FLORIDA DEPARTMENT OF HEALTH

Charlie Crist
Governor

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

INTEROFFICE MEMORANDUM

INFORMATION
HSES 10-008

DATE: July 14, 2010

TO: County Health Department Directors/Administrators
ATTN: Environmental Health and Engineering Directors

THROUGH: Lisa Conti, D.V.M., M.P.H., Dipl. ACVPM, Director
Division of Environmental Health

FROM: Gerald Briggs, Chief,
Bureau of Onsite Sewage Programs

SUBJECT: ANSI/NSF Standard 40, Class I, Aerobic Treatment Unit (new listing)

INFORMATION ONLY

Orenco Systems, Incorporated with model AdvanTex AX20-RT Wastewater Treatment System Aerobic Treatment Unit (ATU) have been certified as meeting all of the requirements of ANSI/NSF Standard 40 - Residential Wastewater Treatment Systems for Class I classification. Please note that it as been added to the listing of ATUs acceptable for use in the State of Florida.

It has been certified in Mode 1A (gravity discharge) and Mode 1B (pump discharge). Also, NSF has determined that this unit is comparable to the already certified model AX20N and did not require further testing. Attached, you will find a PDF file of the evaluation letter issued by NSF International as well as an Installation and Maintenance Manual and the original NSF Wastewater Technology report.

The unit was tested with a 1000 gallon pre-treatment tank. This will be the minimum allowable tank size. For ATU-applications the manufacturer does not see a need to recommend a maximum size.

The following treatment tank manufactured by Orenco Systems, Incorporated has been approved for use in the State of Florida with the above listed aerobic treatment unit.

TANK NUMBER	CATEGORY	WALL THICKNESS	LIQUID DEPTH	APPROVAL DATE
70-128-AXRT1-C3	C-3			5/24/2010

Remarks: Fiberglass recirculating tank for Advantex AX20-RT treatment system.

Please direct any questions to Kim Duffek at (407) 317-7325.

Attachments
cc: Orenco Systems, Incorporated

NSF International

March 1, 2010

Mr. Nickolas Noble
Orenco Systems, Inc.
814 Airway Avenue
Suthurlin, OR 97479

Dear Nick,

This letter confirms that NSF completed a review of the Orenco model AX20RT in May of 2009, as requested by Orenco. The review of the AX20RT was in comparison to the model AX20 which was tested in accordance with NSF/ANSI Standard 40 and found to meet the requirements of NSF Certification. Based on our review of the model AX20RT, it was determined to be sufficiently similar to the model AX20 to allow for NSF certification of the AX20RT in the absence of any further testing. Although the configuration of the AX20RT is different, the treatment processes are functionally the same. The most significant differences between the two systems are 1) The way the effluent is discharged and; 2) The filter pod and treatment tank are moved into a single structure for the AX20RT instead of being separated into two structures for the AX20. NSF expects comparable treatment performance between the two systems.

If you have any questions, please contact me directly.

Sincerely,

Sharon Steiner

Sharon Steiner
Business Unit Manager
Wastewater Treatment Unit Program

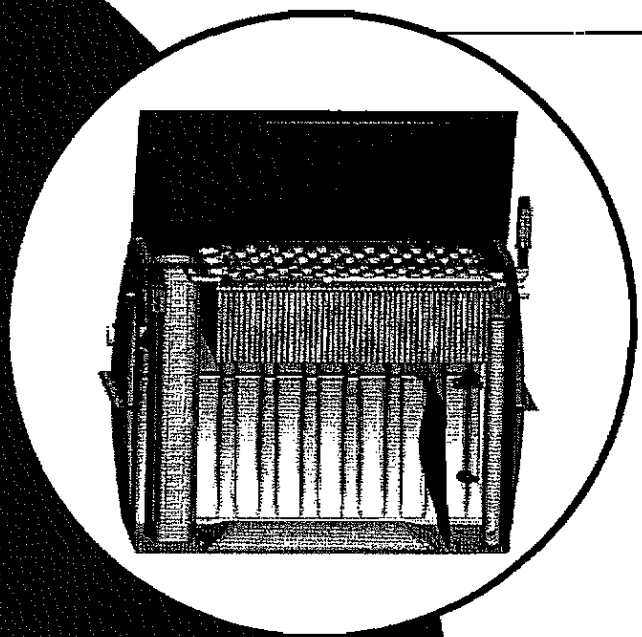
734-827-6846 (voice)
734-827-7790 (fax)
steiner@nsf.org (e-mail)

cc: product specs (0B980)

Installation Manual

AdvanTex -AX20-RT Treatment Systems

Residential Applications



An illustrated guide to installing an Orenco AdvanTex® AX20-RT Treatment System.

NIM-ATX-AXRT-1
Rev. 1.0, © 1/10
Orenco Systems®, Inc.

Orenco Systems®
Incorporated

Changing the Way the World Does Wastewater®

800-348-9843
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www.orenco.com
www.vericomm.net

1 Installation Manual: *AdvanTex® AX20-RT Treatment Units*

Before You Begin

As the installer of an onsite wastewater treatment system, you play a crucial role. Homeowners, neighbors, service providers, regulators, Dealers, manufacturers ... we all rely on your expertise and good work. At Orenco, we've worked hard to make your installation as easy and "hassle-free" as possible.

Property owners, neighbors, regulators, Dealers, manufacturers, and service providers all depend on your careful installation

We're very proud of this wastewater treatment system. Like all our products, the AdvanTex® AX20-RT Treatment Unit has gone through extensive research, development, and field-testing. Then each component is built to written specifications and subjected to quality review before shipping. If this system or any of its components possesses flaws that would inhibit its proper functioning, please contact your authorized AdvanTex Dealer. The Dealer can also provide repair and replacement instructions and replacement components. If there is no authorized AdvanTex Dealer in your area, call Orenco Systems®, Inc. at 800-348-9843 or +1-541-459-4449.

Products described in this manual are covered by one or more of the following U.S. Patents: 6,540,920; 6,372,137; 5,531,894; 5,492,635; 5,480,561; 5,360,556; 4,439,323. Products are also covered by foreign patents.

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Installation Manual: *AdvanTex® AX20-RT Treatment Units*

This manual covers installation of all models of our AdvanTex AX20-RT Treatment Units. In addition to this manual, the installation manual for the system's electrical control panel describes installation, wiring, and operating instructions for Orenco control panels. Please read all other control panel documentation, as well.

It's important that you read through this entire manual before beginning the installation. And make sure you have the correct equipment, materials, tools, and training to perform this installation. Please note that *you must perform the installation according to the current manual to keep the warranty in force.*

Once you become familiar with the installation process, you should be able to install an AdvanTex AX20-RT unit in less than half a day, not counting the time to install the tank and dispersal system.

Conditions for Using an AX20-RT to Repair an Existing System

Before you install an AX20-RT to repair or upgrade an existing septic system, be sure that the following conditions are met:

- The existing primary tank must be Orenco-approved and must meet all applicable regulatory requirements. (No pour-in-place tanks, no homemade tanks, etc.)
- The existing primary tank must be structurally sound
- The existing primary tank must have at least 1000 gallons (3800 liters) capacity at the normal operating level (1000 gal. or 3800 L below the invert of the outlet).
- The existing primary tank must have an at-grade access with a securable and removable lid. If it doesn't, an at-grade access must be installed onto the primary tank and be made watertight.
- The primary tank must be tested for leakage to a height of at least 2 inches into the riser, and it must hold water for at least sixty minutes.
- An Orenco effluent filter with at least 5 ft^2 of filter area must be installed and accessible in the existing primary tank (models FT0822-14B, FTW0444-36V, or FTS0444-36V).
- The depth of burial of the existing primary tank must allow for a fall of at least ⅛ in. per foot (10 mm per meter or 1%) from the outlet of the existing primary tank to the inlet of the AX20-RT unit if the primary tank uses a gravity discharge. If sufficient fall cannot be met, a pumping system will need to be installed in the existing tank to move the filtered effluent to the AX20-RT unit. (Contact Orenco for assistance.)

Important Notes

- *All tanks used with AX20-RT Treatment Units must be prequalified. Call your local Dealer for specifics.*
- *The backwash discharge from a salt-type water softener MUST NOT be plumbed into an AX20-RT Treatment Unit or the preceding septic tank. Failure to follow this instruction, or any other in this manual, will void the system's warranty. Contact your AdvanTex Dealer if you have any questions about household plumbing arrangements that may interfere with the functioning of the system.*
- *All pipe diameters given are U.S. nominal IPS pipe sizes. If you are using metric pipe, you may need adapters to connect to the U.S. fittings supplied.*
- *If you are not a trained AdvanTex Installer, contact your local AdvanTex Dealer or Orenco for training before installing this system.*

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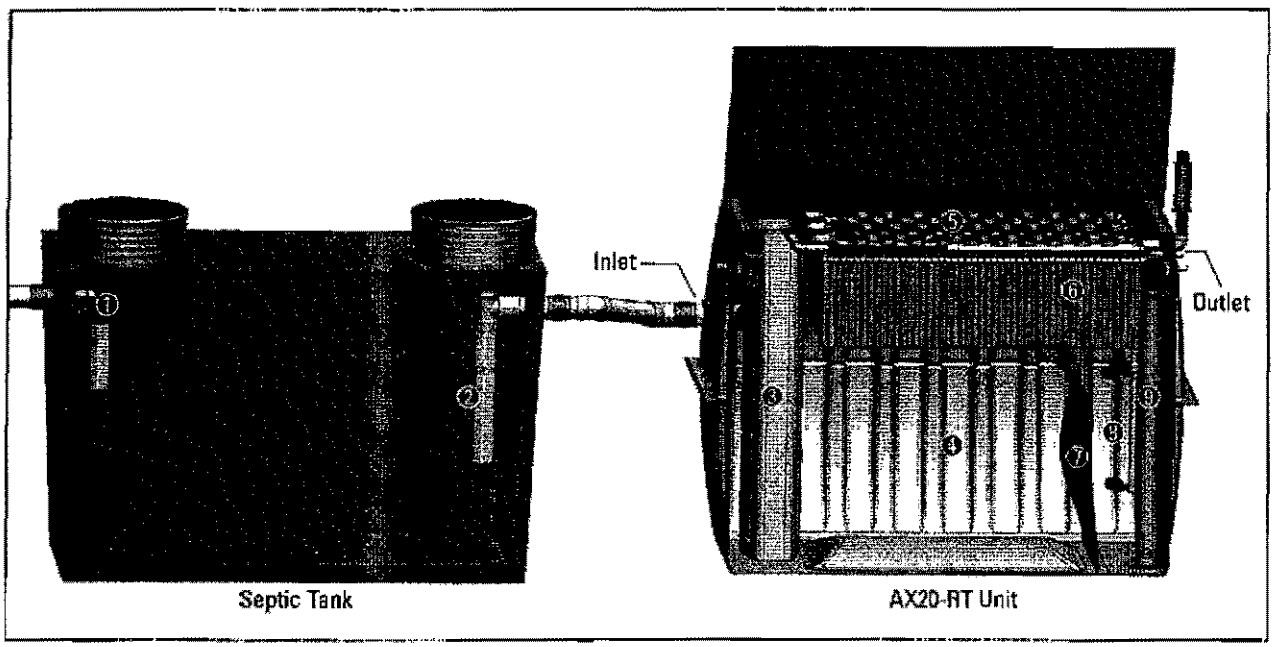
3 Installation Manual: *AdvanTex® AX20-RT Treatment Units*

Overview

The AdvanTex® AX20-RT Treatment System has 10 main functional areas and components:

1. Septic Tank Inlet Tee
2. Biotube® Effluent Filter
3. Biotube Pump Package
4. Recirculating Treatment Tank (recirc side)
5. Manifold and Laterals
6. Textile Media
7. Tank Baffle
8. Recirculating Treatment Tank (discharge side)
9. Flow Inducer and Discharge Pump Assembly (pump discharge only)
10. Control Panel (not shown)



Concrete septic tank and AX20-RT (pump discharge model) shown

Raw sewage enters the septic tank through its inlet tee. In the septic tank, the raw sewage separates into three distinct zones: a scum layer, a sludge layer, and a clear layer. Effluent from the clear layer passes through a Biotube® effluent filter and is discharged by gravity to the recirculating treatment tank portion of the AX20-RT unit, which contains a Biotube Pump Package. The Biotube Pump Package pumps filtered effluent from the recirc side of the AX20-RT unit's recirculating treatment tank to the distribution manifold in the top of the unit. Effluent percolates down through the textile media and is distributed — by means of a tank baffle — between the recirculating side and the discharge side of the AX20-RT recirculating treatment tank.

The operation of the pump on the recirc side of the tank baffle is controlled by a timer in the control panel, which allows the pump to dose the textile media for short periods (usually a half-minute or less), typically 72 times a day. This frequent "microdosing," which optimizes the treatment process, occurs 24 hours a day, to maintain the proper biological environment

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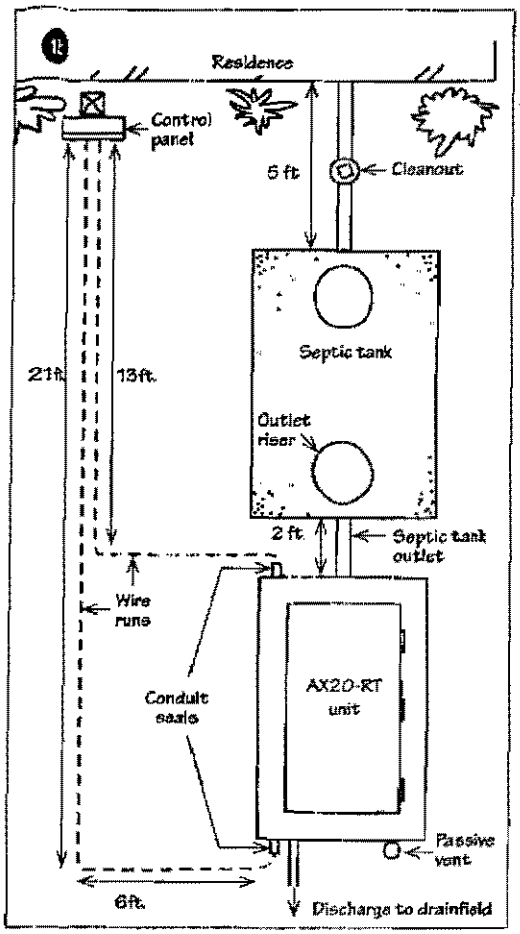

Sample sketch of a possible AX20-RT system layout

Step 1: Review or Sketch Site Plans

Before starting the installation, familiarize yourself with the site plans and specifics of your installation. If you are installing the AX20-RT unit more than 20 feet (6 meters) away from the tank, contact your Dealer or Orenco for assistance.

1a) Detailed Site Plans Provided:

If you are installing the AX20-RT according to a set of detailed plans, we recommend that you make sure that your plans accurately reflect conditions at the site. If there are differences between the physical site and the plans, we recommend you contact the Designer before scheduling the installation.

1b) No Site Plans Provided:

If you are installing the AX20-RT without detailed site plans, or with plans of limited detail, contact your local Dealer or Orenco for design assistance.

- *Determine and sketch the exact positions of the primary tank and AX20-RT unit on the site. Account for current and likely future landscape features in your sketch.*
- *Be sure to position the tank and unit to allow for a minimum ⅛ in. per foot (10 mm per meter or 1%) in the line from the outlet of the primary tank to the inlet of the AX20-RT unit, if the primary tank uses a gravity discharge.*
- *Determine and sketch the layout of your pipes, electrical conduits, and other critical buried elements. Provide measurements and distances on the sketch as accurately as possible.*
- *Sketch the placement of the control panel. (See Panel Installation, EIN-CP-GEN-1, for installation recommendations.)*

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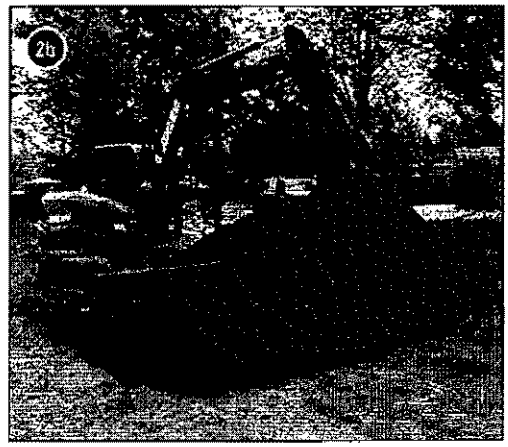
Step 2 Excavate and Set Septic Tank

This section covers excavating a hole for the septic tank and setting the tank. For information on excavating a hole for the AX20-RT unit, see Step 4.

Consider the necessary elevations and grade requirements for the tank and the AX20-RT unit before excavating the hole for the septic tank.

The septic tank must be set deep enough to allow for a minimum slope of ⅛ in. per foot (10 mm per meter or 1%) from the outlet of the septic tank to the inlet of AX20-RT if the septic tank uses a gravity discharge. Also, keep in mind that the AX20-RT needs to sit 2 inches (50 mm) above final grade



Step 2a: Outline an excavation area (with chalk, paint, string, etc.) for the tank.

Step 2b: Excavate the hole for the septic tank following the tank manufacturer's recommendations. Remember that you need the correct depth for a consistent slope of ⅛ in. per foot (10 mm per meter or 1%) from the septic tank outlet to the inlet of the AX20-RT.

Step 2c: Make sure the bottom of the excavation is free of debris, especially rocks and other sharp objects. If the bottom of the excavation is uneven or rocky, lay a 4-in. (100-mm) bed of sand or pea gravel and compact the material to create an even, smooth surface.

Step 2d: Set the tank following the manufacturer's instructions. Follow the tank manufacturer's guidelines for watertight testing, antiflotation measures, and backfilling to the level of the top of the tank. Do not backfill past the top of the tank at this time.

Step 3: Install Risers and Water Test Septic Tank

NOTE: This section covers riser installations on septic tanks using gravity discharge. Contact Orenco for riser installations on septic tanks using pump discharge.

Step 3a: Be sure you are installing the right size risers for your application and the size of the tank opening.

Step 3b: Wipe the areas to be bonded with a clean rag to ensure a clean, dry bonding surface.

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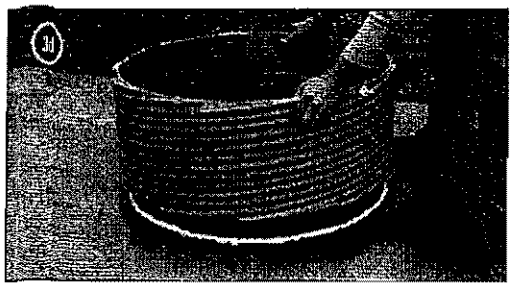
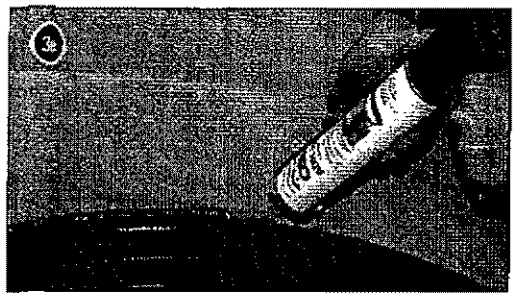
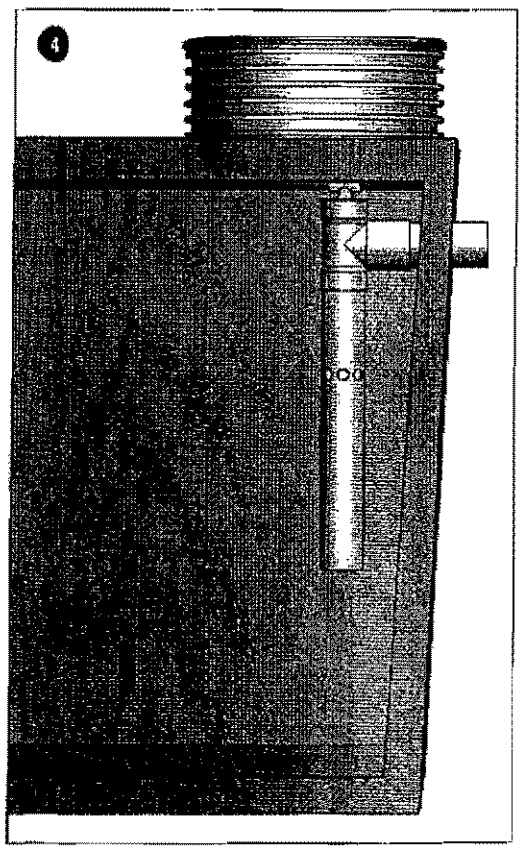


Carefully slide the riser onto the adapter.





Orenco® effluent filter installed on the septic tank outlet

Step 3c: To bond the riser to the riser tank adapter, you can use either ADH100 or methacrylate adhesive alone. However, because ADH100 does not provide a structural joint for approximately 24 hours, we recommend the use of both adhesives. If you use both, apply methacrylate adhesive to the outside surface of the riser tank adapter for a quick (usually an hour or less) structural joint.

Step 3d: Carefully slide the riser onto the adapter. Correctly orient the riser before the adhesive starts to set.

Step 3e: Apply a bead of adhesive to the inside of the adapter and riser joint; then use a putty knife or similar tool to form a continuous fillet between the tank adapter and the inside of the riser.

Step 3f: After the adhesives have hardened, fill the tank with clean water to a level 2 in. (50 mm) above the adhesive joint in the riser, to test the watertightness of the tank and the riser joint. Do not allow the water level to rise more than 3 in. (76 mm) into the riser because structural damage to the tank may occur. The inlet and outlet pipe into the tank needs to be turned up or plugged to allow the tank to be filled.

***CAUTION:** Check the tank manufacturer's guidelines before water testing the tank. Some tank manufacturers require a partial or complete backfill before a tank is water tested.*

Step 3g: When the tank proves watertight, drain the excess water to the tank manufacturer's recommended level.

Step 4: Install Effluent Filter

Install the effluent filter after the tank has been water tested.

Step 4a: Test-fit the effluent filter on the septic tank's outlet pipe without gluing. Make sure it fits plumb. Make sure the filter will fit as snug to the tank wall as possible while ensuring sufficient clearance for removing the filter cartridge.

Step 4b: Secure the filter to the outlet pipe. Two attachment methods can be used:

- You can glue the filter onto the tank outlet pipe using appropriate primer and glue
- You can use a stainless steel set screw to secure the filter.

Step 4c: For easier access when servicing, you can extend the cartridge handle with a longer length of ¾-in. Sch 40 PVC pipe

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Installation Manual: *AdvanTex® AX20-RT Treatment Units*

Step 5: Excavate and Set AX20-RT Unit

Before installing the AX20-RT, consider the depth of the septic tank and the height of the septic tank outlet. Remember that there must be a minimum ⅛ in. per foot slope (10 mm per meter or 1%) from the outlet of the septic tank to the inlet of the AX20-RT, if the septic tank uses a gravity discharge. Also, remember that the AX20-RT lid needs to sit 2 in. (50 mm) above finished grade, to allow for settling and drainage. Take into account any planned landscaping that might affect the finished grade of the system.

NOTE: If you are installing counterbuoyancy flanges, complete step 6a before setting the AX20-RT unit.

Step 5a: Mark the outline of the excavation. The excavation needs to extend 18-24 inches beyond all four sides of the unit.

Step 5b: Excavate the hole for the unit. The AX20-RT unit height is 72 in. (1830 mm). Make sure that the unit will be set deep enough to facilitate a minimum slope of ⅛ in. per foot (10 mm per meter or 1%) from the septic tank if the septic tank uses a gravity discharge. Also make sure that the lid will be 2 in. (50 mm) above final grade after the hole for the unit is excavated and after a compacted bed of aggregate or pea gravel — if necessary — is laid.

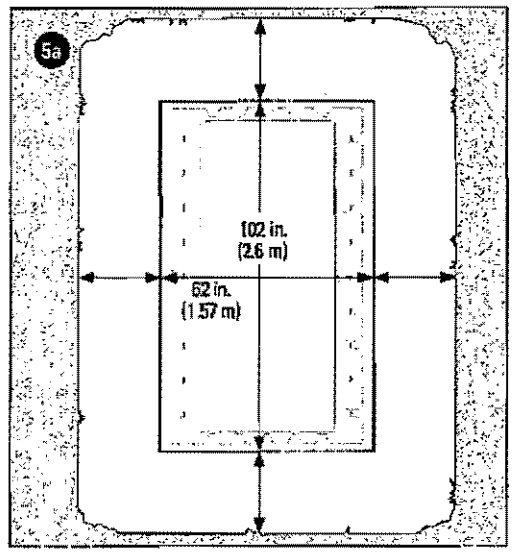
Step 5c: Make sure the bottom of the excavation is stable and free of debris, especially rocks and other sharp objects.

- If the base soil is unstable (peat, quicksand, muck, soft or highly expansive clay, etc.), overexcavate the site depth and then set a firm, 6-in. (152-mm) compacted base of ½-in.- to ¾-in.-minus (13- to 19-mm) aggregate or pea gravel. In extremely unstable soil, a concrete layer may be needed to stabilize the bottom of the excavation. If you have any doubt about the soil's ability to support the tank, consult a local civil or structural engineer.
- If the base soil is rocky or uneven, lay a 4-in. (100 mm) bed of sand or pea gravel less than ⅜ in. (10 mm) in diameter, and compact the material to create an even, smooth surface.

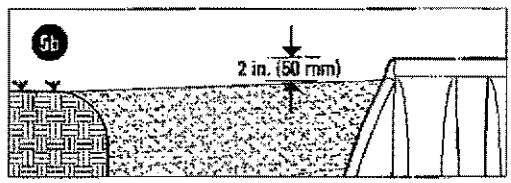
Step 5d: Use properly sized lifting equipment to attach a chain or cable to the two lifting brackets on the top of the AX20-RT unit. Carefully lift and lower the unit into the excavation. When the unit is set and level in the correct position, remove the chain/cable.

WARNING: Do not allow workers to stand in or near the excavation while placing the unit!

***CAUTION:** Use a lifting device that will not damage the unit or the lid of the unit.*



Excavate 18-24 in. (457-610 mm) beyond all four sides of the unit.



Excavate so that the lid sits at 2 in. (50 mm) above final grade

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Step 6: Prep and Install Counterbuoyancy

Because of the shallow burial depth of the AX20-RT, you may need to install counterbuoyancy measures on the unit, especially if the site has seasonally high groundwater. If you are unsure whether or not your installation requires counterbuoyancy measures, contact your Dealer or Orenco.

There are two types of counterbuoyancy offered by Orenco, factory counterbuoyancy flange kits or counterbuoyancy tie-down hardware kits.

6a) Counterbuoyancy Flanges:

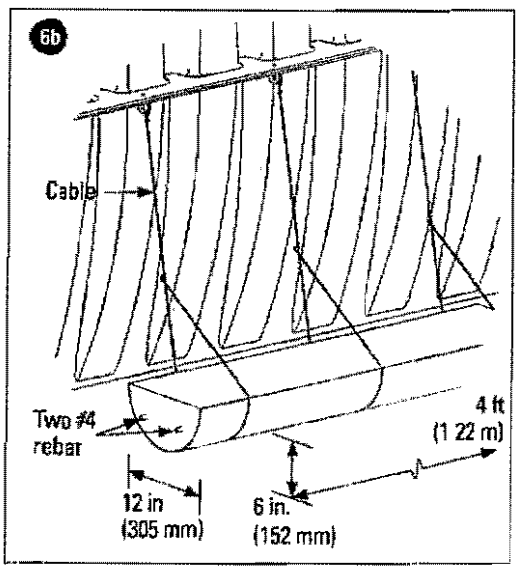
1: Using properly-sized lifting equipment, Raise the AX20-RT unit 3-4 in. (75-100 mm) off of a flat, level surface.

2: Lightly sand the contact surfaces on the upper surfaces of the flanges and the bottom of the AX20-RT, and then clean the sanded surfaces with acetone and clean, dry, lint-free rags.

3. Apply a ¾-in. (19-mm) bead of SS115 or SS140 adhesive down the length of each flange.

4. Slide the flanges under the AX20-RT unit, and then lower the unit onto the flanges. Allow the adhesive to set before moving the AX20-RT.

6b) Counterbuoyancy Tie-Downs:



Counterbuoyancy tie-down cables and half-pipe concrete forms

Orenco's tie-down counterbuoyancy hardware kits are for use with concrete forms. Sections of 12-in. diameter PVC half-pipe or chamber material can be used as forms; simple forms 12 in. wide × 6 in. high × 4 ft long (305 mm × 152 mm × 1.22 m) can be built from wood.

NOTE: To save time, we recommend preparing the counterbuoyancy measures offsite before you install the unit.

1: Fill the forms halfway with concrete, and then place two #4 reinforcing bars in each of the forms.

2: Finish filling the forms with concrete.

NOTE: Wait for the concrete to set completely before lifting the counterbuoyancy measures.

3: Use appropriate lifting equipment to set the pieces in place.

4: Secure the pieces to the unit with the supplied cables and hardware.

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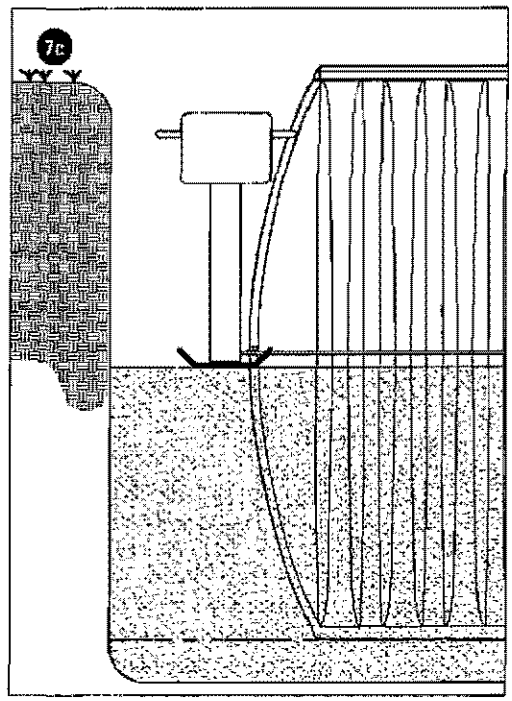
Step 7: Partially Backfill AX20-RT Excavation

Step 7a: Fill the AX20-RT unit with about 16 in. (410 mm) of water for internal support. Be sure to fill on <u>both sides</u> of the tank baffle.

Step 7b: Backfill around the unit with a 16-in. (410-mm) layer of backfill material. Native material is acceptable if there are no large or sharp rocks that may damage the unit walls. If native material is not usable, backfill with ½-in aggregate or pea gravel. Do not backfill with sand. Use a mechanical compactor to thoroughly compact the fill, to minimize settlement and provide support for the walls of the unit.

Step 7c: After the first layer of backfill is complete, fill the tank with water to just above the midseam flange on both sides of the tank baffle and then add another 16-in. layer of backfill. Compact the backfill so that the backfill level is 2-3 in. (50-75 mm) below the midseam flange.

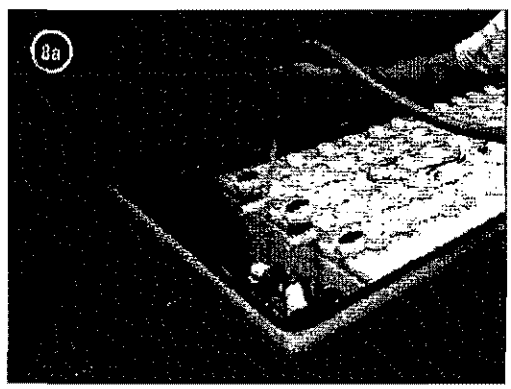


Backfill and compact to 2-3 in. below midseam.

Step 8: Test Watertightness of AX20-RT Unit

Step 8a: After backfilling the AX20-RT excavation to just below the midseam flange, make sure that the unit is filled with water to at least 1 in. (25 mm) above the midseam flange on both sides of the tank baffle.

Step 8b: Wait at least 15 minutes and then inspect the midseam of the unit for leaks. There should be no drop in liquid level and no visible leakage from the seam.



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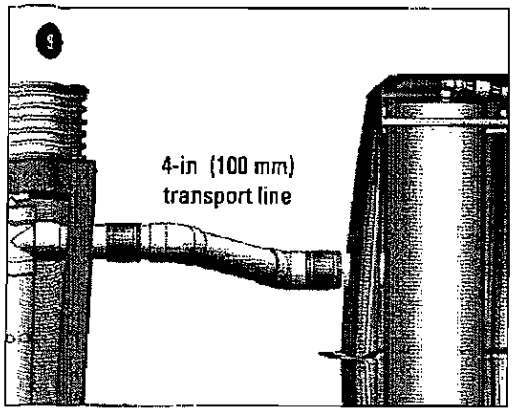

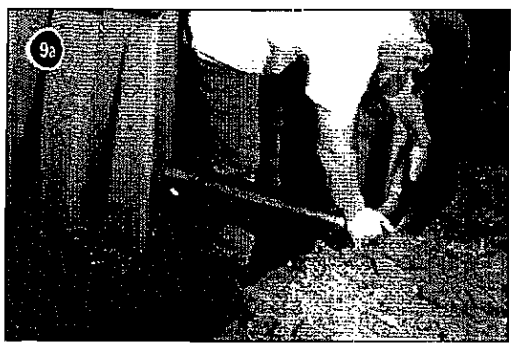

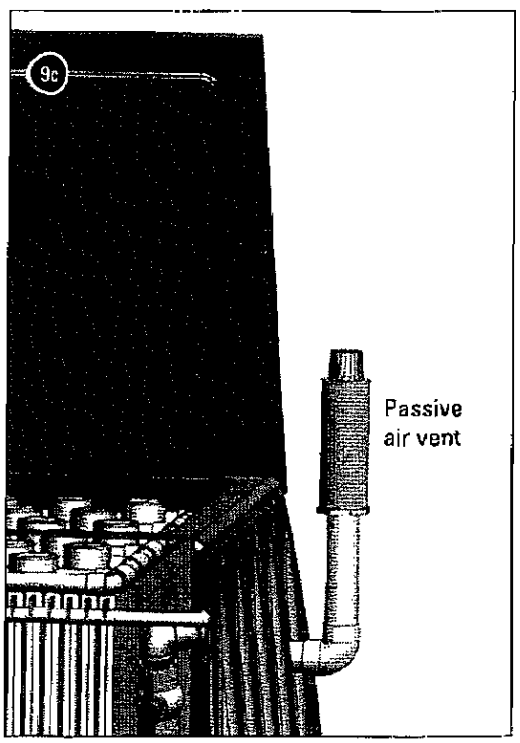

Step 9: Connect Transport Line and Passive Air Vent

NOTE: DO NOT use primer on ABS parts.

Step 9a: Dry fit the 4-in. (100-mm) transport line and any fittings between the outlet of the septic tank and the inlet on the AX20-RT unit. Make sure that you maintain a ⅛ in per foot (10 mm per meter or 1%) slope from the septic tank if the septic tank uses gravity discharge.

Step 9b: Glue all of the transport line pieces in place.

Step 9c: Use 2-in (50 mm) PVC pipe to plumb the passive air vent to the 2-in. (50 mm) vent fitting that protrudes from the outlet side of the AX20-RT unit. Be sure the vent line is sloped to drain towards the unit and that the passive air vent is within 20 ft (6 m) of the unit. After installation, the top of the passive air vent should be a minimum of 3 in. (75 mm) above final grade.

Step 9d: We recommend installing the passive air vent near a wall or in a similar location where it is less likely to be damaged by a lawn mower or accidental kicking, etc. You can easily hide the air vent behind shrubbery or other landscaping and paint it if another color is desired.

IMPORTANT: *In all cases, the line between the passive air vent and the unit must be sloped back ¼ in. per foot (20 mm per meter) toward the unit. To prevent accumulation of water, do not allow any "bellies" or low points in the vent piping. Keep the 2-in. vent piping less than 20 ft (6 m) in total length.*

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Installation Manual: *AdvanTex® AX20-RT Treatment Units*

Step 10: Install and Test Control Panel

Install Control Panel:

For complete control panel installation instructions, see the installation manual for the electrical control panel that comes with you system Instructions specific to your control panel ship inside of the control panel.*

Step 10a: Make sure the the items supplied conform to state and local regulations

Step 10b: A qualified and licensed electrician should install and service the panel and ancillary wiring in compliance with the National Electrical Code, as well as state and local codes (Wiring diagrams can be found in the installation manual* that comes with the panel.) Wiring will include the following items:

a) Incoming power to the panel. One or more circuits may be required, depending upon the number of pumps and local electrical codes.
b) Incoming phone line to the panel (for VeriComm® control panels)
c) Wiring from the control panel to the pump and floats
d) Wiring to a discharge pump and floats (if applicable)

***NOTE:** We do <u>not</u> recommend installing a control panel against the wall of a bedroom, living room, or other living space because it makes a periodic thump during operation. If it must be placed near the house, mount it on 4 × 4 (100 × 100 mm) pressure-treated post(s) next to the wall*

Test Control Panel:

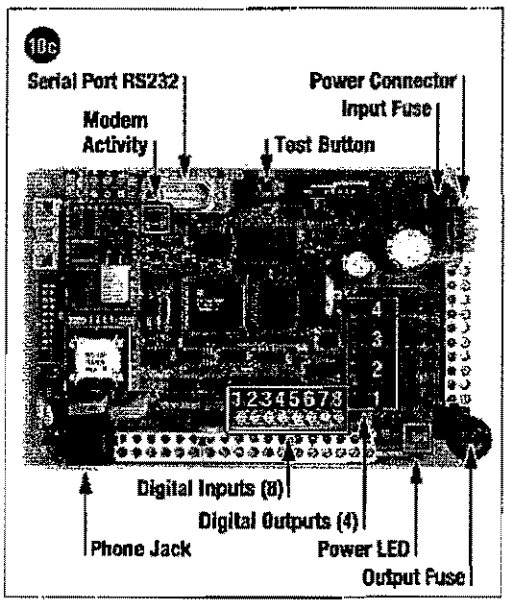
VeriComm® (VCOM) telemetry-enabled panels are used for remote monitoring and control of AX20-RT pumping operations.

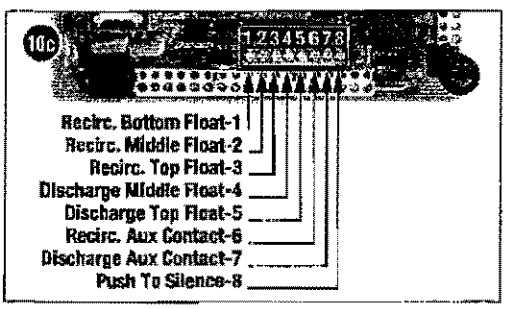
Fault conditions are automatically reported to the VeriComm Monitoring System, making the system virtually invisible to the homeowner. However, if fault conditions are not responded to, or if the system cannot communicate with the VeriComm Monitoring System, then local alarms may be activated.

Perform the following procedures to verify proper installation of the VeriComm panel

***NOTE:** For more detailed procedures specific to each panel model, refer to the documentation that comes with the panel.**

Step 10c: Familiarize yourself with the components of the telemetry control board.





* *If the installation instructions are missing from the control panel, find the product model code, located on a sticker inside the panel door. Then call your local Dealer or log in to our online Document Library at www.orenco.com and download a copy of the installation instructions (Category "Instructions, Electrical"). You can also call Orenco for a replacement.*

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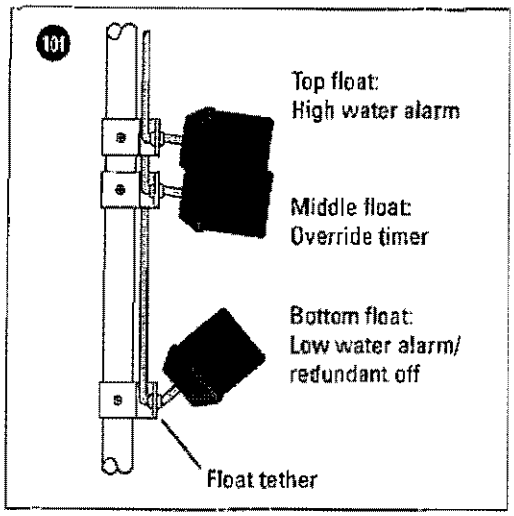
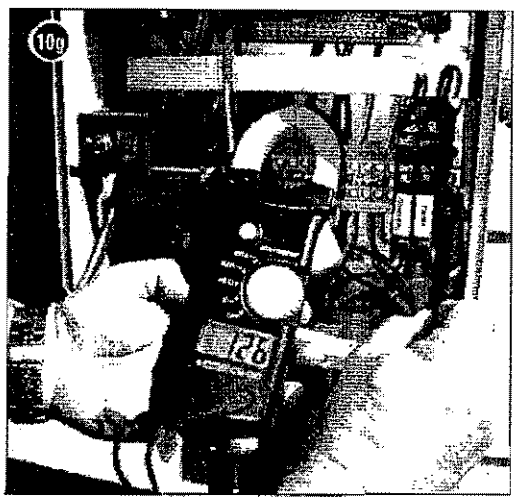


VeriComm® Recirculating Float Assembly shown



Measure voltage

Measure amperage

Step 10d: Make sure the panel has been completely and correctly installed, and verify that the circuit breakers are in the "On" position. Also check the controller status. The power LED, located on the control board, will be:

- *Blinking, which indicates the controller is operating normally, or*
- *Off (when power is applied), which indicates a possible problem with*
  - *the input fuse on the PC board;*
  - *the main fuse located inside the panel;*
  - *the controls circuit breaker located inside the panel; or*
  - *the incoming line voltage.*

Step 10e: To enable Test Mode, hold the "Push-To-Silence" button on the front of the panel until the audible alarm sounds (approximately 15 seconds).

- *The appropriate digital input should be illuminated when the button is held in.*
- *When the audible alarm sounds to indicate that the panel is in Test Mode, release the button.*

While in Test Mode, the panel will operate in the following manner:

- *The call-in function is disabled;*
- *Local audible and visual alarms are activated as alarm conditions occur;*
- *System Data Logs are suspended; and*
- *Timer cycles are shortened.*

Step 10f: Familiarize yourself with the floats on the system.

Step 10g: Verify that the pump is submerged in water before continuing. If the bottom float drops, the alarm should sound. Press down the spring-loaded "AUTO/OFF/MAN" switch located inside the panel. The pump should immediately activate. For verification, the appropriate digital input should illuminate, indicating that the auxiliary contact is on.

Measure the voltage and amperage of the pump.

a) Measure the voltage at the pump terminals in the panel. Measuring the voltage with the pump off will confirm that the correct voltage is connected. Then activate the pump by toggling the AUTO/OFF/MAN switch to MAN, or using a PDA or laptop with the Bluetooth Device, and measure the voltage while the pump is running. The maximum recommended voltage drop is 3%. A low voltage condition may indicate that the site wiring is improperly sized.

b) Using a loop ammeter, place the ammeter clamp around the loop of wire located above the pump circuit breaker and read the amperage while the pump is running and connected to the discharge assembly with the valves at the end of the laterals closed. The amperage should be within the specifications of the pump.

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Step 10: Install and Test Control Panel (cont.)

Step 10h: Refer to the control panel documentation to test the floats that activate/deactivate the pump. To perform the float test, make sure there is enough liquid in the tank. If there isn't enough liquid in the tank, turn the pump circuit breaker off.

NOTE: *If phone service to the panel is active, complete step 10i. If not, proceed to step 10j. However, phone service should be activated before system start-up.*

Step 10i: Press and release the "Push-To-Silence" button 15 times within a one-minute period. This instructs the panel to call the VeriComm Monitoring System.

- *A red LED ("Modem Activity" component) should illuminate, indicating that the controller has established communication with the host. (This may take a few minutes.)*
- *Once the communication session has ended, the modem will automatically disconnect.*
- *If the LED does not illuminate within the specified time, verify that the phone line has a dial tone. This can be done by hooking up a phone to the line that is going into the panel.*

Step 10j: The panel will automatically disable Test Mode and return to normal operation after 30 minutes. To disable Test Mode manually, hold the "Push-To-Silence" button on the front of the panel until the audible alarm sounds (approximately 15 seconds). The appropriate digital input should be illuminated when the "Push-To-Silence" button is held in. When the audible alarm sounds to indicate that the panel is no longer in Test Mode, release the button.

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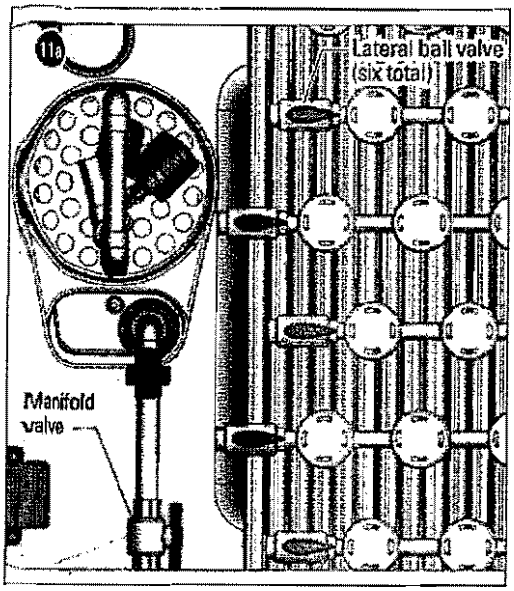
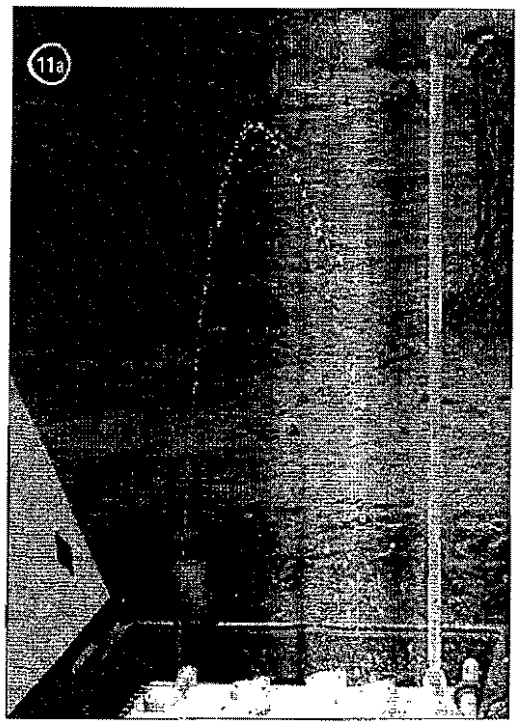


Open the manifold valve and lateral valves.



Measure squirt height.

Step 11: Test System Function

Once power is connected to the control panel, follow these steps to prepare the system for operation.

IMPORTANT: *Before using a generator to operate a pump, contact Orenco or your Dealer to make sure it can supply sufficient starting amperage.*

NOTE: *When testing pumps, always make sure there is enough water in the unit to safely run the pumps.*

Step 11a: Open the manifold valve and the lateral ball valves and then toggle the "AUTO/OFF/MAN" switch for the recirc pump to "MAN" for 5-10 seconds to flush any debris out of the manifold and laterals. Close the lateral ball valves. With the recirc pump still in "MAN," remove several orifice shields and measure squirt height. Squirt height should measure between 3-5 ft (0.9-1.5 m). Windy conditions will cause a lower squirt height. When finished, return the "AUTO/OFF/MAN" switch to "AUTO."

NOTE: *If the desired squirt height is not achieved or the unit does not pressurize, check for debris, breaks, or closed valves. Also verify that the pump is receiving sufficient power. If the unit still does not pressurize correctly, contact your Dealer or Orenco for technical assistance.*

Step 11b: Place the panel in Test Mode. Check the function of the recirc pump floats by lifting the low-level, mid-level, and high-level float in turn and verifying that the pump cycles on and off for each. If the unit is not equipped with a discharge pump, take the control panel out of Test Mode at this time.

Step 11c: If the unit has a discharge pump, make sure there is enough water on the discharge side of the tank baffle for the pump to run. Make sure the panel is in Test Mode. Check the function of the discharge pump floats by lifting the low-level, mid-level, and high-level float in turn and verifying that the pump cycles on and off for each. When you are finished, take the control panel out of Test Mode.

Step 11d: Close and bolt down the AX20-RT unit lid when you are finished.

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Step 12: Complete Final Backfilling

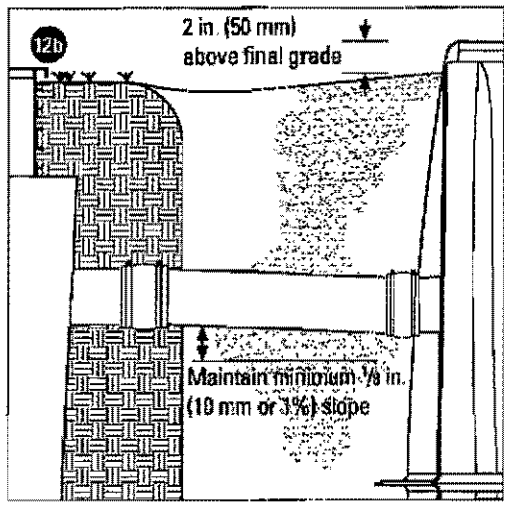
IMPORTANT: *When backfilling, be careful not to alter the slope of pipes. Brace the pipes or place the pipes on a compacted bed and carefully fill around them.*

NOTE: *Before backfilling, make sure the AX20-RT unit lid and all riser lids are bolted down.*

Step 12a: Backfill the septic tank excavation if it has not yet been done. Follow the tank manufacturer's guidelines for backfilling.

Step 12b: Backfill and compact around the AX20-RT unit in maximum 12-in. (305-mm) lifts. Native material is acceptable if there are no large or sharp rocks that may damage the unit walls. If native material is not usable, backfill with sand or pea gravel. For installations in non-cohesive soils* with high seasonal water tables, use ¼-in. crushed rock as the backfill material. The top of the AX20-RT lid should sit 2 in. (50 mm) above final grade.

IMPORTANT: *After backfilling, call the system's Service Provider to arrange for the official System Start-up.*



Backfill the AX20-RT in 12-in. (300 mm) lifts

* *As described in OSHA Standards (29 CFR, Part 1926, Subpart P, Appendix A), noncohesive soils or granular soils include gravel, sand, or silt with little or no clay content. Granular soil cannot be molded when moist and crumbles easily when dry. Cohesive soils include clayey silt, sandy clay, silty clay, clay, and organic clay. Cohesive soil does not crumble, can be excavated with vertical sideslopes, is hard to break up when dry, and when moist, can be rolled into threads without crumbling. For example, if at least a 2-in. (51-mm) length of 1/8-in. (3-mm) thread can be held on one end without tearing, the soil is cohesive.*

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Notes

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Notes

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Notes

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AdvanTex®-AX
Treatment Systems

Installation Guide

Residential Applications

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Incorporated

Changing the Way the World Does Wastewater®

800-348-9843
541-459-4449
www.orenco.com
www.vericomm.net

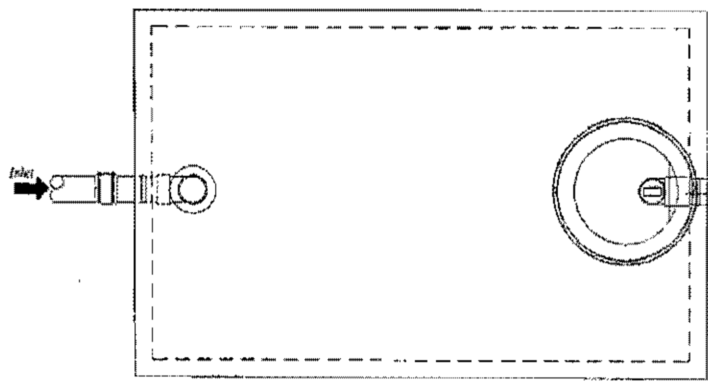
AdvanTex Treatment System AXN Models meet the requirements of ANSI-NSF Standard 40 for Class I Systems.

c UL us LISTED

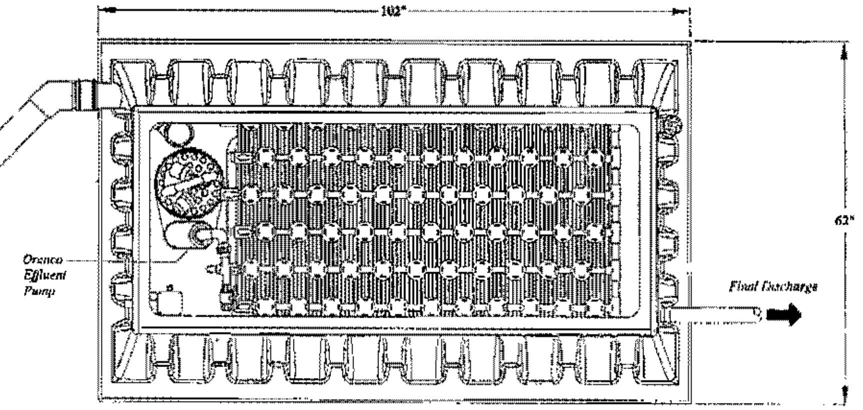
NIM-ATX-AXRT-1
Rev 1 [illegible]/10
Orenco Systems®, Inc.

Gravity Discharge, 2-Comp. Recirculating Tank

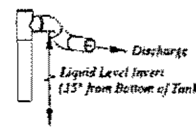
Filter Tank Dry Weight: 860 lbs



1000 gal. Primary Tank - Top View

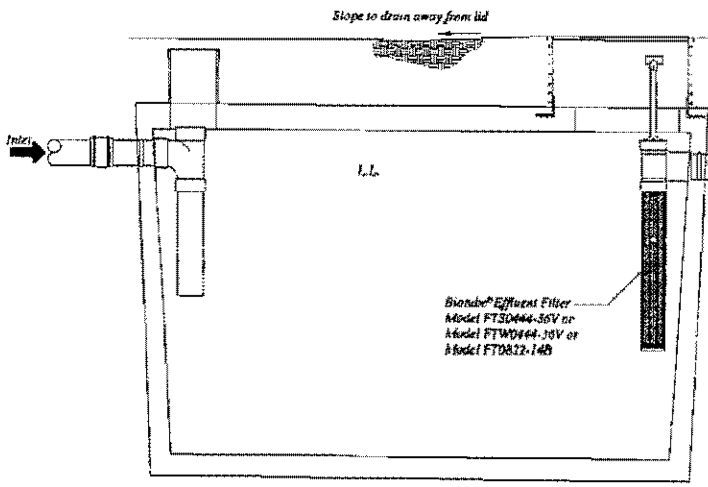


800 gal. Recirculating Tank - Top View

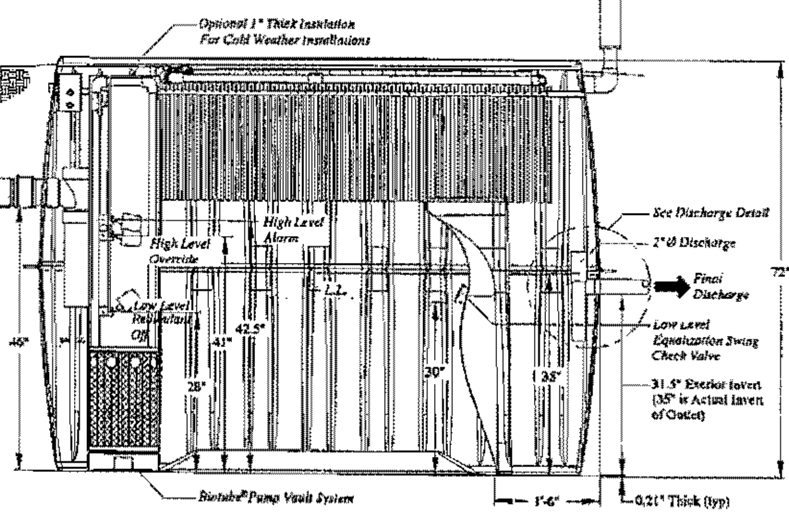


Discharge Detail

Not To Scale



1000 gal. Primary Tank - Side View



800 gal. Recirculating Tank - Side View

Orenco Systems®

Title: AX20RT-Mode 1A

Designed By: ENGINEERING | Drawn By: CHRIS JORDAN
Approved By: | Drawing: 1 OF 3 | Drawing No: NDW-ATX-RT-01
Date Approved: | Revision: A-02 | Date: 1/26/2010 | Scale: 1" = 20'

U.S. Patents 4,439,323
5,492,635 5,372,137 5,360,556
5,980,748 5,531,894 5,480,561
Other Patents Pending

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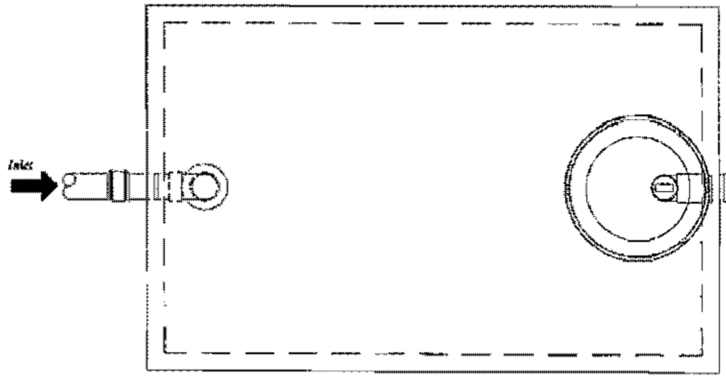
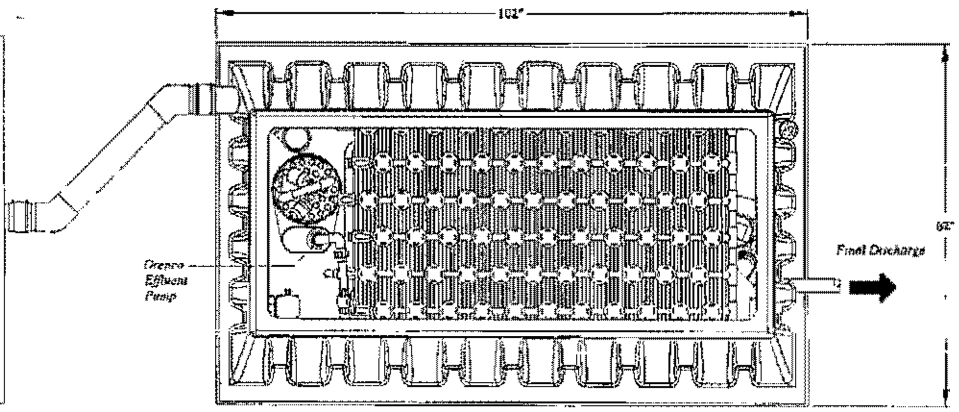
Pump Discharge, 2-Comp. Recirculating Tank

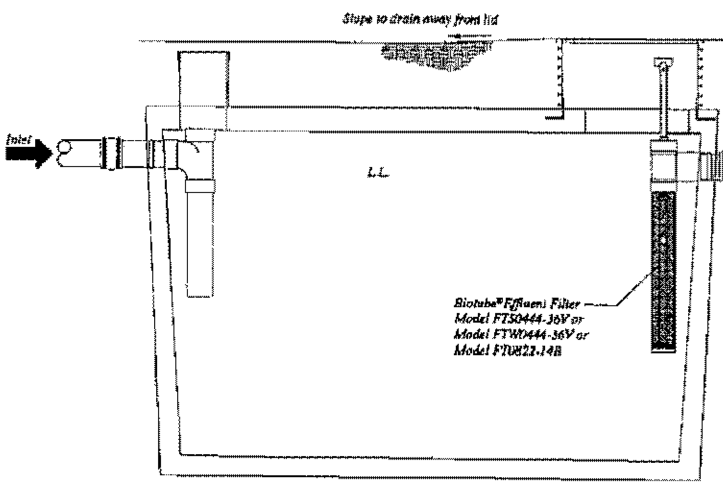
Filter Tank Dry Weight: 900 lbs



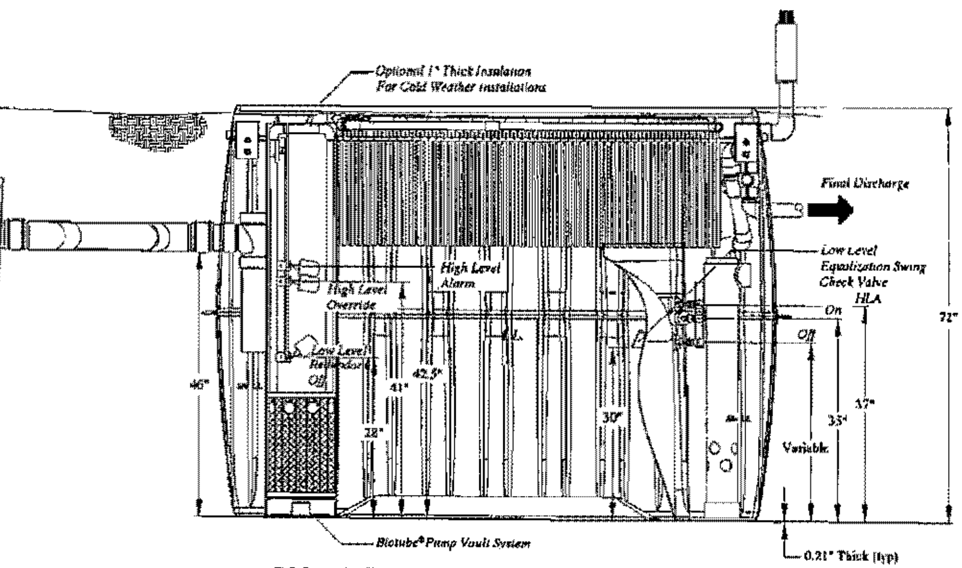
1000 gal. Primary Tank - Top View



800 gal. Recirculating Tank - Top View



1000 gal. Primary Tank - Side View



800 gal. Recirculating Tank - Side View

Orenco Systems® Incorporated

Title: AX20RT - Mode 1B		
Drawing No. NDW-ATX-RT-03		
Date: 1/26/2010	Scale: 1" = 20'	
Drawn By: Chris Jordan	Drawing 3 Of 3	Revision: A-02
Designed By: Engineering	Approved By:	Date Approved:

U.S. Patents 4,439,323
5,492,635-6,372,137-5,360,556
5,980,748-5,531,894-5,480,561
Other Patents Pending

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FOR ADVANCED WASTEWATER TREATMENT

Introducing AdvanTex® AX20-RT

Orenco Systems Incorporated
800-348-9843

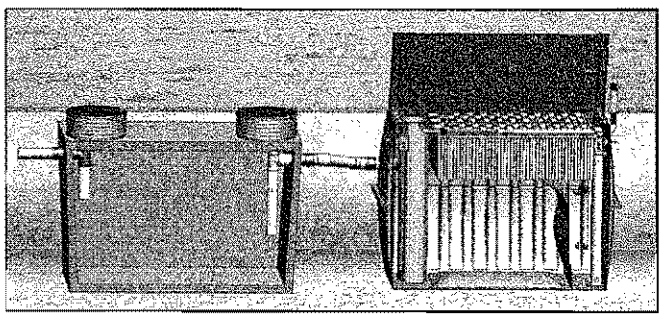
"Performs like AdvanTex, Installs like a Tank"

AdvanTex® - Quality Treatment, at a Competitive Price

Orenco's AdvanTex AX20-RT is a completely pre-packaged "plug & play" AX20 that installs as easily as a septic tank. Its simplified design reduces costs for excavation, installation, and O&M, giving your residential customers AdvanTex-quality wastewater treatment at a competitive price.

3-in-1, Pre-plumbed System

The AX20-RT combines the recirc, treatment, and discharge modules of a standard AX20 into a single, shallowly-buried unit. What's more, there's no recirculating splitter valve to mess with. Instead, a patented baffle with one-way valve performs this function automatically. Plus all interior components are installed and adjusted at the factory. Just hook it up to a tank and go! Easier install, fewer call-backs.



Clear, Odorless, Re-Usable Effluent

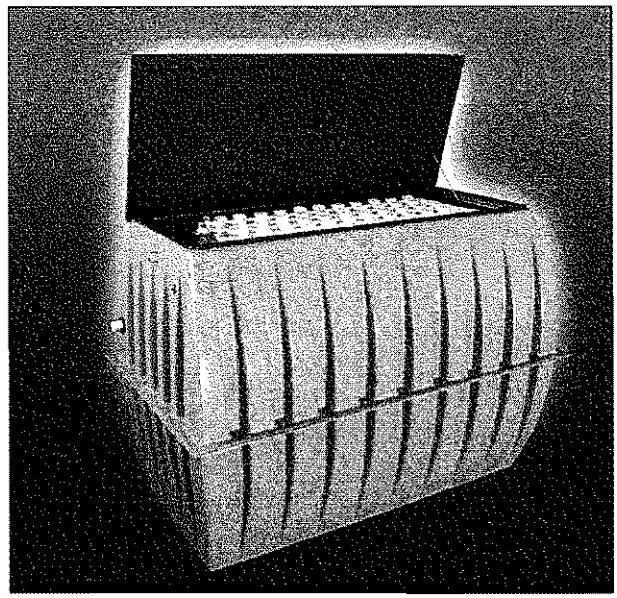
The AX20-RT produces the same, great, "re-use" quality effluent produced by all AdvanTex systems: BOD and TSS of 10 mg/L or less. (In fact, it has been approved by NSF as an AX20-equivalent.) So the treated effluent can be re-used for sub-surface irrigation. A responsible, green solution to household water and wastewater needs!

Low Power Costs, Low Maintenance Costs

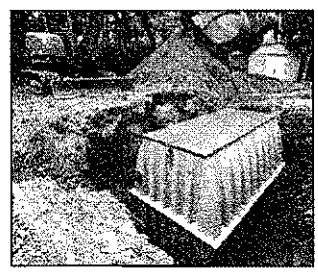
No blowers. No odors. The AX20-RT is passively vented and uses less than $2/mo in electricity. And it's easy to maintain with an annual service call. Cleanable filters and media, 20-year pumps. Your customers will thank you.

Reduces Nitrogen Too

Like all AdvanTex Treatment Systems, the AX20-RT reduces nitrogen by 60-70% naturally, or by more than 90% with supplemental processing.



Compact Footprint, Shallow-Bury



The AX20-RT recirculates, treats, and discharges high quality effluent out of a unit that is only 6 ft high and a total of 20 sq ft. And it can be shallowly buried right next to a watertight tank. So it's perfect for small sites and sites with clay or rocky soils.

Ideal for Repair/Replacement of Failing Systems

Many existing septic systems are at the end of their useful life. The AX20-RT can replace a failing system in a fraction of the space. And, if the existing tank is re-useable, at a fraction of the cost.

Comes with 24/7 Remote Monitoring

The AX20-RT comes standard with Orenco's VeriComm® Remote Telemetry Control Panel and Monitoring System for affordable, round-the-clock supervision and control. (Non-telemetry panels also available.)

Standard Models and Configurations

See back ——→

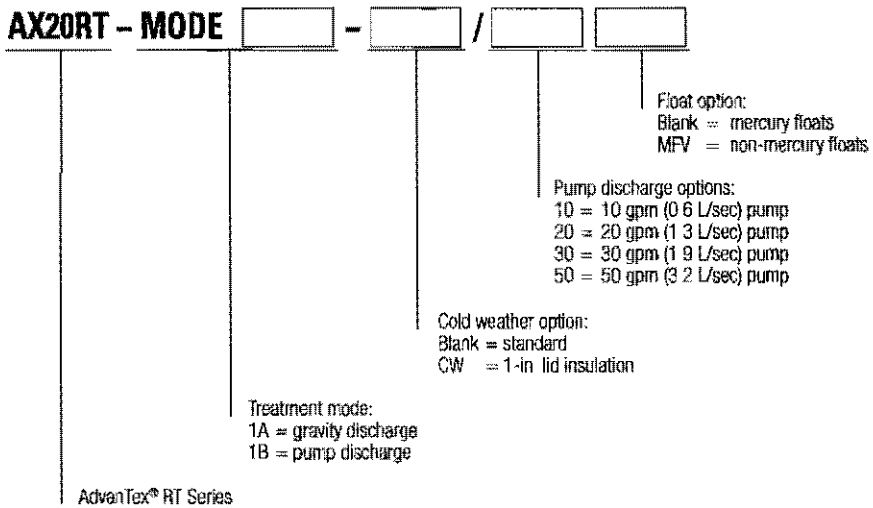
AdvanTex® AX20-RT (continued)

Standard Models and Configurations

There is an AX20-RT for both gravity and pump discharge and for cold weather applications. Following is a list of standard models.

- AX20RT-MODE1A
- AX20RT-MODE1A-CW
- AX20RT-MODE1B/10
- AX20RT-MODE1B-CW/10
- AX20RT-MODE1B/30
- AX20RT-MODE1B-CW/30

Other models are available. See nomenclature, below.



Call Orenco at 1-800-348-9843 for an AX20-RT design package or for the name of your local AdvanTex Dealer.

WASTEWATER TECHNOLOGY

ANSI/NSF Standard 40 - *Residential Wastewater Treatment Systems*

Final Report:

Orenco Systems, Inc.
AdvanTex AX20N Wastewater Treatment System
01/11/2015/060

NSF International
789 Dixboro Road
PO Box 130140
Ann Arbor, Michigan 48113-0140 USA

Evaluation Report:
Orenco Systems Inc. AdvanTex AX20N
Wastewater Treatment System

Under the provisions of ANSI/NSF Standard 40
Residential Wastewater Treatment Systems

April 2002

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EXECUTIVE SUMMARY

Testing of the Orenco Systems AdvanTex AX20N 500 gpd treatment system, was conducted under the provisions of ANSI/NSF Standard 40 for Residential Wastewater Treatment Systems (July 2000 revision) ANSI/NSF Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the Mamquam Wastewater Technology Test Facility located in Squamish, British Columbia, using wastewater diverted from the Mamquam municipal wastewater treatment plant which serves predominantly residential development The Mamquam Wastewater Technology Test Facility, operated by NovaTec Consultants of Vancouver British Columbia, is a Standard 40 subcontractor for NSF. The evaluation consisted of six days of dosing prior to starting the test, followed by sixteen weeks of dosing at design flow, seven weeks of stress test and three weeks of dosing at design flow Sampling was initiated on May 14, 2001 However, the test wasn't officially started until May 20, 2001 since there were only three sample days during the first week. Sampling started in the spring and continued into the fall, covering a range of operating temperatures

Over the course of the evaluation, the average effluent $CBOD_5$ was 5 mg/L, ranging between <2 and 25 mg/L, and the average effluent suspended solids was 4 mg/L, ranging between <2 mg/L and 42 mg/L

The AdvanTex AX20N produced an effluent that successfully met the performance requirements established by ANSI/NSF Standard 40 for Class I effluent:

> The maximum 7-day arithmetic mean was 14 mg/L for $CBOD_5$ and 11 mg/L for suspended solids, both below the allowed maximums of 40 and 45 mg/L respectively The maximum 30-day arithmetic mean was 8 mg/L for $CBOD_5$ and 6 mg/L for suspended solids, both below the allowed maximums of 25 mg/L and 30 mg/L respectively

The effluent pH during the entire evaluation ranged between, 6 0 and 7 2, within the required range of 6 0 to 9.0. The plant met the requirements for noise levels (less than 60 dbA at a distance of 20 feet), color, threshold odor, oily film and foam

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PREFACE

Performance evaluation of residential wastewater treatment systems is achieved within the provisions of ANSI/NSF Standard 40: Residential Wastewater Treatment Systems (revised July 2000), prepared by the NSF Joint Committee on Wastewater Technology and adopted by the NSF Board of Trustees

Conformance with the Standard is recognized by issuance of the NSF Mark This is not to be construed as an approval of the equipment, but a certification of the data provided by the test and an indication of compliance with the requirements expressed in the Standard.

Plants conforming to Standard 40 are classified as Class I or Class II plants according to the quality of effluent produced by the plant during the performance evaluation Class I plants must also demonstrate performance consistent with the effluent color, odor, oily film and foam requirements of the Standard. Class I plants must meet the requirements of EPA Secondary Treatment Guidelines[1] for five day carbonaceous biochemical oxygen demand, suspended solids and pH

Permission to use the NSF Mark is granted only after the equipment has been tested and found to perform satisfactorily, and all other requirements of the Standard have been satisfied Continued use of the Mark is dependent upon evidence of compliance with the Standard and NSF General and Program Specific Policies, as determined by periodic reinspection of the equipment at the factory, distributors and reports from the field

NSF Standard 40 requires the testing laboratory to provide the manufacturer of a residential wastewater treatment system, a report including significant data and appropriate commentary relative to the performance evaluation of the plant NSF policy specifies provision of performance evaluation reports to appropriate state regulatory agencies at publication Subsequent direct distribution of the report by NSF is made only at the specific request of or by permission of the manufacturer

The following report contains results of the entire testing program, a description of the plant, its operation and key process control equipment, and a narrative summary of the test program, including test location, procedures and significant occurrences The plant represented herein reflects the equipment authorized to bear the NSF Mark

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CERTIFICATION

NSF International has determined by performance evaluation under the provisions of ANSI/NSF Standard 40 (revised July, 2000) that the AdvanTex AX20N manufactured by Orenco Systems Inc., has fulfilled the requirements of ANSI/NSF Standard 40 The Orenco Systems AdvanTex AX20N has therefore been authorized to bear the NSF Mark so long as Orenco Systems Inc continues to meet the requirements of Standard 40 and NSF General and Program Specific Policies

General performance evaluation and stress tests were performed by NovaTec Consultants of Vancouver B.C., at the Wastewater Technology Site located in Squamish, British Columbia The raw wastewater used in the test was municipal wastewater. The characteristics of the wastewater during the test are included in the tabulated data of this report

The observations and analyses included in this report are certified to be correct and true copies of the data secured during the performance tests conducted by NSF on the wastewater treatment system described herein The manufacturer has agreed to present the data in this certification in its entirety whenever it is used in advertising, prospectuses, bids or similar uses

Thomas J Bruursema
General Manager
Wastewater Treatment Unit Certification

Thomas Stevens
Manager
Engineering and Research Services

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1.0 PROCESS DESCRIPTION

The Orenco Systems Inc AdvanTex AX20N is an attached growth multiple pass packed bed reactor.

In the packed bed reactor, microorganisms remove soluble contaminants from the wastewater, utilizing them as a source of energy for growth and production of new microorganisms. The organic matter is attacked by extracellular enzymes that solubilize the solids to make them available to the microorganisms as a food source The organisms primarily responsible for the degradation of the organic and some inorganic matter, are aerobic bacteria. As such, the transfer of oxygen into the wastewater is critical to the treatment process. A passive ventilation system is used to provide fresh air to the interior of the packed bed reactor pod.

2.0 PERFORMANCE EVALUATION

2.1 Description of Plant Evaluated

The AdvanTex AX20N tested in this evaluation has a rated capacity of 500 gallons per day (gpd). Specifications and drawings are included in Appendix A

Raw sewage enters the first compartment of a two-compartment fiberglass tank (1,000 gal working volume) that provides about 48 hours of retention at the rated capacity This compartment provides primary treatment; settleable solids accumulate on the bottom and floatable solids accumulate on the surface. Effluent from the clear layer flows into the second compartment of the tank (500 gal volume) which provides about 24 hours retention at the rated capacity A pump located in a screened pump vault in the second compartment, transfers effluent at a predetermined frequency, to a manifold that distributes the liquid over textile media inside a filter pod Effluent percolates down through the media and is collected at the bottom of the filter pod. The treated effluent flows out through a pipe to an automated splitter valve During periods of no flow to the system, all of the treated effluent is returned to the second compartment. Otherwise, part of the treated effluent is discharged, and the balance is returned to the second compartment Aeration is provided by the sprinkling action of the effluent over the media and as the effluent moves down through the media

2.2 Test Protocol

Section 9 of ANSI/NSF Standard 40 protocol, "Performance Testing and Evaluation", is included in Appendix B Start up of the plant was accomplished by filling the plant with 2/3 water and 1/3 raw sewage The plant was then dosed at the design loading rate of 500 gpd as follows:

6 a m to 9 a.m - 35 percent of daily rated capacity (175 gallons)
11 a.m to 2 p m. - 25 percent of daily rated capacity (125 gallons)
5 p m to 8 p.m. - 40 percent of daily rated capacity (200 gallons)

Dosing was accomplished by opening a pneumatic valve for five seconds to feed around 4 gallons to the test plant Doses were spread uniformly over each dosing period

After a start up period (up to three weeks at the manufacturer's discretion), the plant is subjected to the following loading sequence:

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Design loading	-	16 weeks
Stress loading	-	7 5 weeks
Design loading	-	2 5 weeks

During the design loading periods, flow proportioned 24-hour composite samples are collected of the influent and effluent five days per week. The influent and effluent samples are analyzed for carbonaceous five-day biochemical oxygen demand, and total suspended solids concentrations. On-site determinations of the effluent temperature and pH are made five days per week. Upon the request of Orenco System Inc , effluent turbidity was also measured five days per week.

Stress testing is designed to evaluate how the plant performs under non-ideal conditions, including varied hydraulic loadings and electrical or system failure. The test sequence includes (1) Wash Day stress, (2) Working Parent stress, (3) Power/Equipment Failure stress, and (4) Vacation stress. Detailed descriptions of the stress sequences are shown in Appendix B.

During the stress test sequences, 24 hour composite samples are collected before and after each stress dosing pattern. The analyses and on-site determinations completed on the samples are the same as described for the design load testing. Each stress is followed by seven consecutive days of dosing at design rated capacity before beginning the next stress test. Sample collection is initiated twenty four hours after completion of wash day, working parent, and vacation stresses, and beginning 48 hours after completion of the power failure stress.

In order for the plant to achieve Class I effluent it is required to produce an effluent which meets the EPA guidelines for secondary effluent discharge[1]:

(1) $CBOD_5$: The 30-day average of effluent samples shall not exceed 25 mg/L and each 7-day average of effluent samples shall not exceed 40 mg/L.

(2) Suspended Solids: Each 30-day average of effluent samples shall not exceed 30 mg/L and each 7-day average of effluent samples shall not exceed 45 mg/L.

(3) pH: Individual effluent values remain between 6 0 and 9 0.

Requirements are also specified for effluent color, odor, oily film and foam, as well as maximum noise levels allowed from the plant.

2 3 Test Chronology

The system was installed under the direction of the manufacturer on May 9, 2001. The infiltration/exfiltration test was completed on May 11, 2001. The plant was filled with 2/3 fresh water and 1/3 raw sewage and dosing was initiated at the rate of 500 gpd, beginning May 13, 2001. Sampling was initiated on May 14, 2001. However, the test was officially started on May 20, 2001 since there were only three sample days during the first week. The stress test sequence was started on September 10 and ended on October 23, and testing was completed on November 16, 2001.

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3.0 ANALYTICAL RESULTS

3 1 Summary

Chemical analyses of samples collected during the evaluation were completed using the procedures in *Standard Methods for the Examination of Water and Wastewater*[2] and USEPA methods Copies of the data generated during the evaluation are included in Appendix C. The results of the analyses performed during the first week of dosing are also included in Appendix C for informational purposes only. Results of the chemical analyses and on-site observations and measurements made during the evaluation are summarized in Table I

TABLE I. SUMMARY OF ANALYTICAL RESULTS

	Average	Std. Dev.	Minimum	Maximum	Median	Interquartile Range
$CBOD_5$ (mg/L)						
Influent	162	100	40	550	130	100 - 180
Effluent	5	4	<2	25	3	2 - 6
Suspended Solids (mg/L)						
Influent	291	267	34	1600	200	130 - 340
Effluent	4	5	<2	42	3	2 - 4
Turbidity (NTU)						
Effluent	3 8	1 1	2.0	7.8	3 6	3 0 - 4 4
pH						
Influent	-	-	6 5	7 6	7.0	6.8 - 7 1
Effluent	-	-	6.0	7.2	6.4	6.3 - 6 6
Temperature (°C)						
Influent	16	2	13	20	17	15 - 18
Effluent	17	3	11	22	18	15 - 19

Notes: The median is the point where half of the values are greater and half are less
The interquartile range is the range of values about the median between the upper and lower 25 percent of all values

Criteria for evaluating the analytical results from the testing are described in Section 9.5 of ANSI/NSF Standard 40 In completing the pass/fail determination for the data, an allowance is made for effluent suspended solids and $CBOD_5$ during the first month of testing. The 30 and 7 day averages during this time may not equal or exceed 1 4 times the effluent limits required for the rest of the test. This provision recognizes that an immature culture of microorganisms within the system may require additional time to achieve adequate treatment efficiency. Effluent $CBOD_5$ and suspended solids concentrations from the AdvanTex AX20N during the first calendar month of testing were within the normal limits and did not need to use this provision

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Section 9 5 1.1 of the Standard provides guidance addressing the impact of unusual testing conditions, including sampling, dosing, or influent characteristics, on operation of a system under test Specific data points may be excluded from 7- and 30 - day average calculations where determined to have an adverse impact on performance of the system, with rationale for the exclusion to be documented in the final report There were no such conditions during this test.

Sections 3.6 and 9 2 1 of the Standard defines influent wastewater characteristics as they apply to testing under the Standard Typical domestic wastewater is defined as having a $CBOD_5$ concentration between 100 and 300 mg/L. and a suspended solids concentration between 100 and 350 mg/L. The influent strength remained within the specified range, with the exception of Months 2 and 5. During Month 2, the 30-day average influent total suspended solids was 570 mg/L and during Month 5, the average influent $CBOD_5$ concentration was 92 mg/L. Following section 9 5 1 1 of the Standard, NSF made an assessment of the impact of the influent strength on the treatment system for months 2 and 5 NSF determined that the dosing strength did not adversely affect the treatment process due to the relatively consistent effluent quality during those periods. Effluent total suspended solids averaged 6 mg/L during month 2 and 5 mg/L for the entire test Effluent CBOD averaged 3 mg/L during month 5 and 4 mg/L for the entire test The overall influent strength for the test was 291 mg/L. for total suspended solids and 162 mg/L for CBOD

3 2 Carbonaceous Biochemical Oxygen Demand

The carbonaceous five day biochemical oxygen demand ($CBOD_5$) analyses were completed using the EPA Method 405 1 The results of the analyses completed on the samples collected during the testing are shown in Figure 1.

Influent $CBOD_5$:

The influent $CBOD_5$ ranged from 40 to 550 mg/L during the evaluation, with an average concentration of 162 mg/L and a median concentration of 130 mg/L.

Effluent $CBOD_5$:

The effluent $CBOD_5$ concentrations ranged from <2 to 25 mg/L over the course of the evaluation, with an average concentration of 5 mg/L. The median effluent $CBOD_5$ concentration was 3 mg/L.

The Standard requires that the effluent $CBOD_5$ not exceed 40 mg/L on a 7-day average or 25 mg/L on a 30-day average Table II shows the 7 and 30 day average effluent CBOD concentrations and the 30-day average influent $CBOD_5$ concentrations The 7-day average effluent $CBOD_5$ ranged from 2 to 14 mg/L The 30-day average ranged from 3 to 8 mg/L. As shown in Table II, the AdvanTex AX20N met the requirements of Standard 40 for effluent $CBOD_5$.

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3.3 Suspended Solids

Suspended solids analyses were completed using Methods 209C and 209D of *Standard Methods*. The results of the suspended solids analyses over the entire evaluation are shown in Figure 2. Data from the suspended solids analyses are summarized in Table I.

Influent suspended solids:

The influent suspended solids ranged from 34 to 1,600 mg/L during the evaluation, with an average concentration of 291 mg/L. The median influent suspended solids concentration during the evaluation was 200 mg/L.

Effluent Suspended Solids:

The effluent suspended solids concentration ranged from <2 to 42 mg/L during the evaluation, with an average concentration of 4 mg/L and a median concentration of 3 mg/L. As shown in Figure 2, the maximum single day effluent suspended solids concentration of 42 mg/L was measured on July 16, near the end of the second thirty days of testing, during a period with a 30-day average influent suspended solids concentration of 570 mg/L.

Over the course of the evaluation, ANSI/NSF Standard 40 requires that the effluent suspended solids not exceed 45 mg/L on a 7-day average or 30 mg/L on a 30-day average. Table III shows the 7- and 30-day suspended solids averages.

The 7-day average effluent suspended solids ranged from 2 to 11 mg/L and the 30-day averages ranged from 3 to 6 mg/L. As shown in Table III, the AdvanTex AX20N met the requirements of ANSI/NSF Standard 40 for effluent suspended solids.

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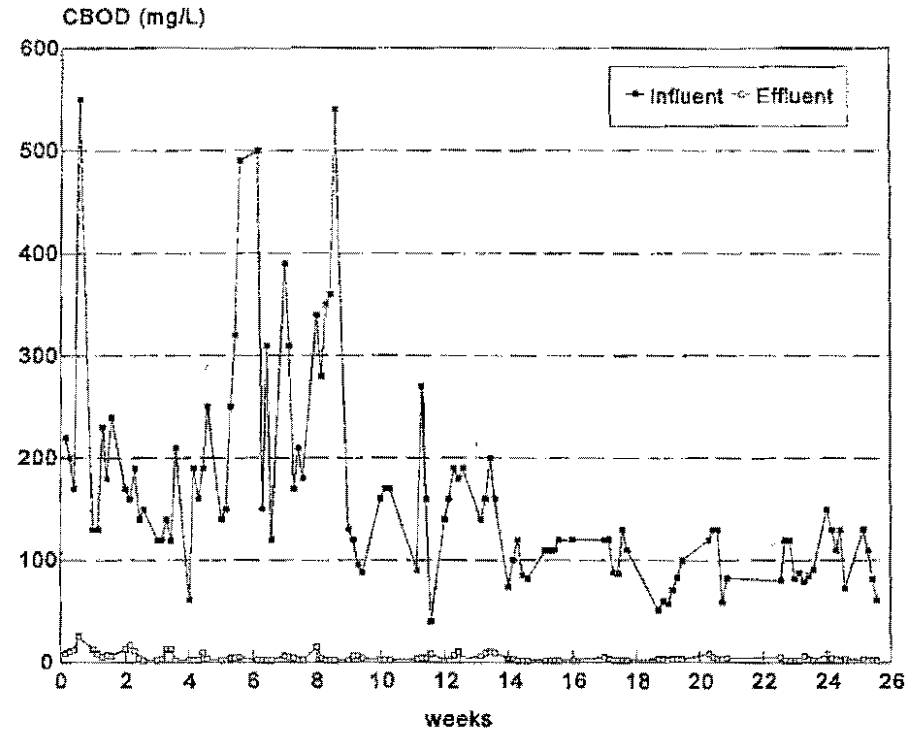

Figure 1 Carbonaceous Biochemical Oxygen Demand

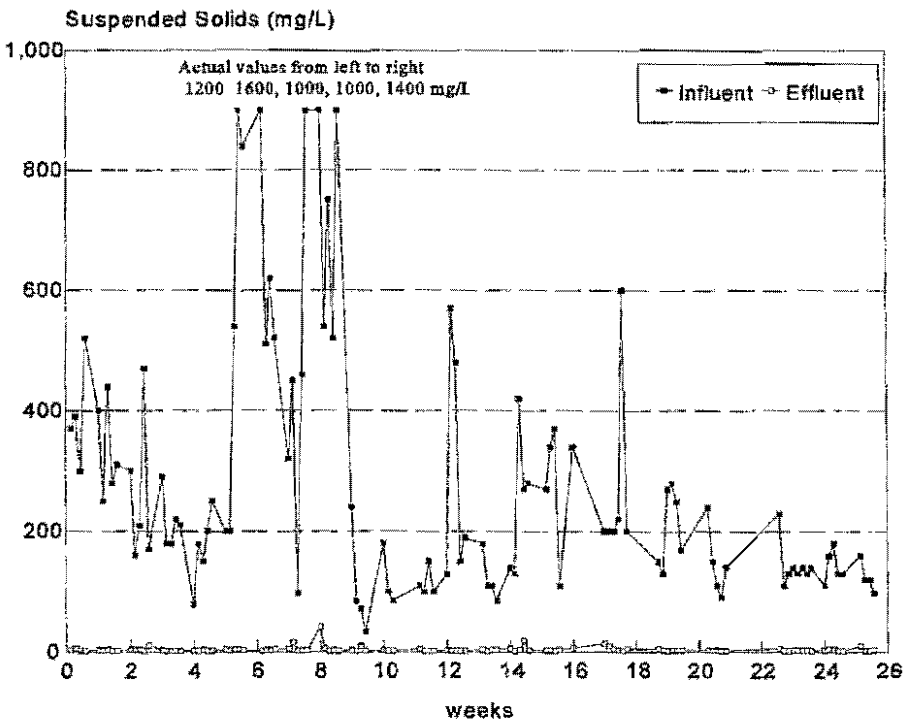

Figure 2 Suspended Solids

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Table II. 7- and 30-day Average $CBOD_5$

Month	Week	7-day Average Effluent $CBOD_5$ (mg/L)	30-day Average Effluent $CBOD_5$ (mg/L)	30-day Average Influent $CBOD_5$ (mg/L)
1	1	14	8	182
	2	8		
	3	9		
	4	7		
2	5	4	4	268
	6	3		
	7	2		
	8	4		
3	9	5	4	170
	10	4		
	11	2		
	12	5		
	13	5		
4	14	9	4	121
	15	3		
	16	2		
	17	2		
5	18	3	3	92
	19	2		
	20	3		
	21	5		
	22	3		
6	23	3	3	101
	24	3		
	25	4		
	26	2		

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Table III 7- and 30-day Average Suspended Solids

Month	Week	7-day Average Effluent Suspended Solids (mg/L)	30-day Average Effluent Suspended Solids (mg/L)	30-day Average Influent Suspended Solids (mg/L)
1	1	3	3	281
	2	3		
	3	5		
	4	2		
2	5	2	6	570
	6	4		
	7	3		
	8	6		
3	9	11	3	246
	10	4		
	11	2		
	12	3		
	13	2		
4	14	4	5	224
	15	8		
	16	3		
	17	4		
5	18	8	4	213
	19	4		
	20	3		
	21	3		
	22	2		
6	23	3	3	139
	24	3		
	25	3		
	26	4		

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3.4 pH

Over the entire evaluation period, the influent pH ranged from 6 5 to 7 6 (median of 7 0) The effluent pH ranged from 6.0 to 7 2 during the evaluation (median of 6 4), within the 6 to 9 range required by ANSI/NSF Standard 40 The pH data for the evaluation are shown in Appendix C

3 5 Temperature

Influent temperatures over the evaluation period ranged from 13 to 20°C (median of 17°C) The temperature data are shown in Appendix C

3.6 Color, Threshold Odor, Oily Film, Foam

Three samples of the effluent were analyzed for color, odor, oily film and foam as prescribed in NSF Standard 40 The effluent was acceptable according to the requirements in NSF Standard 40, with color less than 15 units, non-offensive threshold odor, no visible evidence of oily film and no foam.

3.7 Noise

A reading of the noise level at a distance of 20 feet from the plant was taken while the plant was in operation, using a hand-held decibel meter. The reading was below the 60 dbA required by ANSI/NSF Standard 40.

3 8 Turbidity Analyses

Although not required by Standard 40, Orenco Systems Inc , requested that effluent samples from the AdvanTex AX20N be analyzed for turbidity Turbidity analyses were completed following method 2130B of Standard Methods The turbidity measurements ranged between 2 0 NTU and 7 8 NTU (median of 3 6 NTU). All turbidity data are shown in Appendix C In addition, graphs showing a comparison of effluent turbidity to TSS and CBOD values are included in Appendix D

4.0 REFERENCES

1. "Environmental Protection Agency Guidelines for Secondary Treatment", Federal Register, Volume 28, No. 159, 1973.

2 APHA, AWWA, WPCF, Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, Washington, D C

3 U S. EPA, Methods for Chemical Analysis of Water and Wastes, U S Environmental Protection Agency, Washington, D C

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APPENDIX A

PLANT SPECIFICATIONS

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PLANT SPECIFICATIONS

ORENCO SYSTEMS INC , ADVANTEX AX20N

Plant Capacity

Design Flow	500 gpd
Plant Hydraulic Capacity at Design Flow	1,500 gallons
First compartment (pre-treatment)	1,000 gallons
Second compartment	500 gallons
Hydraulic Retention Time (at Design Flow)	
First compartment	48 hours
Second compartment	24 hours

Pump

Effluent Pump	Orenco Systems Inc P300511, ½ HP, 115 V, 60 Hz,
Filter	AdvanTex AX20 Textile Filter

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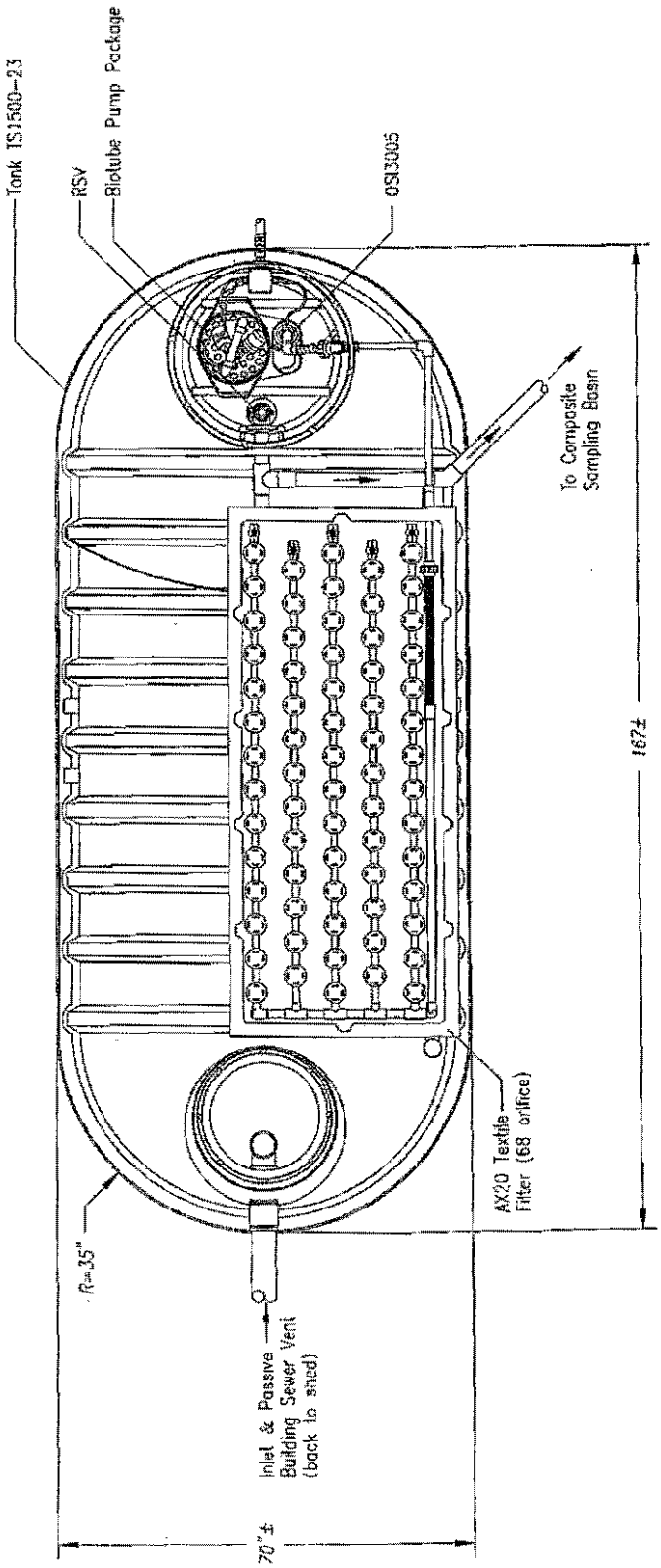
Tank: 1500 gallon two compartment
Compartment Ratio: $\frac{2}{3}$ Primary; $\frac{1}{3}$ Recirc



Top View

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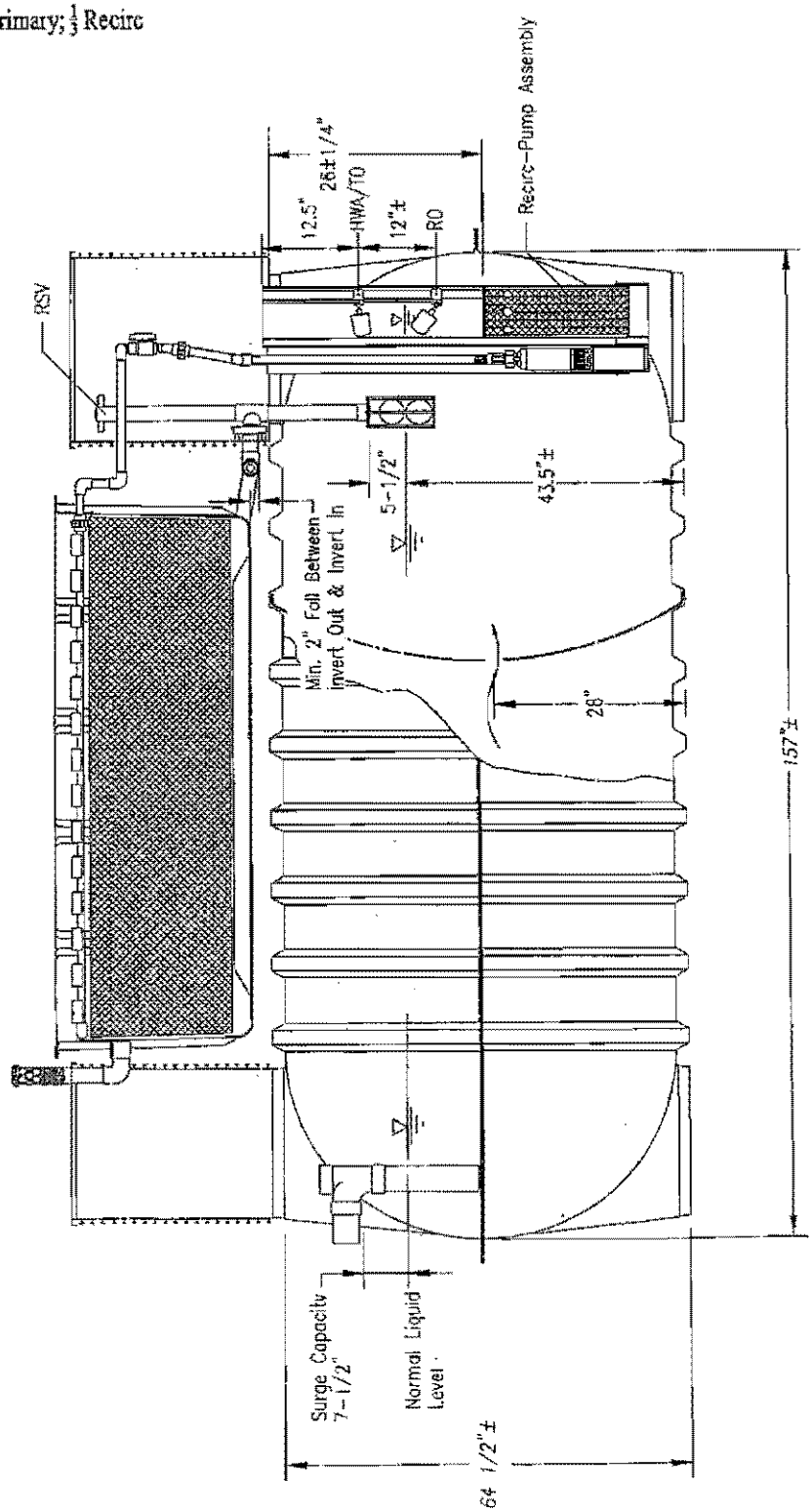
AdvanTex™ Treatment System
.ode 1 AX20N

Orenco Systems®
Incorporated

Tank: 1500 gallon two compartment
Compartment Ratio: $\frac{2}{3}$ Primary; $\frac{1}{3}$ Recirc



Side View

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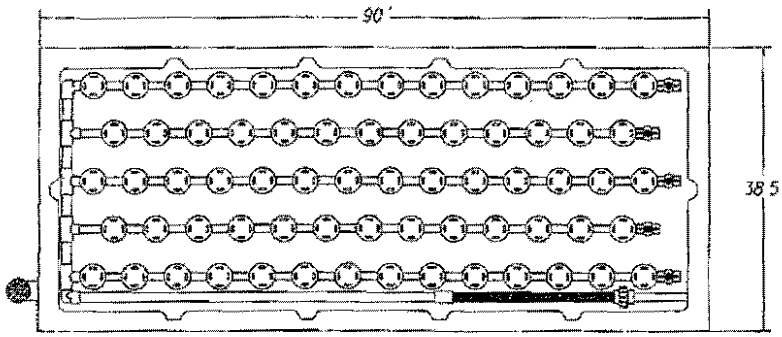
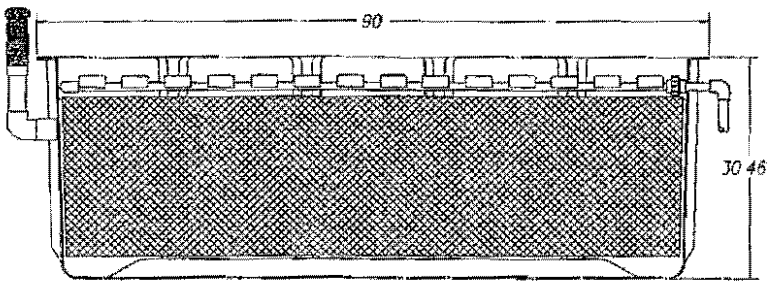
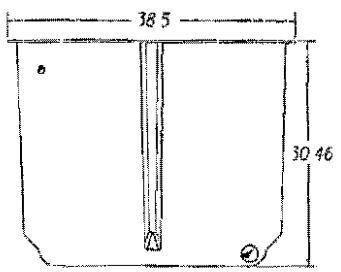


Top View



Side View



End View

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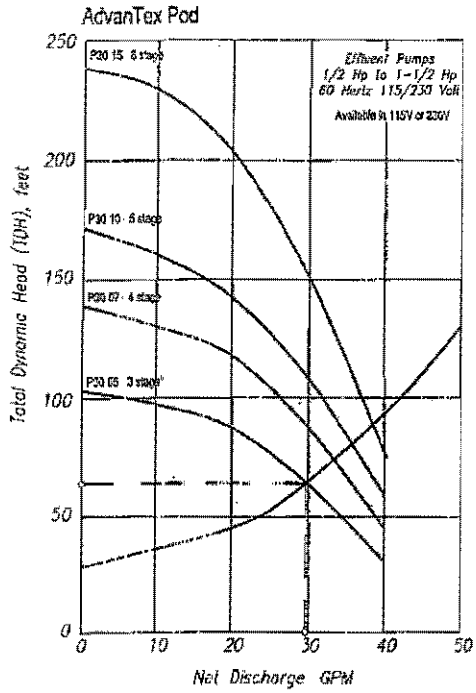
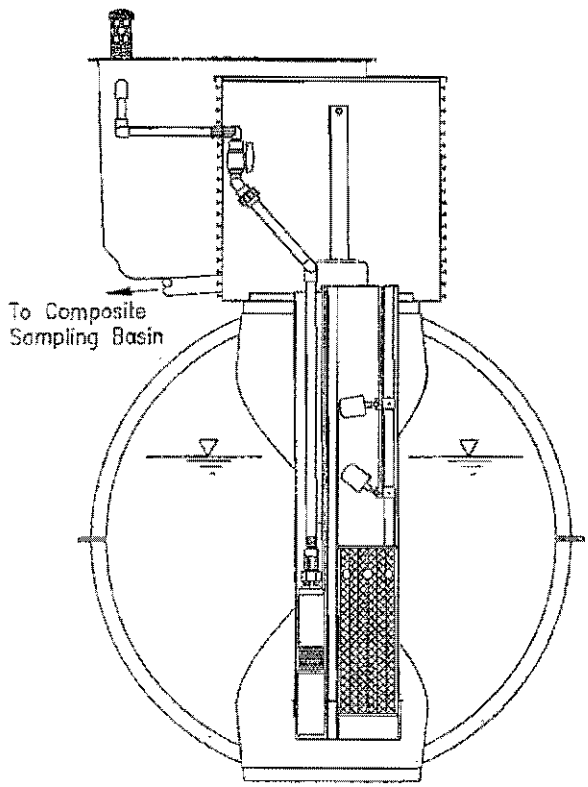
Orenco Systems®
Incorporated



Pump Curve with 1/2" Flow Control Orifice

Pump Curve



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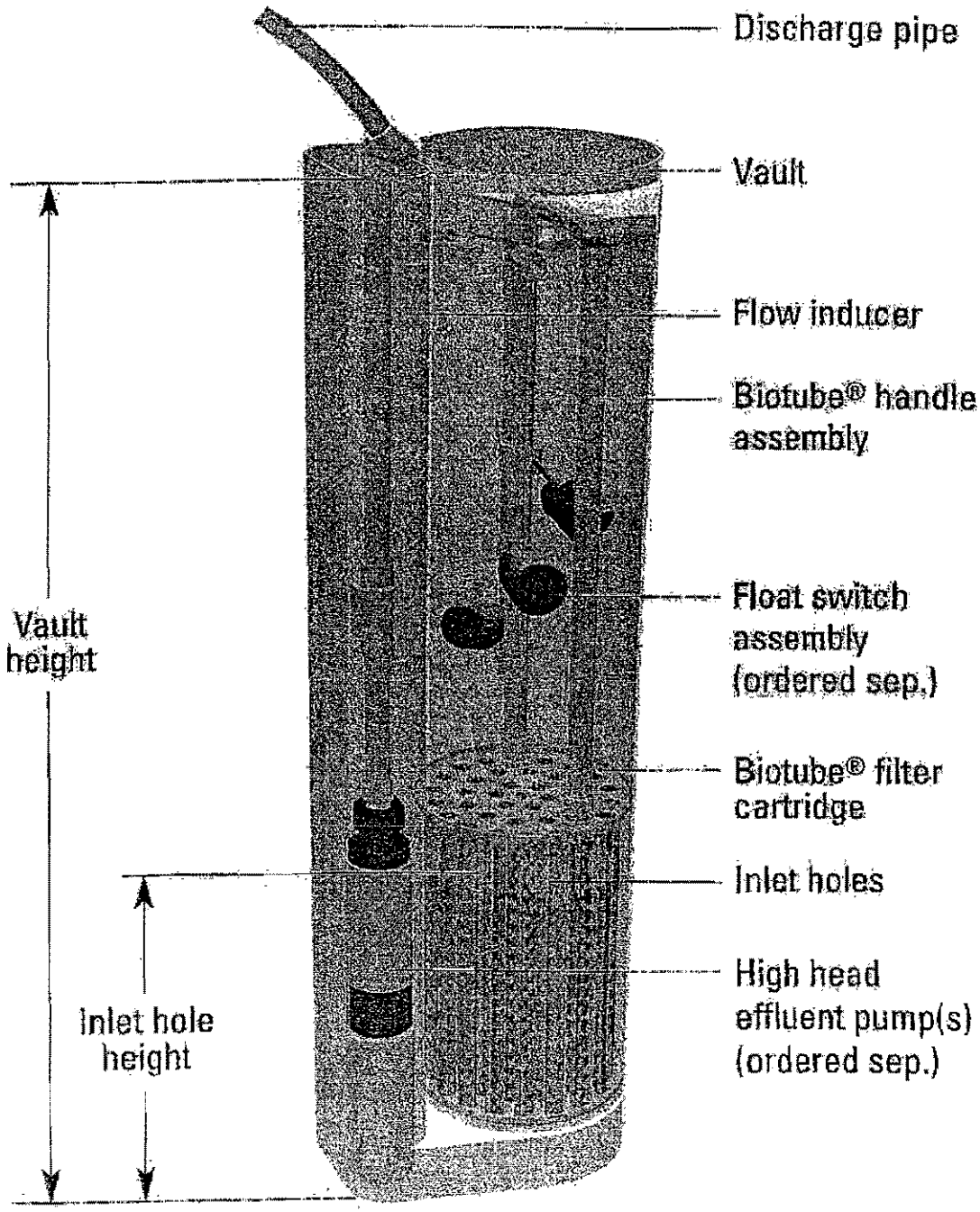
Biotube Pump Vault Components



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APPENDIX B

NSF STANDARD 40 PERFORMANCE EVALUATION METHOD AND REQUIREMENTS

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9 Performance testing and evaluation

This section describes the methods used to evaluate the performance of residential wastewater treatment systems Systems shall be designated as Class I or Class II The performance classification shall be based upon the evaluation of effluent samples collected from the system over a 6-month period

9.1 Preparations for testing and evaluation

9.1.1 The system shall be assembled, installed, and filled in accordance with the manufacturer's instructions.

9.1.2 The manufacturer shall inspect the system for proper installation. If no defects are detected and the system is judged to be structurally sound, it shall be placed into operation in accordance with the manufacturer's start-up procedures. If the manufacturer does not provide a filling procedure, ⅔ of the system's capacity shall be filled with water and the remaining ⅓ shall be filled with residential wastewater.

9.1.3 The system shall undergo design loading (Section 9 2 2.1) until testing and evaluations are initiated Sample collection and analysis shall be initiated within 3 weeks of filling the system and, except as specified in Section 9.5 1.2, shall continue without interruption until the end of the evaluation period

9.1.4 If conditions at the testing site preclude installation of the system at its normally prescribed depth, the manufacturer shall be permitted to cover the system with soil to achieve normal installation depth

9.1.5 Performance testing and evaluation of systems shall not be restricted to specific seasons.

9.1.6 When possible, electrical or mechanical defects shall be repaired to prevent evaluation delays. All repairs made during the performance testing and evaluation shall be documented in the final report

9.1.7 The system shall be operated in accordance with the manufacturer's instructions However, routine service and maintenance of the system shall not be permitted during the performance testing and evaluation period

NOTE – The manufacturer may recommend or offer more frequent service and maintenance of the system but for the purpose of performance testing and evaluation, service and maintenance shall not be performed beyond what is specified in this standard

9.2 Testing and evaluation conditions, hydraulic loading, and schedules

9.2.1 Influent wastewater characteristics

The 30-day average $CBOD_5$ concentration of the wastewater delivered to the system shall be between 100 mg/L and 300 mg/L.

The 30-day average TSS concentration of the wastewater delivered to the system shall be between 100 mg/L and 350 mg/L.

9.2.2 Hydraulic loading and schedules

The performance of the system shall be evaluated for 26 consecutive weeks. During the testing and evaluation period, the system shall be subjected to 16 weeks of design loading, followed by 7 5 weeks (52 days) of stress loading, and then an additional 2.5 weeks (18 days) of design loading.

9.2.2.1 Design loading

The system shall be dosed 7 days a week with a wastewater volume equivalent to the daily hydraulic capacity of the system. The following schedule shall be adhered to for dosing:

6:00 a.m to 9:00 a.m.	approximately 35% of the rated daily hydraulic capacity
11:00 a.m. to 2:00 p.m	approximately 25% of the rated daily hydraulic capacity
5:00 p.m to 8:00 p.m.	approximately 40% of the rated daily hydraulic capacity

9.2.2.2 Stress loading

Stress loading is designed to evaluate a system's performance under four non-ideal conditions Systems shall be subjected to each stress condition once during the 6-month testing and evaluation period and each of

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the four stress conditions shall be separated by 7 days of design loading (Section 9.2.2.1).

9.2.2.2.1 Wash-day stress

The wash-day stress shall consist of three wash-days in a 5-day period. Each wash-day shall be separated by a 24-hour period. During a wash-day, the system shall be loaded at times and capacities similar to those delivered during design loading (Section 9.2.2.1), however during the first two dosing periods per day, the design loading shall include 3 wash loads (3 wash cycles and 6 rinse cycles).

9.2.2.2.2 Working-parent stress

For 5 consecutive days, the system shall be subjected to a working-parent stress. During this stress, the system shall be dosed with 40% of its daily hydraulic capacity between 6:00 a.m. and 9:00 a.m. Between 5:00 p.m. and 8:00 p.m., the system shall be dosed with the remaining 60% of its daily hydraulic capacity, which shall include 1 wash load (1 wash cycle and 2 rinse cycles).

9.2.2.2.3 Power/Equipment failure stress

The system shall be dosed with 40% of its daily hydraulic capacity between 5:00 p.m. and 8:00 p.m. on the day the power/equipment failure stress is initiated. Power to the system shall then be turned off at 9:00 p.m. and dosing shall be discontinued for 48 hours. After 48 hours, power shall be restored and the system shall be dosed over a 3 hour period with 60% of its daily hydraulic capacity, which shall include 1 wash load (1 wash cycle and 2 rinse cycles).

9.2.2.2.4 Vacation stress

On the day that the vacation stress is initiated, the system shall be dosed at 35% of its daily hydraulic capacity between 6:00 a.m. and 9:00 a.m. and at 25% between 11:00 a.m. and 2:00 p.m. Dosing shall then be discontinued for 8 consecutive days (power shall continue to be supplied to the system). Between 5:00 p.m. and 8:00 p.m. of the ninth day, the system shall be dosed with 60% of its daily hydraulic capacity, which shall include 3 wash loads (3 wash cycles and 6 rinse cycles).

9.2.3 Dosing volumes

The 30-day average volume of the wastewater delivered to the system shall be within 100% ± 10% of the system's rated hydraulic capacity.

NOTE – All dosing days, except those with dosing requirements less than the daily hydraulic capacity, shall be included in the 30-day average calculation.

9.2.4 Color, odor, foam, and oily film assessments

During the 6-month testing and evaluation, a total of 3 effluent samples shall be assessed for color, odor, foam, and oily film. The assessments shall be conducted on effluent composite samples selected randomly during the first phase of design loading (weeks 1–16), the period of stress loading (weeks 17–23.5), and the second phase of design loading (weeks 23.5–26).

9.3 Sample collection

9.3.1 General

9.3.1.1 A minimum of 96 data days shall be required during system performance testing and evaluation. No routine service or maintenance shall be performed on the system whether the time period to achieve the 96 data days falls within or exceeds 6 months.

9.3.1.2 All sample collection methods shall be in accordance with APHA's *Standard Methods for the Examination of Water and Wastewater* unless otherwise specified.

9.3.1.3 Influent wastewater samples shall be flow-proportional, 24-hour composites obtained during periods of system dosing. Effluent samples shall be flow-proportional, 24-hour composites obtained during periods of system discharge.

9.3.2 Design loading

During periods of design loading, daily composite effluent samples shall be collected and analyzed 5 days a week.

9.3.3 Stress loading

During stress loading, influent and effluent 24-hour composite samples shall be collected on the day each stress condition is initiated. Twenty four hours after the completion of wash-day, working-parent, and vacation stresses, influent and effluent 24-hour composite

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samples shall be collected for 6 consecutive days. Forty eight hours after the completion of the power/equipment failure stress, influent and effluent 24-hour composite samples shall be collected for 5 consecutive days.

9.4 Analytical descriptions

9.4.1 pH, TSS, and $CBOD_5$

The pH, TSS, and $CBOD_5$ of the collected influent and effluent 24-hour composite samples shall be determined with the appropriate methods in APHA's *Standard Methods for the Examination of Water and Wastewater.*

9.4.2 Color, odor, oily film, and foam

9.4.2.1 General

The effluent composite samples shall be diluted 1:1000 with distilled water. Three composite effluent samples shall be tested during the 6-month evaluation period.

9.4.2.2 Color

The apparent color of the diluted effluent samples shall be determined with the visual comparison method described in APHA's *Standard Methods for the Examination of Water and Wastewater,* eighteenth edition.

9.4.2.3 Odor

A panel consisting of at least 5 evaluators shall qualitatively rate 200 mL aliquots of the diluted effluent samples as offensive or non-offensive when compared to odor-free water prepared in accordance with APHA's *Standard Methods for the Examination of Water and Wastewater.*

9.4.2.4 Oily film and foam

Diluted effluent sample aliquots shall be visually evaluated for the presence of an oily film or foaming.

9.5 Criteria

9.5.1 General

9.5.1.1 If conditions during the testing and evaluation period result in system upset, improper sampling, improper dosing, or influent characteristics outside of the ranges specified in 9.2.1, an assessment shall be conducted to determine the extent to which these conditions adversely affected the performance of the system. Based on this assessment, specific data points may be excluded from the 7-day and 30-day averages of effluent measurements. Rationale for all data exclusions shall be documented in the final report.

9.5.1.2 In the event that a catastrophic site problem not described in this standard including, but not limited to, influent characteristics, malfunctions of test apparatus, and acts of God, jeopardizes the validity of the performance testing and evaluation, manufacturers shall be given the choice to:

1) Perform maintenance on the system, reinitiate system start-up procedures, and restart the performance testing and evaluation; or

2) With no routine maintenance performed, have the system brought back to pre-existing conditions and resume testing within 3 weeks after the site problem has been identified and corrected. Data collected during the system recovery period shall be excluded from 7-day and 30-day averages of effluent measurements.

NOTE – Pre-existing conditions shall be defined as the point when the results of 3 consecutive data days are within 15% of the previous 30-day average(s).

9.5.1.3 A 7-day average discharge value shall consist of a minimum of 3 data days. If a calendar week contains less than 3 data days, sufficient data days may be transferred from the preceding calendar week to constitute a 7-day average discharge value. If there are not sufficient data days available in the preceding calendar week, the transfer of data days may take place from the following calendar week to constitute a 7-day average discharge value. No data day shall be included in more than one 7-day average discharge value.

9.5.1.4 A 30-day average discharge value shall consist of a minimum of 50% of the regularly scheduled sampling days per month. If a calendar month contains less than the required number of data days, sufficient data days may be transferred from the preceding calendar month to constitute a 30-day average discharge value. If there are not sufficient data days available in the preceding calendar month, the transfer of data days may take place from the following calendar month to constitute a 30-day

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average discharge value No data day shall be included in more than one 30-day average discharge value

9.5.1.5 During the stress loading sequence, consisting of wash-day, working-parent, power/equipment failure, and vacation stress loading periods, data shall be collected from a minimum of ⅔ of the total scheduled sampling days and from at least 2 of the scheduled sampling days during any single stress loading period

9.5.2 Class I systems

The following criteria shall be met in order for a system to be classified as a Class I residential wastewater treatment system. All requirements for each parameter shall be achieved except as provided for in Section 9.5.2.2.

9.5.2.1 EPA secondary treatment guideline parameters

9.5.2.1.1 $CBOD_5$

The 30-day average of $CBOD_5$ concentrations of effluent samples shall not exceed 25 mg/L.

The 7-day average of $CBOD_5$ concentrations of effluent samples shall not exceed 40 mg/L.

9.5.2.1.2 TSS

The 30-day average of TSS concentrations of effluent samples shall not exceed 30 mg/L.
The 7-day average of TSS concentrations of effluent samples shall not exceed 45 mg/L.

9.5.2.1.3 pH

The pH of individual effluent samples shall be between 6.0 and 9.0.

9.5.2.2 Effluent concentration excursions

System performance shall not be considered outside the limits established for Class I systems if, during the first calendar month of performance testing and evaluation, 7-day average and 30-day average effluent $CBOD_5$ and TSS concentrations do not equal or exceed 1.4 times the effluent limits specified in 9.5.2.1.

NOTES – The technology utilized in many residential wastewater treatment systems is biologically-based. The allowance of excursions from the effluent limits established in this standard during the first calendar month of performance testing and evaluation reflects the fact that an immature culture of microorganisms within the system may require additional time to achieve adequate treatment efficiency.

The value of 1.4 is based on the USEPA Technical Review Criteria for Group I Pollutants, including $CBOD_5$ and TSS.

9.5.2.3 Color, odor, oily film, and foam

9.5.2.3.1 Color

The color rating of each of the 3 diluted composite effluent samples shall not exceed 15 units.

9.5.2.3.2 Odor

The overall rating of each of the three diluted composite effluent samples shall be non-offensive.

9.5.2.3.3 Oily film and foam

Oily films and foaming shall not be visually detected in any of the diluted composite effluent samples.

9.5.3 Class II systems

The following criteria shall be met in order for a system to be classified as a Class II residential wastewater treatment system.

9.5.3.1 $CBOD_5$

Not more than 10% of the effluent $CBOD_5$ values shall exceed 60 mg/L.

9.5.3.2 TSS

Not more than 10% of the effluent TSS values shall exceed 100 mg/L.

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APPENDIX C

ANALYTICAL RESULTS

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: May 20, 2001 Plant Code: NT-S05

Weeks Into Test: 1

Weekend Dosing: Sunday 493 gallons Saturday 546 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		493	493	486	529	542
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		14	16	15	15
	aeration chamber					
	effluent		14	15	15	16
pH	influent		6.9	6.9	6.8	6.9
	aeration chamber					
	effluent		7.0	7.2	7.1	7.2
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		220	200	170	550
	effluent		8	10	12	25
Suspended Solids (mg/L)	influent		370	390	300	520
	aeration chamber					
	effluent		3	6	2	2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		7.2	6.3	5.8	5.3

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: May 21, 2001 - Victoria Day Holiday (no testing)

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: May 27, 2001 Plant Code: NT-S05

Weeks Into Test: 2

Weekend Dosing: Sunday 546 gallons Saturday 568 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		546	555	529	555	529
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	13	14	14	15	16
	aeration chamber					
	effluent	16	15	15	16	17
pH	influent	6.9	6.8	7.0	7.0	7.0
	aeration chamber					
	effluent	7.1	7.1	7.1	7.1	7.0
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	180	130	230	180	240
	effluent	13	8	5	7	6
Suspended Solids (mg/L)	influent	400	250	440	280	310
	aeration chamber					
	effluent	3	3	4	2	2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	4.6	4.9	4.3	4.7	5.8

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: June 3, 2001 Plant Code: NT-S05

Weeks Into Test: 3

Weekend Dosing: Sunday 568 gallons Saturday 490 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		568	516	481	446	460
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	15	16	16	16	17
	aeration chamber					
	effluent	15	15	15	15	16
pH	influent	7.0	7.1	7.0	7.0	7.0
	aeration chamber					
	effluent	6.9	6.8	6.7	6.6	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	170	160	190	140	150
	effluent	13	17	11	4	<2
Suspended Solids (mg/L)	influent	300	160	210	470	170
	aeration chamber					
	effluent	4	4	4	<2	11
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	6.0	4.2	4.4	4.0	4.4

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: June 10, 2001 Plant Code: NT-S05

Weeks Into Test: 4

Weekend Dosing: Sunday 490 gallons Saturday 471 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		471	471	471	471	471
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	16	15	15	16	15
	aeration chamber					
	effluent	15	16	15	17	15
pH	influent	7.0	7.1	7.1	6.9	7.0
	aeration chamber					
	effluent	6.4	6.5	6.4	6.3	6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	120	120	140	120	210
	effluent	<2	3	13	13	<2
Suspended Solids (mg/L)	influent	290	180	180	220	210
	aeration chamber					
	effluent	3	<2	<2	2	<2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	4.3	4.4	3.9	3.3	3.0

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: June 17, 2001 Plant Code: NT-S05

Weeks Into Test: 5

Weekend Dosing: Sunday 471 gallons Saturday 473 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		471	471	471	472	472
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	15	16	17	18	16
	aeration chamber					
	effluent	16	16	17	17	18
pH	influent	7.0	6.9	7.0	7.0	7.0
	aeration chamber					
	effluent	6.4	6.4	6.4	6.4	6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	61	190	160	190	250
	effluent	<2	<2	<2	9	3
Suspended Solids (mg/L)	influent	79	180	150	200	250
	aeration chamber					
	effluent	2	2	3	<2	2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	3.6	3.6	3.5	3.8	3.7

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: June 24, 2001 Plant Code: NT-S05

Weeks Into Test: 6

Weekend Dosing: Sunday 473 gallons Saturday 475 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		473	474	474	475	475
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	16	16	16	17	16
	aeration chamber					
	effluent	17	17	17	17	16
pH	influent	7.0	7.0	6.7	6.7	6.9
	aeration chamber					
	effluent	6.4	6.5	6.5	6.4	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	140	150	250	320	490
	effluent	<2	<2	4	4	5
Suspended Solids (mg/L)	influent	200	200	540	1200	840
	aeration chamber					
	effluent	4	3	4	4	3
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	5.2	4.7	5.1	5.2	4.2

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: July 1, 2001 Plant Code: NT-S05

Weeks Into Test: 7

Weekend Dosing: Sunday 476 gallons Saturday 475 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		476	477	477	478	477
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		18	19	16	16
	aeration chamber					
	effluent		18	19	19	18
pH	influent		6.7	6.9	6.8	6.7
	aeration chamber					
	effluent		6.3	6.6	6.5	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		500	150	310	120
	effluent		2	<2	<2	<2
Suspended Solids (mg/L)	influent		1600	510	620	520
	aeration chamber					
	effluent		<2	3	3	4
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		5	4.9	4.6	4.8

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: July 1, 2001 - Canada Day Holiday (no testing)

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: July 8, 2001 Plant Code: NT-S05

Weeks Into Test: 8

Weekend Dosing: Sunday 474 gallons Saturday 473 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		473	472	471	472	472
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	16	17	19	18	16
	aeration chamber					
	effluent	18	19	20	19	20
pH	influent	6.8	7.0	7.0	6.8	7.1
	aeration chamber					
	effluent	6.5	6.6	6.6	6.5	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	390	310	170	210	180
	effluent	6	5	4	<2	<2
Suspended Solids (mg/L)	influent	320	450	98	460	1000
	aeration chamber					
	effluent	5	16	2	3	3
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	4.8	4.4	4.3	4.3	5

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: July 15, 2001 Plant Code: NT-S05

Weeks Into Test: 9

Weekend Dosing: Sunday 474 gallons Saturday 478 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		474	474	475	475	478
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	17	17	18	19	18
	aeration chamber					
	effluent	18	19	19	18	18
pH	influent	6.8	6.9	6.8	6.9	7.0
	aeration chamber					
	effluent	7.1	6.4	6.6	6.6	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	340	280	350	360	540
	effluent	15	4	2	<2	<2
Suspended Solids (mg/L)	influent	1000	540	750	520	1400
	aeration chamber					
	effluent	42	6	2	3	<2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	2.8	5.3	5.1	4.2	3.5

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: July 22, 2001 Plant Code: NT-S05

Weeks Into Test: 10

Weekend Dosing: Sunday 478 gallons Saturday 478 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		478	478	478	191	478
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	18	20	20	19	18
	aeration chamber					
	effluent	20	22	20	20	20
pH	influent	7.4	7.6	7.4	6.9	
	aeration chamber					
	effluent	6.7	6.6	6.4	6.7	6.8
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	130	120	95	88	
	effluent	<2	6	6	4	6
Suspended Solids (mg/L)	influent	240	84	72	34	
	aeration chamber					
	effluent	3	<2	10	<2	3
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	4	2	2	2	2

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: July 27, 2001 - Problem with influent sampler. No samples were taken.

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: July 29, 2001 Plant Code: NT-S05

Weeks Into Test: 11

Weekend Dosing: Sunday 480 gallons Saturday 0 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		480	481	482	167	167
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	18	18	18		
	aeration chamber					
	effluent	18	19	18		
pH	influent	7.1	7.3	7.4		
	aeration chamber					
	effluent	6.7	6.8	6.8		
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	160	170	170		
	effluent	<2	<2	<2		
Suspended Solids (mg/L)	influent	180	100	86		
	aeration chamber					
	effluent	3	2	<2		
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	3.1	2.9	3.4		

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: 08/02 to 08/05 - Electrical problems with test site. Low to no dosage on these dates. No sample was taken. Regular dosage resumed 08/05 mid day.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: August 5, 2001 Plant Code: NT-S05

Weeks Into Test: 12

Weekend Dosing: Sunday 315 gallons Saturday 488 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		485	486	486	487	488
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		18	17	18	18
	aeration chamber					
	effluent		18	19	19	20
pH	influent		7.1	7.2	7.5	7.5
	aeration chamber					
	effluent		6.5	6.6	6.5	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		90	270	160	40
	effluent		3	4	4	8
Suspended Solids (mg/L)	influent		110	100	150	100
	aeration chamber					
	effluent		5	2	2	<2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		4.4	4.4	2.6	2.7

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: August 6, 2001 - Civic Holiday (no testing)

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: August 12, 2001 Plant Code: NT-S05

Weeks Into Test: 13

Weekend Dosing: Sunday 485 gallons Saturday 487 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		490	490	478	491	492
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	18	18	18	18	19
	aeration chamber					
	effluent	20	20	20	20	20
pH	influent	7.0	7.3	7.1	7.2	6.9
	aeration chamber					
	effluent	6.4	6.5	6.5	6.2	6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	140	160	190	180	190
	effluent	<2	<2	7	<10	3
Suspended Solids (mg/L)	influent	130	570	480	150	190
	aeration chamber					
	effluent	3	<2	<2	<2	2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	3.5	2.7	2.7	2.5	2.8

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: August 19, 2001 Plant Code: NT-S05

Weeks Into Test: 14

Weekend Dosing: Sunday 485 gallons Saturday 474 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		483	481	479	477	475
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		18	18	17	17
	aeration chamber					
	effluent		19	19	18	18
pH	influent		6.9	7.1	7.0	7.0
	aeration chamber					
	effluent		6.3	6.2	6.2	6.3
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		140	160	200	160
	effluent		6	9	10	9
Suspended Solids (mg/L)	influent		180	110	110	85
	aeration chamber					
	effluent		4	2	4	4
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		3.1	2.7	3.8	3.5

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: August 20, 2001 - Samples were missed due to miscommunication with operators.

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: August 26, 2001 Plant Code: NT-S05

Weeks Into Test: 15

Weekend Dosing: Sunday 473 gallons Saturday 483 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		471	470	495	491	487
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	19	18	18	18	18
	aeration chamber					
	effluent	18	19	18	20	18
pH	influent	6.8	6.9	7.0	6.9	7.1
	aeration chamber					
	effluent	6.3	6.3	6.3	6.2	6.2
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	74	100	120	85	82
	effluent	4	3	<2	<2	<2
Suspended Solids (mg/L)	influent	140	130	420	270	280
	aeration chamber					
	effluent	6	2	4	19	3
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	3.4	3.2	3.6	3.3	3.6

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 2, 2001 Plant Code: NT-S05

Weeks Into Test: 16

Weekend Dosing: Sunday 479 gallons Saturday 454 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		474	470	466	462	458
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		18	17	18	18
	aeration chamber					
	effluent		18	20	18	19
pH	influent		7.0	7.1	7.0	7.0
	aeration chamber					
	effluent		6.2	6.5	6.4	6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		110	110	110	120
	effluent		<2	<2	2	<2
Suspended Solids (mg/L)	influent		270	340	370	110
	aeration chamber					
	effluent		3	3	2	4
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		3.2	3.5	3.1	3.5

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: September 3, 2001 - Labor Day (no testing)

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NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 9, 2001 Plant Code: NT-S05

Weeks Into Test: 17

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		450	446	442	438	434	430	425
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent		17					
	aeration chamber							
	effluent		18					
pH	influent		7.0					
	aeration chamber							
	effluent		6.4					
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		120					
	effluent		<2					
Suspended Solids (mg/L)	influent		340					
	aeration chamber							
	effluent		7					
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber		4.8					

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Wash day stress from 9/10 to 9/14.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 16, 2001 Plant Code: NT-S05

Weeks Into Test: 18

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		421	417	509	511	513	515	517
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent		18	18	18	18	18	18
	aeration chamber							
	effluent		18	18	18	20	18	19
pH	influent		7.1	7.0	7.1	7.0	7.1	7.2
	aeration chamber							
	effluent		6.5	6.6	6.6	6.5	6.5	6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		120	120	88	87	130	110
	effluent		5	3	2	<2	<2	2
Suspended Solids (mg/L)	influent		200	200	200	220	600	200
	aeration chamber							
	effluent		14	10	5	3	<2	5
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber		7.8	5.5	3.7	2.8	2.2	2.8

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Working Parent Stress started on 9/22.

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Plant Effluent

Week Beginning: September 23, 2001 Plant Code: NT-S05

Weeks Into Test: 19

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		519	521	523	525	527	529	531
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent							17
	aeration chamber							
	effluent							17
pH	influent							7.4
	aeration chamber							
	effluent							6.4
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent							51
	effluent							3
Suspended Solids (mg/L)	influent							150
	aeration chamber							
	effluent							5
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber		2.2.	3.4	2.8	1.3	1.8	4.8

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Working Parent Stress completed on 9/26.

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Plant Effluent

Week Beginning: September 30, 2001 Plant Code: NT-S05

Weeks Into Test: 20

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		533	535	537	500	501	0	300
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent	17	18	16	15	17		
	aeration chamber							
	effluent	16	19	17	16	18		
pH	influent	7.1	7.0	7.4	7.3	7.2		
	aeration chamber							
	effluent	6.3	6.4	6.5	6.5	6.6		
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	60	57	71	83	100		
	effluent	3	2	3	3	3		
Suspended Solids (mg/L)	influent	130	270	280	250	170		
	aeration chamber							
	effluent	3	2	3	3	3		
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber	3.1	3.5	3.3	3.9	3.4		

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Power/Equipment Failure Stress from 10/4 to 10/16.

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Plant Effluent

Week Beginning: October 7, 2001 Plant Code: NT-S05

Weeks Into Test: 21

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		505	507	508	509	510	512	513
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent				17	15	15	15
	aeration chamber							
	effluent				16	16	15	16
pH	influent				6.7	6.8	6.8	6.9
	aeration chamber							
	effluent				6.0	6.0	6.0	6.2
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent				120	130	130	59
	effluent				8	5	3	3
Suspended Solids (mg/L)	influent				240	150	110	91
	aeration chamber							
	effluent				4	3	3	2
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber			3.9	2.8	3.5	2.5	3.1

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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Plant Effluent

Week Beginning: October 14, 2001 Plant Code: NT-S05

Weeks Into Test: 22

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		308.4	0	0	0	0	0	0
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent	17						
	aeration chamber							
	effluent	15						
pH	influent	6.6						
	aeration chamber							
	effluent	6.1						
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	83						
	effluent	4						
Suspended Solids (mg/L)	influent	140						
	aeration chamber							
	effluent	2						
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber	2.5						

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Vacation Stress started on 10/14.

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Plant Effluent

Week Beginning: October 21, 2001 Plant Code: NT-S05

Weeks Into Test: 23

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		0	0	299	499	499	499	508
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent						14	14
	aeration chamber							
	effluent						12	12
pH	influent						6.8	6.7
	aeration chamber							
	effluent						6.9	6.7
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent						80	123
	effluent						5	2
Suspended Solids (mg/L)	influent						230	113
	aeration chamber							
	effluent						6	2
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber						4.9	3.3

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: Vacation Stress completed on 10/23.

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Plant Effluent

Week Beginning: October 28, 2001 Plant Code: NT-S05

Weeks Into Test: 24

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		506	503	501	499	499	499	499
Dissolved Oxygen (mg/L)	aeration chamber							
	effluent							
Temperature (C)	influent	14	15	14	15	14	14	
	aeration chamber							
	effluent	13	12	12	12	12	13	
pH	influent	6.7	6.6	6.6	6.7	6.6	6.6	
	aeration chamber							
	effluent	6.6	6.6	6.5	6.5	6.2	6.2	
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	116	82	88	79	85	91	
	effluent	<2	<2	<2	6	3	2	
Suspended Solids (mg/L)	influent	130	140	130	140	130	140	
	aeration chamber							
	effluent	2	3	3	3	3	2	
Volatile Suspended Solids (mg/L)	influent							
	aeration chamber							
	effluent							
45 Minute Settleable Solids (mL/L)	aeration chamber	2.8	2.8	2.9	3	2.7	2	

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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Plant Effluent

Week Beginning: November 4, 2001 Plant Code: NT-S05

Weeks Into Test: 25

Weekend Dosing: Sunday 499 gallons Saturday 496 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		499	499	499	498	497
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent	14	13	13	15	13
	aeration chamber					
	effluent	11	11	12	12	12
pH	influent	6.6	6.6	6.7	6.6	6.8
	aeration chamber					
	effluent	6.4	6.3	6.2	6.3	6.3
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent	146	131	113	131	73
	effluent	8	4	3	2	3
Suspended Solids (mg/L)	influent	111	155	177	134	126
	aeration chamber					
	effluent	3	5	4	<2	2
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber	3.8	3.5	3.9	3	3.5

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes:

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Plant Effluent

Week Beginning: November 11, 2001 Plant Code: NT-S05

Weeks Into Test: 26

Weekend Dosing: Sunday 495 gallons Saturday 490 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		493	492	491	490	492
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent					
Temperature (C)	influent		14	14	14	13
	aeration chamber					
	effluent		12	12	13	12
pH	influent		6.7	6.6	6.5	6.6
	aeration chamber					
	effluent		6.1	6.1	6.2	6.5
Carbonaceous Biochemical Oxygen Demand (mg/L)	influent		130	113	82	61
	effluent		3	2	<2	2
Suspended Solids (mg/L)	influent		160	121	124	98
	aeration chamber					
	effluent		10	<2	2	4
Volatile Suspended Solids (mg/L)	influent					
	aeration chamber					
	effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber		6.4	3.9	2.6	3.4

(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Notes: November 12, 2001 - Rememberance Day (no testing)

APPENDIX D

TURBIDITY ANALYSES

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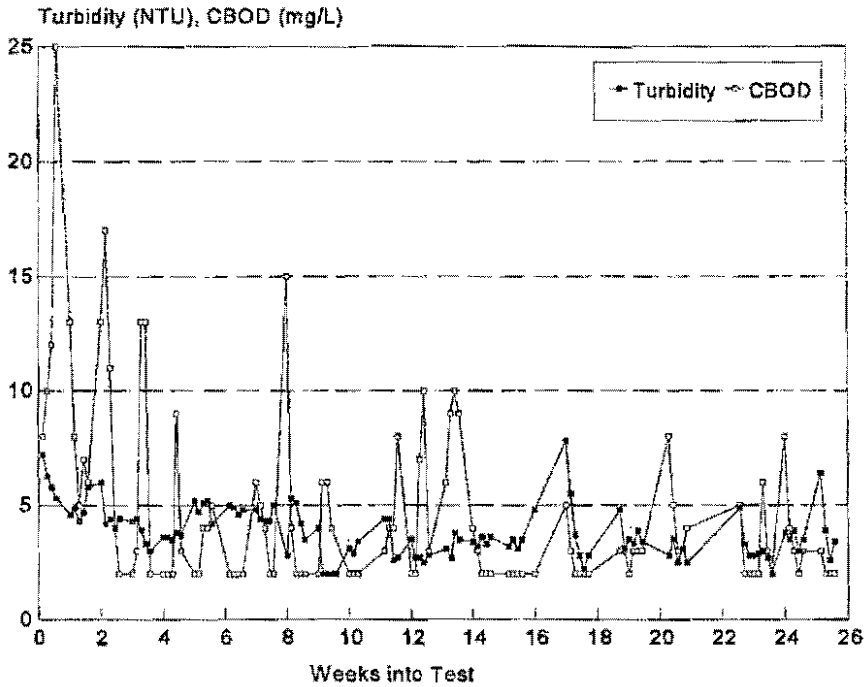
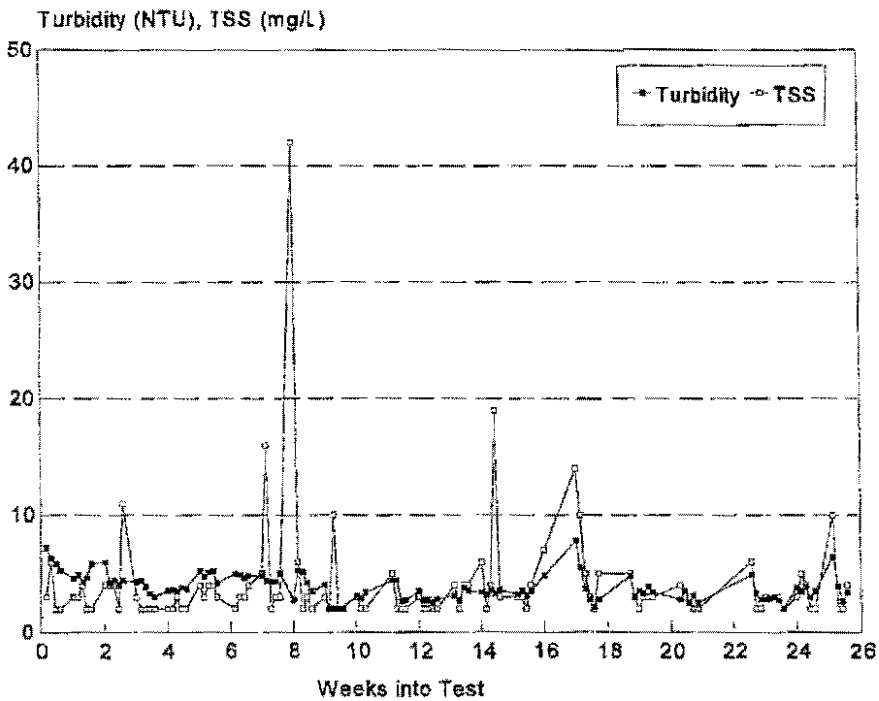
Effluent Turbidity and CBOD



Effluent Turbidity and Total Suspended Solids



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