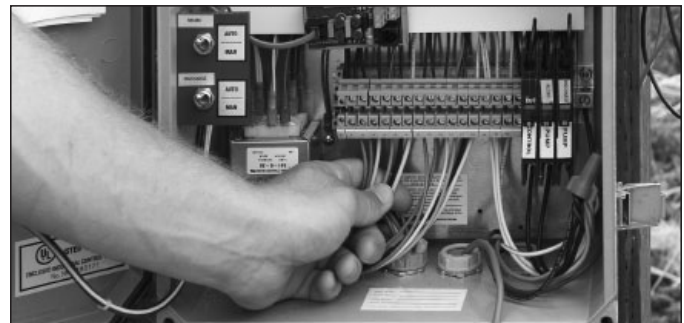


### Control Panel

- Proper timer settings.

Open the control panel and, using a handheld or laptop computer, verify that the timer settings are appropriate for the installation. Record the Panel ID (RTU or UL number) and timer settings on the *Start-Up Summary Report*. Default timer settings are set for an occupancy of 3 people. This may also be adjusted at [vericomm.net](http://vericomm.net), for systems equipped with VeriComm.

- Proper wire size used based on information provided by manufacturer.



For Orenco components, the panel installation instructions provide correct wire sizes.

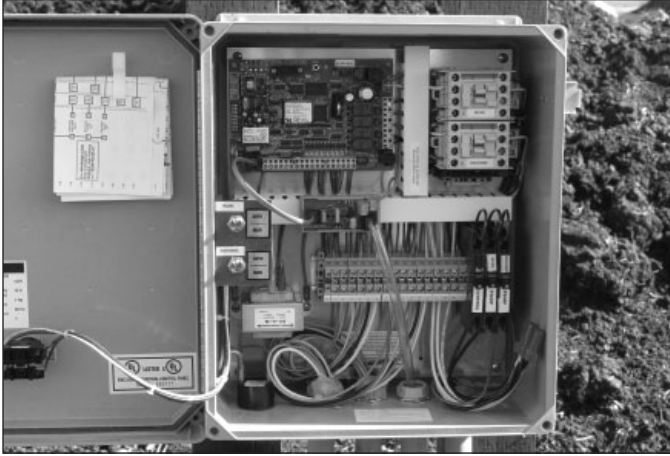
- All electrical connections in panel secured.
- Panel wired per manufacturer's wiring diagram.

Check the panel to make sure that it is wired according to the diagram clipped inside the panel's door. Gently tug on the wires to make sure they are secured in the terminals.

- Service provider name/number written on "For Service Call" label.

Write in your company's name and phone number, if it hasn't been done already.

## Completing the Start-Up Checklist (continued)



- Control panel functional test, as detailed in the *Residential AdvanTex Installation Instructions*, has been followed.

The installer should have performed this test during installation. If not, perform it now.

Before performing the next step, return the panel from test mode to normal mode by holding down the alarm button on the front of the panel until the alarm chirps.

- Dial tone verified.

If phone service to the panel is not yet connected, you will be notified later when the service is connected and the panel automatically starts calling in.

If phone service *is* available to the panel, quickly press the alarm button on the front of the panel 15 times to force the panel to call in to the VeriComm® Web site. The Modem Activity light on the VCOM board should light up.

If the Modem Activity light does not light up, unplug the phone line from the phone jack on the panel and plug the phone line into a phone line tester, or a phone, to see if there is a dial tone. If there is no dial tone, come back and repeat the forced call-in test when phone service is activated to the panel. If there is a dial tone but the modem will not call in, call your AdvanTex Dealer for troubleshooting assistance.

- Control panel diagrams left in panel for future review.

Remember to leave the diagrams in the panel.

## Final/Safety Inspection

- All access riser hardware is in place. Lids are secured.
- All splice box lids are secured.

Close and secure all pod, riser, external splice box, and basin lids.



**WARNING:** If lid bolts are missing, replace them with spares. If you have no spare lid bolts, fasten the lid with a self-tapping screw, and immediately call your Dealer for replacement bolts. If the lid is unbolted or if the lid or riser are damaged, be sure to securely block access to the tank opening before leaving the site. Open tanks are hazardous, and children or adults who try to enter them may be seriously injured, asphyxiated or drowned.

- Panel circuit breakers are in the ON position, panel is set for automatic operation, and panel is latched (or locked if necessary).

Make sure all circuit breakers are ON. If the panel is in test mode, it will automatically return to normal mode in 30 minutes. To manually return it to normal mode, hold the alarm button on the front of the panel down until the alarm chirps. Close and latch the panel, and lock it if necessary.

Make sure that the *Start-Up Summary Report* is completely filled out.

## Homeowner's Package

- Homeowner's Package reviewed with homeowner.

Go through the *Homeowner's Package* with the homeowner, or with the builder's representative if the home has not yet been sold.



## Back at the Office

Fax the completed *Start-Up Summary Report* to the number on the bottom of the report.

## Scheduled Field Maintenance Report

### AdvanTex® Field Maintenance Report

Property Owner/Tracking #			Operator	
Site Address				Contact Phone
AX Site ID #	County ID #	Pod #	RTU #/UL #	Date of Last Inspection

**Retrieve O&M Info**

Daily flow \_\_\_\_\_

Recirc ratio \_\_\_\_\_

Timer settings: \_\_\_\_\_

**Perform Field Sampling/Observations**

NTU (15 ± NTUs)	pH (6-9)	DO (2-6)
-----------------	----------	----------

**Odor of Sample**

Typical  Musty  Earthy  Moldy

Non-typical  Sulfide  Cabbage  Decay

**Oily film in PVU**  Yes  No

**Foam in tank**  Yes  No

**Check Control Panel**

Recirc Amps	Discharge Amps
-------------	----------------

Audible and visual alarms  OK

Dial tone (telemetry only)  Yes  No

**Inspect/Clean Pump System**

	Inspect	Clean
Riser/Lid .....	<input type="checkbox"/>	
Splice Box .....	<input type="checkbox"/>	
Float Cords .....	<input type="checkbox"/>	
Floats .....	<input type="checkbox"/>	<input type="checkbox"/>
Pump .....	<input type="checkbox"/>	<input type="checkbox"/>
Biotube® Filter .....	<input type="checkbox"/>	<input type="checkbox"/>
Biotube Pump Vault .....	<input type="checkbox"/>	<input type="checkbox"/>
Recirculating Splitter Valve .....	<input type="checkbox"/>	<input type="checkbox"/>

Comments \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Measure Sludge/Scum**

	Sludge		Scum	
	Current	Previous	Current	Previous
1st Compartment				
2nd Compartment				

**Inspect/Clean AdvanTex Filter**

Odor: <input type="checkbox"/> Normal <input type="checkbox"/> Pungent		Inspect	Clean
Biomat: <input type="checkbox"/> Normal <input type="checkbox"/> Excessive		<input type="checkbox"/>	<input type="checkbox"/>
Bridging/Ponding: <input type="checkbox"/> None/Minor <input type="checkbox"/> Excessive		<input type="checkbox"/>	<input type="checkbox"/>
	Laterals/Orifices	<input type="checkbox"/>	<input type="checkbox"/>
	Pod Bottom	<input type="checkbox"/>	<input type="checkbox"/>
	Intake Vent	<input type="checkbox"/>	<input type="checkbox"/>

**Inspect/Clean Discharge Pump System**

Inspect		Inspect	Clean
Riser/Lid <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Splice Box <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Float cords <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Floats	<input type="checkbox"/>	<input type="checkbox"/>
	Pump	<input type="checkbox"/>	<input type="checkbox"/>

**Inspect/Service Other System Components**

	Inspect	Clean		Inspect	Clean
Disinfection Equipment <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dispersion Laterals/Orifices	<input type="checkbox"/>	<input type="checkbox"/>

Dispersion Type \_\_\_\_\_

**Additional Services Rendered**

Cleaned textile sheets?  Replaced UV items?

Replaced/Used other items?

**Parts Used: W = Warranty, B = Billable (✓ appropriate selection)**

W	B	Item Number	Description

**Final/Safety Inspection**

RSV reinstalled  Lids bolted on

Manifold reconnected; flush valves closed  Control panel reactivated

**Summary/Recommendations**

System performing; no further action needed  Tank needs pumping

Call for service  Other? \_\_\_\_\_

**Fax completed form to 1-866-384-7404**

## Performing Scheduled Field Maintenance

Residential Advantex Treatment Systems require periodic servicing. AX20 systems need a six-month visit, a one-year visit, and annual visits\* thereafter. AX20N systems require four visits during the first two years and annual visits\* thereafter. Failure to provide required maintenance will void the Advantex Treatment System warranty and may place the system out of compliance with local regulations.

### Homeowner Communication

Whenever possible, contact the residents when it's time for a service visit, especially if the residents are new to the home. The service visit is an opportunity to talk with them about proper use of the system, so try to schedule the visit when someone will be there.

### Retrieve O&M Info

Download the *Field Maintenance Report* form for your site from [www.advantexservice.com](http://www.advantexservice.com). The top of the form should be pre-filled with information about the system.

### Perform Field Sampling/Observations

When you arrive at the site, remove the lids from the risers and take your sample before doing anything else, so that the sample won't be contaminated by material that you stir up while working. To sample effluent, remove the Recirculating Splitter Valve (RSV) from its quick-release holster and set it aside. There will be enough of a trickle through the RSV plumbing to collect a sample without waiting for the pump to cycle.

**IMPORTANT:** To avoid contamination, do not run the pump manually or in test mode to obtain this sample.

Wash down, brush, or wipe the RSV inlet before taking the sample so there will be no contamination from dislodged solids.

**Leave the RSV disconnected for the rest of the service call** so that any debris you stir up does not make its way to the drainfield.

**Clarity of sample**

Assess the clarity of the sample by using a portable turbidity meter.



\*Servicing intervals may vary according to local regulations.

**WARNING:** Follow the precautions below when performing field maintenance on Advantex Systems.

- Do not enter the tank. Entering a tank without proper confined space procedures and equipment can cause serious injury or death.
- Use proper personal protection equipment, such as rubber gloves and eye protection, as well as protective clothing, to cover parts of the body that will be exposed to wastewater or effluent.
- When working on components that contact sewage or effluent, lay them on a plastic sheet or place them in a trash can, not on the lawn. Several tools that reduce the mess of cleaning Biotube® filters and Advantex textile sheets are available from Orenco.
- Turn off power to electrical components when working in splice boxes or the control panel or when disconnecting pumps.
- When finished, use proper personal hygiene.

**Odor of sample**

Sniff the sample and assess its odor. Record these observations about clarity (NTUs) and odor on the *Field Maintenance Report* form.

**pH of sample**

**Dissolved oxygen of sample**

Using pH test strips or a pH meter, check the pH of the sample and record it on the *Field Maintenance Report* form. Values from 6 to 9 are normal. Also check the sample's dissolved oxygen (DO) using a DO meter (or DO field test ampoules), and record that on the form. Values from 2.5 to 6 mg/L are normal.

**NOTE:** If field sample levels are outside of the norm or if your observations indicate the treatment system may not be functioning properly, further testing in a laboratory environment may be needed.

Sampling equipment, minimum sample size, and storage procedures should conform to the standard methods required by your federal, state, and local authorities.

**Oily film in PVU**

**Foam in tank**

Check the liquid in the pump vault (PVU) for an oily sheen, and the liquid in the first compartment of the tank for foam or other unusual appearance. Record your observations on the *Field Maintenance Report* form.

## Performing Scheduled Field Maintenance (continued)

### Check Control Panel

Open the control panel and place it in test mode.

#### Run amperage

Check and record the run amperage of the recirculation pump and discharge pump. Place the clamp of an ammeter around the wire to each pump's circuit breaker and read the amperage while each pump is running. You can run the pump by holding the toggle switch on MAN. Amperage should be no more than the pump's maximum service factor amperage.

Release the switch to the AUTO position. Make sure the pump comes on as the timer cycles. Timer cycles are shortened to about 30 seconds in test mode.



#### Audible and visual alarms

Check the operation of the floats and timers by lifting the float trees out of the tank and discharge basin and following the instructions clipped inside the panel door. Make sure that audible and visual alarms are activated when the appropriate float is raised or lowered.

#### Dial tone (telemetry only)

For systems equipped with VeriComm® panels, use a phone line tester or a phone to verify the presence of a dial tone.

### Inspect/Clean Recirc Pump System

#### Riser/Lid

Make sure that the lid is intact, and replace it if necessary. Replace any missing lid bolts. Check for marks of liquid infiltration or exfiltration.

#### Splice box

Open the splice box and make sure there is no water in it. If there is, remove the water with a sponge and repair the leak. If you disconnect any connections, do not reuse the wire nuts when you reconnect them — use new ones.



#### Float cords

#### Floats

Verify that the floats are in good condition and properly secured to the float tree. Verify that float cords are neatly wrapped inside the riser so that they cannot interfere with the operation of the floats. Clean floats by hosing or brushing them so that debris falls back into the tank, not into the pump vault.



#### Pump

Turn circuit breaker off at service panel. Switch MOA and circuit breakers in control panel to "Off." Pull the pump and place it on a cleanable surface, like the riser lid, or in a plastic trash can. Check the intake screen; wash off particles as necessary. Record the kinds of particles in the Comments section of the *Field Maintenance Report* form and report findings to user (for preventive maintenance). Reinstall the pump, checking to make sure the discharge valve on the hose and valve assembly is open.



## Performing Scheduled Field Maintenance (continued)

**Biotube® Filter**

**Biotube Pump Vault**

Clean the Biotube Filter at every visit. Make sure that the RSV is out. Slide Biotube cartridge out of vault. Hold Biotube cartridge over open inlet of tank or primary compartment. Carefully spray build-up into tank. (The Biotube Cradle, available from Orenco, holds the Biotube Filter on the lip of the riser and directs debris into the tank away from the pump vault.) Flush vault bottom.



**Recirculating Splitter Valve**

Move the RSV from side to side to check that the balls move freely. Then verify that the liquid level in the tank is within the normal range. If it is low, the ball mechanism could be jammed in the seated position. If it is high, the RSV may not be making a tight seal when the balls are seated. Clean the balls and replace the balls or the cage if necessary. Don't replace the RSV in the tank until you're ready to leave the site.

### Measure Sludge/Scum

Measure sludge and scum in both compartments of the tank, and record the measurements on the Field Maintenance Report form. Schedule pumping of the tank when the bottom of the scum layer is within 3 inches (75 mm) of the flow-through port of the tank baffle or when the sludge accumulates to within 6 inches (150 mm) of the flow-through port.



Note any unusual appearance or smell of the tank's contents, and consult the *Advanced Service Tips and Troubleshooting Guide*, available from your AdvanTex Dealer, if necessary. If you find kitty litter, sanitary products, excessive grease, or other material that shouldn't be in the tank, talk to the residents of the home and remind them not to flush those things.

### Inspect/Clean AdvanTex Filter

Open the AdvanTex Filter pod.

**Odor**

**Biomat**

**Bridging/Ponding**

Check that the odor and appearance of the biomat are normal. Pungent or unusual odor, ponding (excessive liquid), and bridging (excessive solids) are problems that need immediate attention. The *Advanced Service Tips and Troubleshooting Guide* can help you ascertain the cause. You may need to change the timer settings or discuss household habits with the system users. And you may need to clean the filter sheets. (See "Additional Services Rendered.")

**Laterals/Orifices**

Inspect the orifice shields. A clean area around an orifice cover is a sign of a plugged orifice; clean these orifices out before cleaning the laterals.

To clean and flush the manifold, open the flush valves at the ends of the laterals and brush or jet the laterals.



**Pod bottom**

Pull out a few sheets, inspect the pod bottom, and note any excessive buildup of debris. When you're done cleaning the manifold, remove the RSV from the tank, and run the pump for two or three minutes with the flush valves open and the RSV removed to flush debris from the pod's underdrain back into the tank. You can do this while you are performing other tasks. After flushing, close the flush valves and make sure the orifice covers are on more or less straight. Replace the RSV in the tank.

**Intake vent**

Make sure that the ventilation intake is not damaged or blocked, and clean or replace it if necessary.

## Performing Scheduled Field Maintenance (continued)

### Inspect/Clean Discharge Pump System

- Riser/Lid
- Splice box
- Float cords
- Floats
- Pump

If there is a discharge pump basin, inspect it and its components. Clean floats and pump by hosing them. If you pull the pump, check to make sure the discharge valve is open after reinstalling.

Over time, solids may accumulate in the discharge basin. Use a trash pump to pump these solids into the inlet end of the processing tank.

### Inspect/Service Other System Components

- Disinfection equipment
- Dispersal laterals/orifices

Follow the manufacturer's instructions to inspect and service other components of the system.

### Additional Services Rendered

- Cleaned textile sheets?

You should not need to clean the textile sheets every year, but it may be necessary now and then. Don't clean them unless the buildup of biomat is bridging across the sheets, because removing too much of the biomat inhibits the system's treatment performance.



If you need to clean the sheets, remove the RSV so that solids can freely drain back to the tank. Then clean the sheets one by one with the

AdvanTex Cleaning Wand, a hose, or a backpack pressure washer (at low pressure). Wash debris down into the pod, where it will drain back into the processing tank.

- Replaced UV items?
- Replaced/used other items?

Document any equipment replaced and any additional observations.

### Final/Safety Inspection

Review the Field Maintenance Report form to ensure all activities have been performed.

- RSV reinstalled

If you haven't done so already, reinstall the RSV.

- Manifold reconnected and valves closed

Make sure that the flush valves at the ends of the AX20 laterals are closed.

- Lids bolted on

Replace all lids and tighten all lid bolts.



**WARNING:** If lid bolts are missing, replace them with spares. If you have no spare lid bolts, fasten the lid with a self-tapping screw, and immediately call your Dealer for replacement bolts. If the lid is unbolted or if the lid or riser are damaged, be sure to securely block access to the tank opening before leaving the site. Open tanks are hazardous, and children or adults who try to enter them may be seriously injured, asphyxiated, or drowned.

## Performing Scheduled Field Maintenance (continued)

### Control panel reactivated

Make sure that all circuit breakers have been switched back on. The panel will automatically return from test mode to normal mode in 30 minutes. To manually return it to normal mode, hold down the alarm button on the front of the panel until the alarm chirps. Close and latch the panel, and lock it if necessary.



### Summary/Recommendations

- Treatment system is performing; no further action necessary
- Call for service
- Tank needs pumping
- Other?

Check-off or document final recommendation(s). Back at the office, schedule any necessary follow-up.

### Comments

Record any additional observations from your visit on the *Field Maintenance Report* form, along with information about equipment repaired or replaced.

Fax the completed form to the number on the bottom. The automated system will record the completion of the site's visit and archive an image of the form on [advantextservice.com](http://advantextservice.com) for future reference.

## Unscheduled Field Maintenance Report

### AdvanTex® Field Maintenance Report Unscheduled

Property Owner/Tracking #				Operator	
Site Address					Contact Phone
AX Site ID #	County ID #	Pod #	RTU #/UL #	Date of Last Inspection	

**Dispatcher Comments**

Date: \_\_\_\_\_ Time: \_\_\_\_\_

**Notification of site condition**

- Made by VeriComm® Monitoring System
- Made by Homeowner
- Other \_\_\_\_\_

**Site condition at time of call**

- Alarm       Tank Overflow
- Odor         Sewage Backup
- Other \_\_\_\_\_

**Field Sampling/Observations**

- Necessary     Not necessary

NTU (15 ± NTUs)	pH (6-9)	DO (2-6)
-----------------	----------	----------

**Odor of Sample.**

- Typical       Musty    Earthy    Moldy
- Non-typical    Sulfide    Cabbage    Decay

**Conditions at site**

- Alarm On       Yes    No  
(If yes, alarm type \_\_\_\_\_ )
- Tank Liquid Level    Normal    High    Low
- Pump Operational?    Yes    No
- Circuit Breakers
  - Recirc. . . . .  Tripped    On    Off
  - Discharge. . . . .  Tripped    On    Off
  - Controls . . . . .  Tripped    On    Off

**VCOM® ATRTU Board:** (if applicable)

Document the panel status by shading the appropriate inputs and outputs as indicated by the yellow and red LEDs.

Inputs	①	②	③	④	⑤	⑥	⑦	⑧
Outputs	①	②	③	④				
Power (Green LED)	<input type="checkbox"/> On <input type="checkbox"/> Off <input type="checkbox"/> Flashing							

**Cause of Malfunction:**  Mechanical    Process-Related

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**Services Rendered:**

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**Parts Used:** W = Warranty, B = Billable (✓ appropriate selection)

W	B	Item Number	Description

**Notes/Final Recommendations:**

- System performing; no further action needed     Additional service needed

**Final/Safety Inspection:**

- Lids bolted on?       Yes    No  
(If damaged, comment \_\_\_\_\_ )
- Control Panel reactivated?    Yes    No
- Circuit Breakers:
  - Recirc:    On    Off    Discharge:    On    Off    Controls:    On    Off

Time at Site	Travel Time	Total Time
--------------	-------------	------------

Signature \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_

**Fax completed form to 1-866-384-7404**

## Performing Unscheduled Field Maintenance

### Unscheduled Maintenance Procedures

If you receive an alarm call or phone call that requires a visit to an AdvanTex site, download the *Field Maintenance Report: Unscheduled* from [www.advantextservice.com](http://www.advantextservice.com). The top of the form should be pre-filled with information about the site. If any information is missing, fill it in.

Depending on the type of problem that caused the alarm, you may not need to check all the boxes — they're just there to reduce the amount of writing you have to do. But do use the notes areas to record any repairs or adjustments you make, and to document anything unusual. These notes may help you on future service calls, and they help Orenco and your Dealer identify patterns of problems.

We recommend that you send a copy of this form to the homeowners after your visit. This reinforces any advice you may give them about proper use of their system. It also reassures them that the VeriComm® monitoring system is working and that you are diligently maintaining their system.

### Notification of Site Condition

- Made by VeriComm Monitoring System
- Made by Homeowner
- Other \_\_\_\_\_

Indicate whether you learned about the problem from the VeriComm system, from the homeowner, or some other way — perhaps from a neighbor.

### Site Condition at Time of Call

- Alarm
- Tank Overflow
- Odor
- Sewage Backup
- Other \_\_\_\_\_

Describe the condition that prompted the alarm.

**WARNING:** Do not enter the tank. Entering a tank without proper confined space procedures and equipment can cause serious injury, asphyxiation, or drowning.

### Field Sampling/Observations

- Necessary
- Not necessary

If the cause of the problem is not immediately apparent, use proper techniques (described in the "Performing Scheduled Field Maintenance" section) to sample effluent from the RSV. Do this first so that subsequent activity will not contaminate the sample. Test the sample's clarity, pH, and dissolved oxygen, and record the results on the form. Also check the box that describes the odor of the sample.

### Conditions at Site

**Alarm On**  Yes  No  
(If yes, alarm type \_\_\_\_\_)

**Tank Liquid Level**  Normal  High  Low

**Pump Operational?**  Yes  No

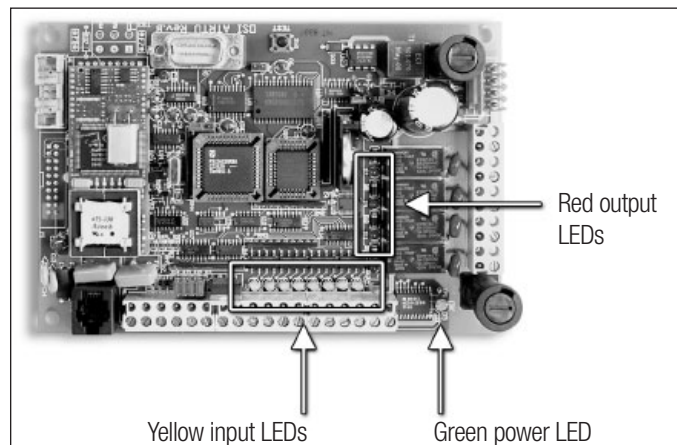
#### Circuit Breakers

- Recirc**  Tripped  On  Off
- Discharge**  Tripped  On  Off
- Controls**  Tripped  On  Off

Record the status of each part of the system on the form. Use the "Notes" field to describe problems in more detail.

### VCOM ATRTU Board (if applicable)

Shade the appropriate circles to indicate which inputs (yellow) and outputs (red) are active on the ATRTU board inside the panel, and record the status of the green power light.



## Performing Unscheduled Field Maintenance (continued)

### Cause of Malfunction

- Mechanical
- Process-Related

When you have found the cause of the malfunction, record whether it is a mechanical problem (such as failure of a float or loosening of a connection) or a problem with the biological processes in the system (such as recirculation ratio, system abuse, or insufficient ventilation). Describe the problem in as much detail as possible in the space provided.

### Services Rendered

Describe what you did to correct the problem.

### Parts Used

Record any new parts you installed. Check the appropriate box to show whether they are covered under warranty or billable to the customer.

### Notes/Final Recommendations

Write down any observations about this incident that will be useful to you, the homeowner, your AdvanTex Dealer, or Orenco.

### Final/Safety Inspection

**WARNING:** If lid bolts are missing, replace them with spares. If you have no spare lid bolts, fasten the lid with a self-tapping screw, and immediately call your Dealer for replacement bolts. If the lid is unbolted or if the lid or riser are damaged, be sure to securely block access to the tank opening before leaving the site. Open tanks are hazardous, and children or adults who try to enter them may be seriously injured, asphyxiated, or drowned.

**Lids bolted on?**  Yes  No

(If damaged, comment \_\_\_\_\_)

**Control panel reactivated?**  Yes  No

#### Circuit Breakers:

**Recirc:**  On  Off

**Discharge:**  On  Off

**Controls:**  On  Off

Verify the condition of system components upon leaving the site.

### Time/Date/Signature

Record time at site and travel time.

Sign and date the form. Then fax it to the number at the bottom. The bar code at the top will ensure that a PDF of the form will go into the Service Provider's inbox on [advantextservice.com](http://advantextservice.com), for assignment to the appropriate site.

Make a copy of the form and send it to the homeowner, along with the invoice.

**Change of Service Provider Authorization**

**AdvanTexService.com**

**Change of Service Provider  
 Authorization Form**

Property Owner		
Site Address		
Contact Phone	Pod #	RTU #/UL #

**Fill this form out completely, have it signed by the Homeowner, and fax to 1-541-459-2884**

Previous Service Provider: \_\_\_\_\_

New Contract Start Date:

Additional Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 New Service Provider Company

\_\_\_\_\_  
 New Service Provider Signature Date

As the homeowner, you acknowledge that you are not under contract with any other Authorized Service Provider as of the "New Contract Start Date," noted above.

\_\_\_\_\_  
 Homeowner Signature Date

**Fax completed form to 1-541-459-2884**

## Changing Service Providers

Consistent maintenance is important to ensuring the excellent performance of AdvanTex Treatment Systems. So, when a service contract expires, it must be renewed, either with the existing service provider or with another service provider. Our [advantextservice.com](http://advantextservice.com) Web site provides tools to help with this effort.

When a service contract expires, contact the homeowners and offer a renewal. If the homeowners renew the contract, update the information in [advantextservice.com](http://advantextservice.com).

If the homeowners do not renew the contract within 60 days, notify the Dealer (if the system is still under warranty) and make a note in [advantextservice.com](http://advantextservice.com). If a service contract is required by law, notify the county or other regulatory jurisdiction as well.

When homeowners do not renew their service contract with their current service provider and select you to be their new service provider, you

will need to have access to the site information for that system. Before meeting with the homeowners, you should log onto [advantextservice.com](http://advantextservice.com) and do the following:

- Print the *Change of Service Provider Authorization Form*.
- Fill out the form, including the site information, previous service provider's name, start date of the new contract, and any explanatory comments.
- Have the homeowners sign the form.
- Add your name, company name, and signature and fax the form to Orengo at the number on the bottom.

Once the form is received, you will have access to the site information for that system, so you can schedule the next service call. In addition, the automated system will archive an image of the form on [advantextservice.com](http://advantextservice.com) for future reference.



## Appendix 1: AX20 Timer Settings Worksheet

The following chart shows recommended timer settings for a new system.

RESIDENTS	TIME ON (SEC)	TIME OFF (MIN)	NOTES
2	0.2 min (12 sec)	19.8 min	<ul style="list-style-type: none"> <li>Assumes water usage of 50 gal. (190 L) per person per day and a return recirculation ratio of 3 : 1 (Filter recirculation ratio of 4 : 1).</li> <li>Override OFF cycle time is set at one-half of the OFF cycle time.</li> <li>Override ON cycle time is set the same as the ON cycle time.</li> </ul>
3 or 4	0.3 min (20 sec)	19.7 min	
5	0.4 min (24 sec)	19.6 min	
6	0.5 min (30 sec)	19.5 min	

As you gain experience with a system, you may conclude that you need to make adjustments, sometimes significant ones. This worksheet is intended to help you determine appropriate start-up timer settings (Pump ON, Pump OFF) for a single-pod AX20 system. Typical values and ranges are provided for each parameter. If you have any questions or if your values fall outside the desired ranges on this worksheet, contact your Dealer.

PARAMETER	TYPICAL VALUES	NOTES
Number of people	3	Range of 2 to 8 people.
Water usage per person	50 gpd (190 L/d)	Typical daily average is 50 gal. (190 L) per person.
$Q_i$ Actual daily flow (total)	150 gpd (570 L/d)	(Number of people) × (water usage per person).
$R_b$ Return recirculation ratio	3 : 1	You can adjust this ratio (return flow to forward flow) up or down depending on system performance. (Range of 2 to 6.)
$R_f$ Filter recirculation ratio	4 : 1	
Total daily flow to AX20	600 gpd (2280 L/d)	(Actual daily flow) × (return recirculation ratio + 1). Must be ≤ 3000 gpd (11,370 L/d). Actual flow should not exceed 500 gpd (1895 L/d). (500 gpd × 6:1 $R_b$ = 3000 gpd)
$Q_d$ Actual pump dose rate	33.3 gpm (126 L/min)	Determine this value by field-testing or by using Orenco's PumpSelect™. Start at the low end.
$T_d$ Pump ON cycle time (dose)	0.25 min	Select a value between 0.17 minutes (10 seconds) and 0.75 minutes (45 seconds).
$T_r$ Pump OFF cycle time (rest)	19.70 min	See Pump OFF equation below.

### PUMP OFF EQUATION

### EXAMPLE

Plugging in the above values and rounding results in the following:

$$T_r = \left[ \frac{1440 \cdot T_d \cdot Q_d}{(R_b + 1) \cdot Q_i} \right] - T_d \qquad T_r = \left[ \frac{1440 \cdot 0.25 \cdot 33.3}{(3 + 1) \cdot 150} \right] - 0.25 = 19.74 \approx 19.70$$

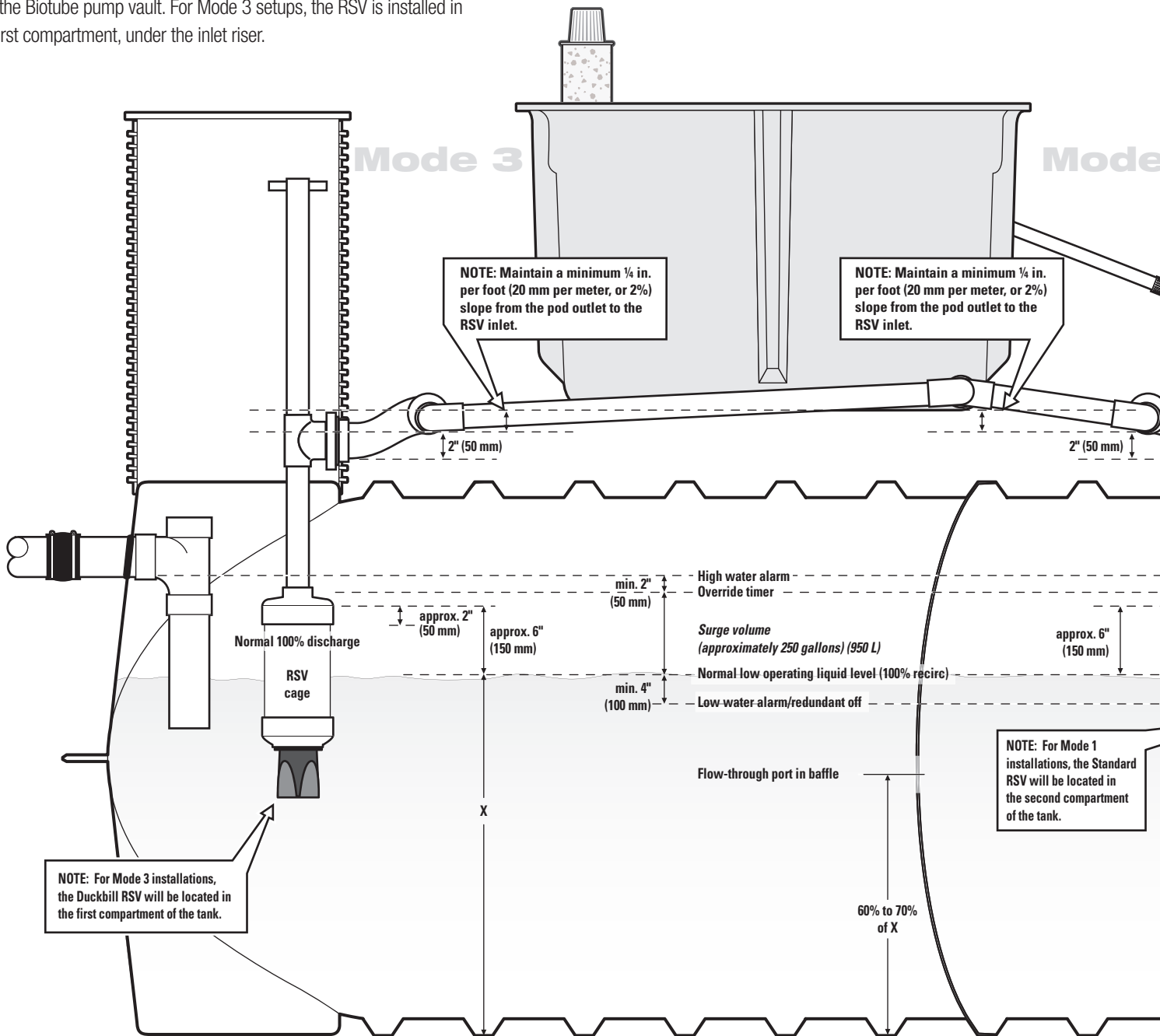
After you determine your Pump ON and Pump OFF times, double check to make sure your start-up settings fall within the cycle time (CT) range, below. If they don't, make adjustments per the "Note."

ADDITIONAL PARAMETERS	TYPICAL VALUES	NOTES
CT Cycle time	20 min	Low flow applications may result in cycle times of an hour or more, which can cause the media to dry out or odors to develop in the recirc tank. If CT is much more than 30 minutes, consult your Dealer or Orenco for suggested adjustments.
Pump cycles per day	72 cycles	1440 min/day ÷ (OFF cycle time + ON cycle time). Must not exceed the pump's maximum rated cycles of 300 cycles per day.
Gallons per cycle	8.3 gal. (31 L)	With 68 orifices and using the $T_d$ range recommended above, you will maintain the recommended 0.08 to 0.25 gal. (0.45 to 0.95 L) per orifice per dose.

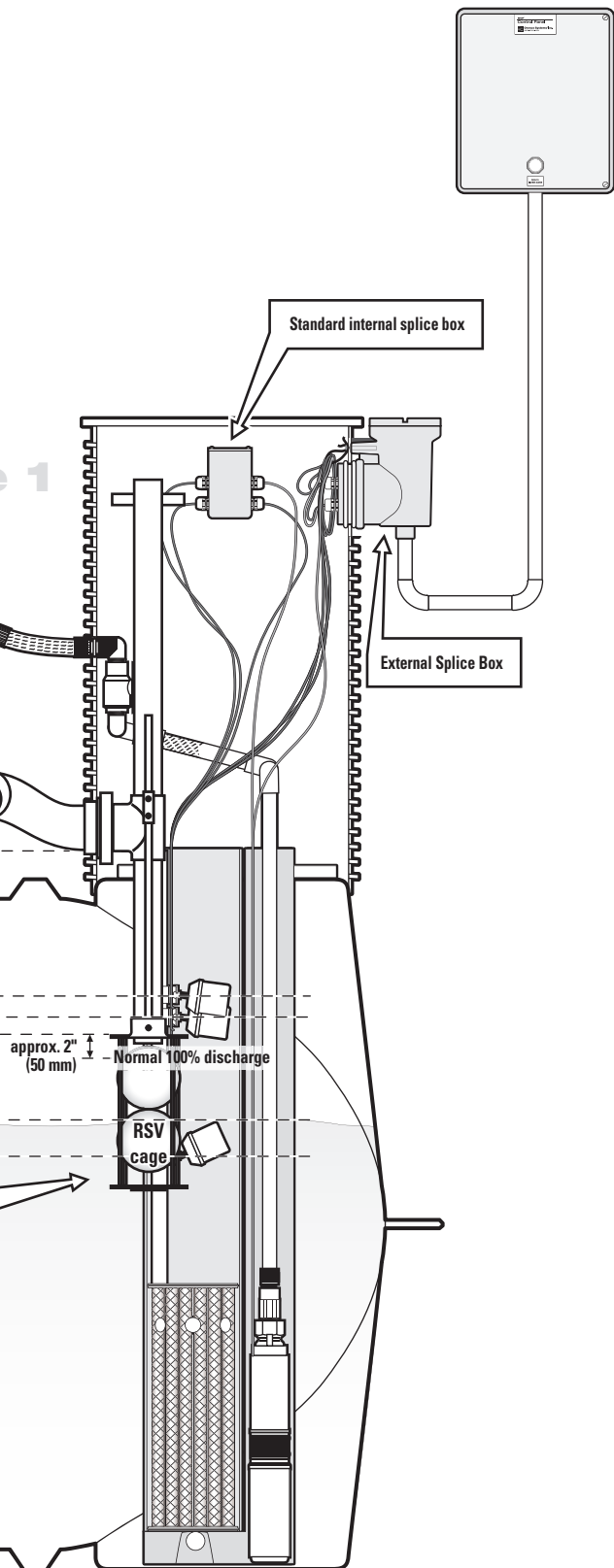
## Appendix 2: Float and RSV Settings

Orenco will provide the float and RSV settings for tanks that are approved for use with AdvanTex Treatment Systems in your area. Service Providers are simply required to verify that the float and RSV settings are correct.

This diagram shows how these settings are established for AdvanTex Treatment Systems that use a VeriComm® Control Panel. The diagram shows both a Mode 1 and a Mode 3 setup. For Mode 1 setups, the recirculating splitter valve (RSV) is installed in the second compartment, with the Biotube pump vault. For Mode 3 setups, the RSV is installed in the first compartment, under the inlet riser.



## Appendix 2: Float and RSV Settings (continued)



### Typical RSV Levels

For stinger pipe lengths up to 24 inches (600 mm) long, the “normal low operating liquid level” will be approximately 5-6 inches (125-150 mm) below the top of the RSV cage. (The normal low operating liquid level is the level at which 100% of the filtrate returns to the tank.) For most residential applications, the recommended surge volume — the volume between the low liquid level and the high water alarm float — is approximately 250 gallons (950 L). For Mode 3 installations, the duckbill model RSV, which has a flexible PVC tube that vents the RSV cage to atmosphere, is required.

### Typical Float Levels

Be sure to check the plans for any site-specific or tank-specific float settings. The top float is normally set equal with the tank's invert of inlet. The bottom float should be approximately 4 inches (100 mm) below the normal low operating level.

**NOTE:** Before leaving the site, verify that the “low water alarm/redundant off” float is positioned at least 10 inches (250 mm) below the top of the RSV cage.

