



**TRUE AEROBIC®**

***ATU Conversion Kit***

(AEROBIC TREATMENT UNIT = ATU)



## **INSTALLATION – MAINTENANCE & OPERATION MANUAL**

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[RioVation.com](http://RioVation.com)

Apriance LLC \* dba: RioVation®

*PATENTS PENDING*

## INTRODUCTION

Septic tanks and drain fields are failing across the USA and the world. Even so, they are still the most widely used technology to treat and dispose of domestic wastewater from homes and small commercial establishments. *Yes, it is ironic!* ... The very anaerobic bacteria that is responsible for treating the wastewater in the septic tank and drainfield also causes them to fail. Anaerobic bacteria attach themselves to the bottom and sidewalls of the drainfield where treatment occurs before the wastewater reaches the ground water and environment. These bacteria, or problem causing biomat, attach to the soil interface and over time plugs the pores in the soil and renders the drainfield unable to pass the wastewater to the environment. The system has failed rendering the occupants unable to use the facilities (... toilets wont flush, drains wont drain!).

The good news is there is a solution! Researchers, installers and other OSSF industry people have discovered that putting Aerobic Treatment Unit (ATU) effluent into a drainfield will rejuvenate the drainfield. RioVation® has a product solution. We call it Forced Rejuvenation® Technology!

The

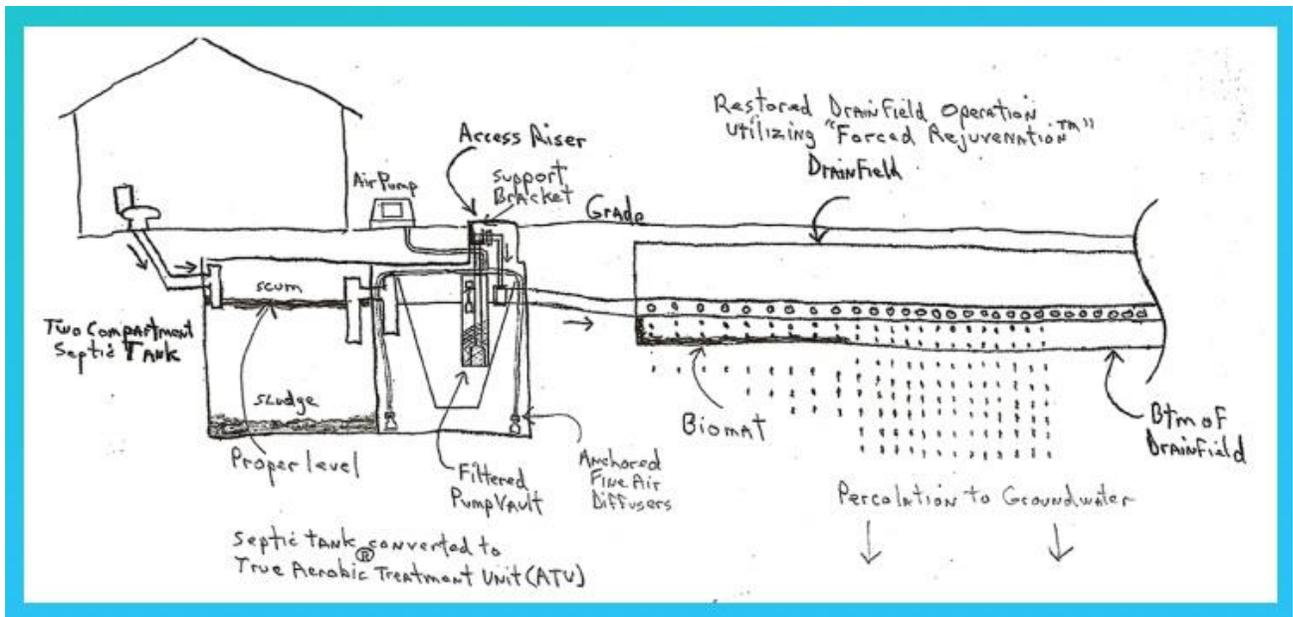


RioVation® TRUE AEROBIC® ATU Conversion Kit product converts an existing septic tank into an Aerobic Treatment Unit (ATU). When the septic tank is converted, the effluent coming out of the septic tank and going into the drainfield becomes odorless, high in dissolved oxygen and aerobic bacteria. As the aerobic bacteria consume the problem causing biomat, the drainfield is rejuvenated (Forced Rejuvenation®) and the soil interface is protected against further biomat plugging. See RioVation® WhiteBoard drawing below.



White Board drawing ... with ... TRUE AEROBIC® ATU Conversion Kit

... also Filtered Pump Vault (Septic Tank Level Control) is shown. PATENTS PENDING



### How the RioVation® TRUE AEROBIC® ATU Conversion Kit Works

The TRUE AEROBIC® ATU Conversion Kit is easy to install and consists of a collapsible plastic clarifier, including floats with tie twine, connecting bolts with nuts and stiffening hoop with coupling clips. It also comes with an air pump (*optional* - housing), hose, and anchored porous ceramic fine air diffuser(s).

The clarifier is collapsed and inserted into the septic tank through the access opening in the lid of the septic tank. Once inside the septic tank the clarifier is un-collapsed and connected to the septic tank outlet pipe. It is supported in place by the floats.



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*The ...  
RioVation®  
TRUE  
AEROBIC®  
ATU Conversion  
Kit installed into  
an existing septic  
tank.*



The diffuser(s) are lowered in place between the septic tank wall and the clarifier wall. The air pump (and optional housing) is mounted at grade and is connected to the diffuser(s) by the air hose. Once the air pump is properly plugged into the house outlet, the septic tank is a fully functional ATU.

The effluent going to the drainfield becomes odorless, high in dissolved oxygen and aerobic bacteria and now with each passing day this effluent consumes more and more of the problem causing biomat in the drainfield, opening the plugged pores in the drainfield and soil interface and rejuvenating the drainfield. As this process occurs, the wastewater once again enters the environment and is conducted away from the drainfield. The system is again functioning as intended.

#### **ASSESSING the septic tank before install of RioVation® TRUE AEROBIC® ATU Conversion Kit**

Assess the septic tank(s) before installing the RioVation® TRUE AEROBIC® ATU Conversion Kit. More than likely your septic tank has been in the ground for some number of years and is covered with landscape grass. It may or may not have a grade access riser and lid at the surface. In years past the septic tank was viewed as a

temporary solution to wastewater disposal. Use it just while you wait for the Central Sewer System to come to your area. *No More!* It is now a permanent solution and must be looked at and dealt with as such. With that said, that is why there may or may not be grade access riser(s) with lid(s) at the surface. How can you effectively maintain a septic tank without it? Enough of that. Let us move forward and assess the septic tank.

More than likely, you have already pumped your septic tank, probably more than once. Your septic tank can be one large tank, or large tank separated into two or more compartments (usually two). It can also be two or three tanks in series. It is important to locate the entire tank or tanks to accurately assess your septic tank before moving forward. This can be easily done with a probe rod purchased at a hardware store (Ace, Lowes, Home Depot...). Once you have located the outer edges of the tank or tanks, identify the last tank or compartment. This is the compartment that the septic effluent leaves from, going to the drain field. This compartment should have an access cover either below ground or at the surface. If not or if not large enough, you must cut an access opening into the septic tank lid. (Follow the instructions under - Riser Installation Instructions.) If necessary, dig down and locate access and remove the cover. If your septic tank already has a riser and lid coming to the surface it must be a minimum of sixteen inches (16") inside diameter. If it does not, you must install one. We recommend a twenty-four-inch (24") diameter riser with lid. This is the preferred size so future maintenance is easier and if you install other RioVation products in the future there will be adequate room to do so. RioVation® has complete riser kits available for you along with Installation Instructions.

Once you have located all inspection ports and have pumped and cleaned all of the compartments of the septic tank and have adequate riser(s) with lid(s) to the grade surface you are ready to start the RioVation® TRUE AEROBIC® ATU Conversion Kit installation.

### **INSTALLATION Instructions for the RioVation® TRUE AEROBIC® ATU Conversion Kit**

1. Looking down into the riser you should see the outlet tee with down pipe. Usually four- inch (4") white PVC plastic. It will be glued to the septic tank outlet pipe through which the septic tank effluent travels to the drain field by gravity flow. Using a hand saw or reciprocating saw with a long blade, cut the outlet tee and outlet pipe off flush with the inside of the septic tank wall or even with outside edge of the riser. Be careful NOT to drop it into the septic tank!!!
2. Now thoroughly clean the inside of the outlet pipe of debris around the edges and inside at least four inches (4") into the pipe. Use strong detergent followed by acetone. (You may get acetone at hardware store or use fingernail polish remover.) Use enough to clean surface and thoroughly remove tarnish to expose the PVC. This will allow the special outlet insert fitting to bond properly. Now measure the inside diameter of the outlet pipe and make sure your outlet insert fitting is the right size. Also do this by dry fitting the outlet insert fitting into the inside of the outlet pipe. It should fairly, easily slide into the pipe but also fit snug enough to provide a proper solvent weld (glue) joint.
3. Glue or solvent weld the three-inch (3") outlet insert fitting into the inside of the thoroughly cleaned septic tank outlet pipe. Using the proper fittings convert the three-inch (3") schedule 40 PVC socket to four-inch (4") SDR 35 pipe. (NOTE! It is best to make this connection with dielectric grease and then secure with a stainless steel screw. This allows the four-inch (4") clarifier pipe to later be easily removed to install other options.)

#### **--- INSTALLING the TRUE AEROBIC® Collapsible Clarifier into the Septic Tank**

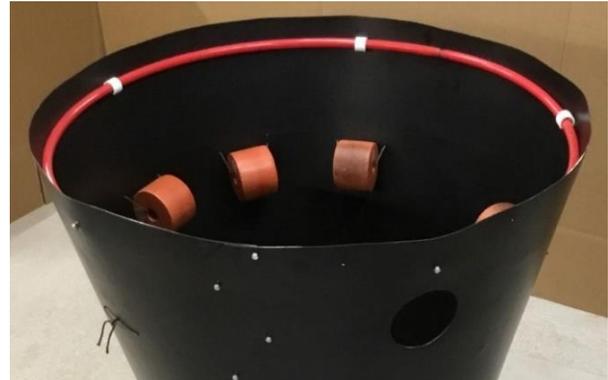
The TRUE AEROBIC® Clarifier should be installed into the final compartment of the septic tank. If the septic tank is made up of only one compartment the clarifier may be installed there.

1. Prepare the Clarifier for installation. Remove the clarifier and components from the box. Bring the seam edges of the clarifier together and connect with screws and nyloc nuts provided. Push screws through predrilled holes from inside clarifier, place nuts on outside of clarifier and tighten.

- Using the nylon twine provided, tie the floats to the clarifier approximately eight-inches (8") from the clarifier top using the four-inch (4") spaced holes (pre-drilled). Tie the float(s) to the inside of the clarifier allowing a ½" space between the clarifier and the float, using a square knot on the outside of the clarifier.
- Put the two clarifier hoop pieces together to form a circle using the two couplings. Then set aside for later installation. Next, connect the hoop clips to the inside of the clarifier two-inches (2") down from the top of the clarifier (holes are predrilled) with the screws and nuts provided and tighten (do not over tighten). NOTE ... *Position the clip openings down.*

**TRUE AEROBIC® ATU Conversion Kit**

- Clarifier hoop installed along inside top with hoop connection clips. →
- Floats tied inside of Clarifier with twine. →
- Clarifier is seamed with screws and nuts. →
- The 4-1/4" hole in the Clarifier goes over the septic tank outlet pipe. →



- The clarifier is now ready to be installed into the septic tank. You may prefer to fill the septic tank with water to the bottom of the outlet pipe (flow line) before proceeding.
- Collapse the clarifier as shown (in earlier above pictures) and lower into the septic tank. Then, un-collapse the clarifier and bring it into a circular shaped position. Now take the completed clarifier hoop and compress enough to get it through the riser. Then position the hoop inside the clarifier and push the hoop up into the hoop clips one at a time, spinning the clarifier as needed to position each clip where it is easily accessible through the riser. When completed the clarifier will now be held in a circular shape. Now attach (slide) the 4-1/4" hole in the clarifier over the septic tank outlet pipe by bringing the four-inch (4") PVC outlet pipe in through the 4-1/4" hole in the clarifier and dry fit the outlet tee assembly to it. (There is no need for it to be glued.)

**TRUE AEROBIC® ATU Clarifier is installed.** →



← Outlet Tee Assembly

Outlet Tee Assembly is installed onto septic tank outlet pipe. →

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**---INSTALLING the Anchored Porous Fine Air Diffuser(s)**

*The following instructions apply to each anchored diffuser installed.*

- Remove the anchored diffuser(s) and hose, and hose clamps from the box. Attach the clear 3/8" air hose to the barb fitting on the top of diffuser(s) and install the clamp.

2. Lower the anchored diffuser by the air hose, through the access riser, and position diffuser so it sets on the tank bottom and is positioned between the wall of the septic tank and the wall of the clarifier. Mentally draw a line from top of clarifier to bottom of septic tank and position diffuser(s) a minimum of 5" from vertical line toward septic tank wall. (Note: Aeration should not bubble up into the clarifier. It should remain a quiet zone.)
3. Drill a 3/4" hole in the side of the access riser a few inches below the grade. Place the clear 1/2" connection hose through the 3/4" hole into the riser. Attach the clear 1/2" connection hose to the clear 3/8" air diffuser hose using the reducer barb fitting and clamps. Leave an extra two or three feet (2' or 3') of clear 3/8" air hose rolled up in the riser. Caulk and seal the clear 1/2" connection hose to the riser



**Anchored Porous Fine Air Diffuser Parts**

← TRUE AEROBIC® Air Pump.

← The clear 1/2" connection hose is shown attached to Air Pump air discharge port.

← Anchored Porous Fine Air Diffuser.

← The clear 3/8" air diffuser hose is shown coiled with reducer barb adapter fitting and clamps.

**--- INSTALLING the AIR PUMP**

1. Remove the Air Pump from the box. Remove the black rubber 90 degree discharge fitting from the box and connect and clamp to the Air Pump discharge port. Locate the Air Pump where there is a suitable 110 volt electrical outlet plug. Shelter from the elements. (An optional RioVation® Air Pump Housing may be used.)
2. Dig a shallow trench from the Air Pump to the riser containing the TRUE AEROBIC® ATU Conversion Kit. Lay the clear 1/2" connection hose in the trench between the diffuser(s) and the Air Pump. Connect and clamp to the barb fitting on the diffuser air hose in the riser. Connect and clamp the other end to the black rubber 90 degree discharge fitting on the Air Pump. Backfill the trench and safely plug the Air Pump into the electrical outlet.

**... The RioVation® TRUE AEROBIC® ATU Conversion Kit is now installed and fully functional!**



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← Air Pump

Air Pump Housing →



(optional)

**HOW to Maintain Your RioVation® True Aerobic® ATU**

Your septic tank is now an Aerobic Treatment Unit (ATU) that actively treats the wastewater from your home every day. By utilizing aerobic microorganisms (bacteria), your ATU converts your wastewater to an odorless effluent high in dissolved oxygen and aerobic bacteria which then passes to your drainfield for drainfield rejuvenation (Forced Rejuvenation®) and protection. As with any biological or mechanical system, your True Aerobic® ATU requires routine inspection and service. It should be performed at a minimum of every six (6) months with the following steps.

1. Remove the security screws and lid along with any other security devices.
2. Make a sample bottle using a clear graduated cylinder about one quart in size. Divide the container into ten (10) equal parts using a waterproof marker, thus signifying 10% – 100%. Attach the bottle to a 4' handle using Gorilla tape. (PVC ½" pipe works well.)
3. Using the sample bottle, catch a full aeration grab sample from the aeration compartment which is between the septic tank wall and the clarifier wall. Allow the sample to remain still & undisturbed for 30 minutes. Measure the sludge volume by locating the interface (the point at which solids settle to) between clarified effluent and settled sludge on graduations. Interface should be between the 20% and 60% mark. Sludge layer should be chocolate in color and full of very, small pieces that resemble small pieces of sponge. If results differ, refer to ATU Condition Chart for corrective action.
4. Next thoroughly wash and clean the sample bottle and catch an effluent sample from inside the clarifier, about six (6") inches under the liquid level. Effluent should have a non-offensive odor and be fairly clear in color. If not refer to ATU Condition Chart.
5. If a scum layer has formed on the liquid surface of the clarifier, remove with a fine mesh net, and dispose of properly. Material may be disposed of by returning upstream of ATU through cleanout.
6. There should be significant turbulence above the anchored diffusers(s) caused by the rising air bubbles. Proper aeration in the True Aerobic® ATU is maintained by the following maintenance operations.
  - A. Clean or replace the air pump intake filter every six (6) months by removing the screen on air pump cover. Remove cover and filter. Replace with new a one or wash the existing filter in mild soap and water, then rinse and dry and reinstall, replacing cover and screen.
  - B. Check the air pressure on the air pump discharge by using the optional Air Pressure Schrader Valve. Remove the plastic cap and connect the optional Quick Chuck Pressure Gauge. If the air pressure exceeds 3.3 PSI, replace all the diffuser stones following the instructions entitled, Diffuser Stone Replacement. If the air pressure is lower than one (1) PSI, check for air leaks. If there are no air leaks it may be time to replace or rebuild your air pump.
7. Always properly reinstall any related safety devices, and the access cover(s) with security screws.
8. **Pumping and Cleaning the septic tank/ATU.**

As with all septic tanks your septic tank/ATU will require periodic pumping and cleaning. This is usually necessary every 2 to 4 years. However, there is no set time because tank sizes and loading rates vary and differ from household to household. An aeration grab sample 30 minute Settleability Test should be run every six (6) months or less. (Refer to #3 in this section for instructions.) When the sample reads more than 60%, it is time to pump and clean out by removing all inspection port covers whether to the surface or buried. Pump and wash all compartments with a garden hose, being careful not to damage internal components.

After pumping and cleaning fill all compartments with clean water. Do NOT leave the septic tank/ATU empty as the groundwater could float it! Inspect all internal components to make sure they are in proper working

order. Make sure the clarifier is floating in its proper place. (See Clarifier Installation Instructions.) Make sure the diffuser(s) are in proper position and have good airflow. (See Diffuser Installation Instructions.) Always properly reinstall any related safety devices and lids, and the access cover(s) with security screws that have been removed.

**9. Diffuser Stone Replacement.**

A. With the riser lid removed, grasp the anchored diffuser by the 3/8" air hose and lift out of the tank as if pulling and anchor onto a boat. Set on the ground beside riser.

B. After washing anchored diffuser with a garden hose, unscrew diffuser from anchor. Next remove stainless steel screw holding the assembly together. Disassemble and remove the stones and gaskets taking note of the positions of each. After cleaning the gaskets reassemble in the reverse order using new stones. Replace the stainless steel screw holding assembly together. Screw the diffuser back on the anchor making sure each stone and gasket align properly so as to get a good airtight seal between each stone and the assembly.

C. Lower anchored diffuser back into its proper position. (Refer to Anchored Diffuser Installation Instructions). Replace the riser lid, installing properly all safety screws and any other safety devices.

**RioVation® AIR PUMP HOUSING INSTALLATION (optional)**

1. The Air Pump Housing can be located on high, level ground next to the septic tank/ATU or next to the house. (Locating next to the house can allow for the air pump to be directly plugged into a house electrical outlet.) Once the location is decided upon, level with shovel and firmly pack ground. Set or mount the air pump housing on the level ground chosen.
2. Cut a two inch (2") hole in one corner of the air pump housing base. This will allow the air pump discharge hose and electrical cord to exit the air pump housing.
3. Remove the air pump from the box and locate it on the air pump housing base. Remove the black rubber 90 degree discharge fitting from the box and connect and clamp to the air pump discharge port.
4. Dig a shallow trench from the Air Pump to the riser containing the TRUE AEROBIC® ATU Conversion Kit. Lay the clear 1/2" connection hose in the trench between the diffuser(s) and the Air Pump. Connect and clamp to the barb fitting on the diffuser air hose in the riser. Connect and clamp the other end to the black rubber 90 degree discharge fitting on the Air Pump. Backfill the trench and properly plug the Air Pump into the electrical outlet.



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