



TRUE AEROBIC®
ATU Conversion Kit
Fixed Film Media (FFM)
(AEROBIC TREATMENT UNIT = ATU)



TRUE AEROBIC® ATU Conversion Kit
Fixed Film Media (FFM)



INSTALLATION – MAINTENANCE
& OPERATION MANUAL

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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 won't flush, drains won't 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 Fixed Film Media (FFM) 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 in our True Aerobic® ATU Suspended Growth (SG) manual, page 2, depicting a restored drainfield.



The ...
RioVation® TRUE AEROBIC® ATU Conversion Kit Fixed Film Media (FFM) installed into an existing septic tank & operating.

HOW the TRUE AEROBIC® FIXED FILM MEDIA (FFM) ATU Works ...

As with any Fixed Film Media Aerobic Treatment Unit the RioVation® True Aerobic® FFM ATU provides a surface for aerobic bacteria micro-organisms to attach to. The wastewater is then mixed or circulated, passing by the fixed film media allowing the aerobic bacteria to feed on or metabolize the waste products in the wastewater, producing a clear odorless effluent high in dissolved oxygen.

The True Aerobic® FFM is unique in how it accomplished this. It is made up of modular, individual, self-positioning FFM Pods that are simply lowered into the septic tank through a small opening in the lid, in the quantity needed to provide the proper treatment.

The FFM Pods themselves are unique in that they are made of a special plastic mesh material that is formed into a cylinder which allows wastewater to flow around and through the media. The contents of the compartment are aerated and mixed using fine air porous ceramic diffusers and an air pump. (The diffuser(s) is attached to one or more of the pods, the Master Pod.) As the wastewater is circulated around and through the FFM Pods, a biofilm forms on the mesh media to provide the biological treatment. Over time this biofilm (micro-organism colonies) grows and thickens and then portions break off and settle to the bottom of the tank as sludge, where it is stored until the tank is pumped. Due to the cylindrical design and the vertical positioning of the FFM

Pods, as sloughing or breaking off of the biofilm occurs, it is allowed to settle to the bottom of the tank which keeps the media performing at its best.



← If your septic tank is running at a high level, a **RioVation® Septic Tank Level Control Filtered Pump Vault** is recommended to maintain a proper level in tank(s). This product simply controls the level in your septic tank, by discharging effluent to your drainfield.



Add additional modular FFM Pods as needed.

ASSESSING the septic tank before installation of the RioVation® TRUE AEROBIC® ATU Conversion Kit FFM

Assess the septic tank(s) before installing the RioVation® TRUE AEROBIC® ATU Conversion Kit FFM. 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 twelve inches (12") inside diameter. If it does not, you must install one. We recommend a twenty-four-inch (24") diameter riser with a 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 Fixed Film Media (FFM) installation.

INSTALLATION Instructions for the RioVation® TRUE AEROBIC® ATU Conversion Kit Fixed Film Media

The True Aerobic® ATU Conversion Kit FFM is easy to install and consists of self-positioning Fixed Film Media pods. Just lower the FFM pods into the septic tank through the access opening of the septic tank using the attached nylon ropes. The FFM pods will position themselves at the proper level. The Master Pod is equipped with the porous ceramic fine air diffuser and air hose and is installed last. Tie the ropes to the side of the riser to make retrieval of the pods easy. The Master Pod should be tied in such a way to keep it near the center of the compartment or tank.

(Patents Pending)

Next run the air hose to the air pump by drilling a hole in the side of the riser. Dig a shallow trench for air hose burial to the air pump (Optional Air Pump Housing may be used.) and connect to the air pump using fittings supplied. Plug the air pump into the house receptacle and your septic tank is now converted into an ATU Aerobic Treatment Unit.



**The ... RioVation® TRUE AEROBIC®
ATU Conversion Kit Fixed Film Media (FFM)**

← **TRUE AEROBIC® Fixed Film Media Master Pod with Attached Diffuser & Air Hose.**

← **TRUE AEROBIC® Air Pump.**

← **Attached Porous Fine Air Diffuser Stones.**

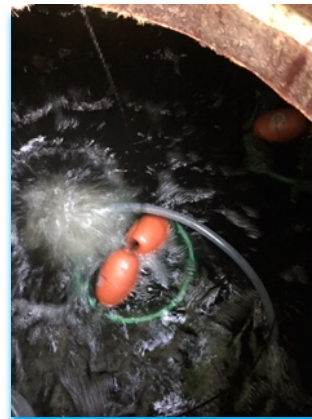
← **The clear 1/2" connection hose is shown attached to diffuser & will connect to Air Pump air discharge port when installed.**

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



← **RioVation®
TRUE AEROBIC®
FFM Master Pod
being lowered
into septic tank
thru access riser.**

**FFM Installed &
operating.** →



INSTRUCTIONS for INSTALLING the RioVation® 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. (The 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 FFM. Lay the clear 1/2" connection hose in the trench between the diffuser 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 Fixed Film Media is now installed and fully functional!

(Patents Pending)



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← Air Pump

Air Pump Housing →



(optional)

HOW to Maintain Your RioVation® True Aerobic® Fixed Film Media ATU

Your septic tank is now a FFM 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® FFM 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 cylinder about one quart in size. Attach the bottle to a 4' handle using Gorilla tape. (PVC ½" pipe works well.)
3. Next catch an effluent sample from inside the aeration compartment, about six (6") inches under the liquid level. The effluent should have a non-offensive odor and be fairly clear in color. If not, refer to the ATU Condition Chart.
4. There should be significant turbulence above the diffusers(s) caused by the rising air bubbles. Proper aeration in the True Aerobic® FFM ATU is maintained by the following maintenance operations.
 - A. Clean or replace the air pump intake filter every six (6) months by removing the screw on the air pump cover. Remove the cover and the filter. Replace with a new one or wash the existing filter in mild soap and water, then rinse and dry and reinstall, replacing the cover and the screw.
 - 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 the air pump.
5. Always properly reinstall any related safety devices, and the access cover(s) with security screws.

Pumping & Cleaning the Septic Tank/ATU and FFM Pods

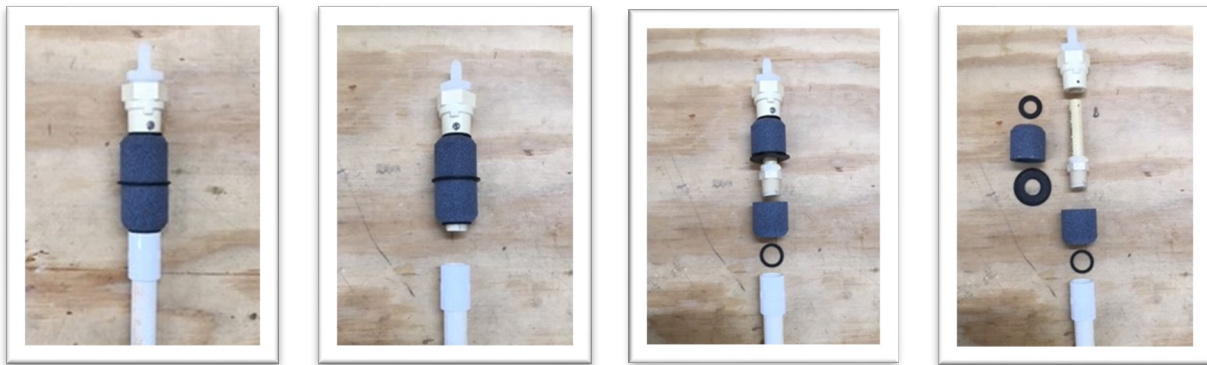
As with all septic tanks your septic tank/ATU will require periodic pumping and cleaning. This is usually necessary every 2 to 4 years. You can use a sludge judge to measure the thickness of the sludge on the bottom of the ATU for a more accurate time frame to pump the septic tank/ATU.

To pump & clean the septic tank/ATU remove all inspection port covers whether to the surface or buried. Remove each FFM pod from the tank via the access riser using the rope connected to each pod. Use care so as not to damage the pods. You may have to remove the air hose from the Master Pod(s). Wash each pod with a garden hose over the access of the ATU and set aside. Pump and wash all compartments with a garden hose being careful not to damage internal components. Once the septic tank/ATU is pumped & cleaned, fill all compartments with clean water. CAUTION ... Do not leave the septic tank/ATU empty as groundwater could float tank(s)! Reinstall all

the pods according to the original installation instructions on page three (3) of this manual. Make sure the diffuser is in the proper position and has good airflow. Always properly reinstall any related safety devices and lids and the access cover(s) with security screws that have been removed.

Diffuser Stone Replacement

With the riser lid removed, pull the Master Pod(s) from the ATU and wash off the diffuser(s) with a garden hose. Remove the hose clamp from the top of the diffuser and pull air hose off the diffuser barb. Unscrew the diffuser from the PVC female adapter. See diffuser pictures below. Now with the diffuser in your hand remove the stainless steel screw holding the assembly together. Disassemble and remove the stones and gaskets taking note of the POSITION of each. After cleaning the gaskets, properly reassemble in the reverse order using new stones. Replace the stainless steel screw holding the assembly together. Screw the diffuser back in the PVC female adapter and tighten by hand making sure to align gaskets and diffusers stones properly so as to get a good airtight seal between each stone and the assembly. Reattach the diffuser barb to the air hose and re-clamp. Reinstall the FFM Master Pod(s) back into the ATU according to the installation instructions on page three (3) of this manual. Replace the riser lid, installing properly all safety screws and any other safety devices.



RioVation® AIR PUMP HOUSING INSTALLATION (housing is optional – You can see picture on page 4)

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® FFM 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.