



RioVation®

LET'S CLEAR SOME THINGS UP FOR YOU!

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BioMaze™ Fixed Film Media

In order to get the most out of your two year limited warranty, please register your product at <https://riovation.com/product-registration>

This limited warranty does not become effective until the end user completes and submits the warranty sheet found online.

Warranty information may be found at <https://riovation.com/limited-warranty>

INSTALLATION MAINTENANCE & OPERATION MANUAL

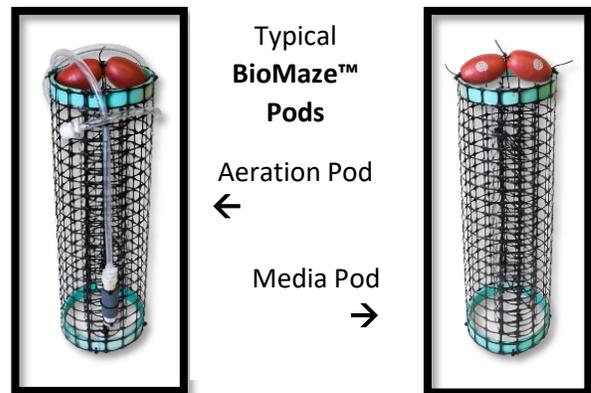
For all BioMaze™ Biofilm Reactor Fixed Film Media Conversion Kits

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. Yet 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, also attach to the soil interface and over time plugs the pores in the soil and renders the drainfield unable to pass the wastewater effluent to the environment. Thus, the system has failed, rendering the occupants unable to use the facilities.

The good news is there is a solution! Researchers, installers and other OSSF industry people have discovered that putting effluent high in dissolved oxygen and aerobic bacteria into a drainfield will rejuvenate the drainfield. RioVation® has a product solution. We call it Forced Rejuvenation® technology!

The RioVation® BioMaze™ Fixed Film Media Conversion Kit converts an existing septic tank into a Biofilm Reactor. When the septic tank is converted, the resulting effluent from the converted tank going to the drainfield is clear, odorless, high in dissolved oxygen and aerobic bacteria. The aerobic bacteria consume the problem causing biomat thus clearing the drainfield and soil interface. The drainfield is rejuvenated (Forced Rejuvenation®) and the soil interface is protected against further biomat plugging.



HOW the BioMaze™ Biofilm Reactor Works

As with any Fixed Film Media (FFM) Treatment Unit, the RioVation® BioMaze™ pods provide a media surface for microorganisms to colonize, forming a biofilm. The wastewater is then mixed or circulated, passing by the BioMaze™ FFM allowing the microorganisms of the biofilm to feed on or metabolize the waste products in the wastewater, producing a clear odorless effluent, high in dissolved oxygen and aerobic bacteria.

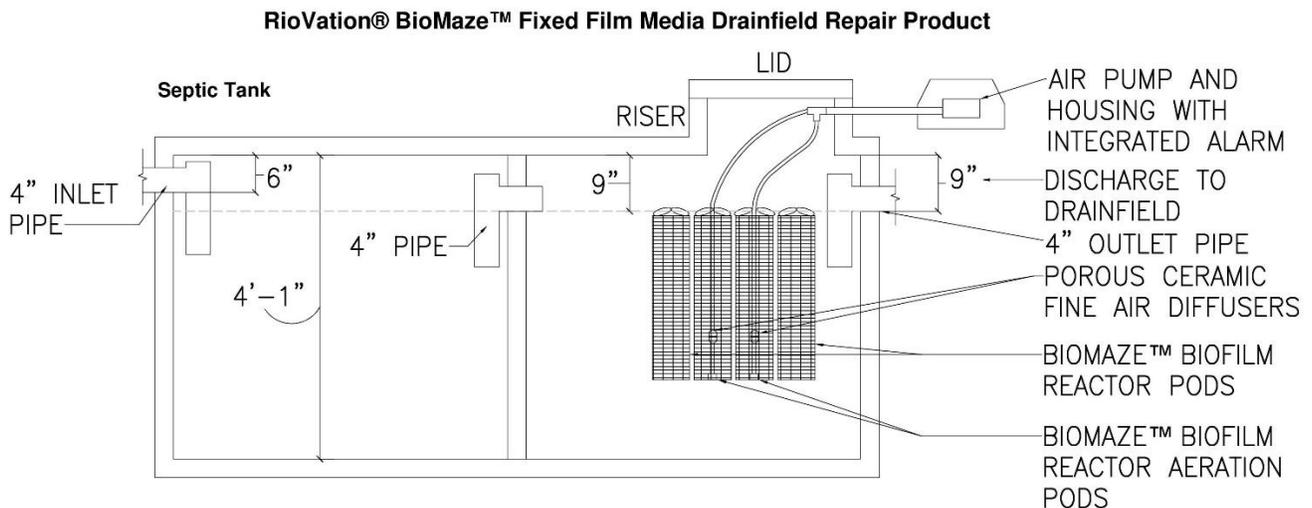
The BioMaze™ FFM is unique in how it accomplished this. It is made up of modular, individual, self-positioning pods that are simply lowered into the septic tank through a riser in the lid, in the quantity needed to provide the proper treatment for the gallon per day flow rate.

The BioMaze™ pods themselves are unique in that they are made of a proprietary plastic mesh media that is formed into a cylinder which allows wastewater to flow around and through the BioMaze™ mesh media. The contents of the compartment are aerated and mixed using fine air porous ceramic diffusers and an air pump. The diffuser is attached to one or more of the pods called the Aeration Pod. As the wastewater is circulated around and through the BioMaze™ Pods, a biofilm forms on the BioMaze mesh media to provide the biological treatment. Over time this biofilm (microorganism 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 BioMaze™ 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.

ASSESSING THE SEPTIC TANK BEFORE INSTALLATION OF THE BIOMAZE™ CONVERSION KIT

Assess the septic tank(s) before installing the BioMaze™ Biofilm Reactor Conversion Kit. More than likely the septic tank has been in the ground for a number of years and is covered with grass. Septic tanks can be one large tank, or a large tank separated into two compartments. It can also be two separate tanks in series. It is important to locate the entire tank(s) to accurately assess the septic tank before beginning the installation process. This can be easily done with a probe rod. Once you have located the outer edges of the tank(s), identify the outlet end of a single compartment final tank or the final compartment of a two-compartment tank. This is where the septic effluent discharges to the drainfield from and where the pods will be installed. Measure the depth of the tank from the flow line to the bottom of the inside of the tank. A minimum of 34" is required to install the BioMaze™ pods. If there is not a riser with a minimum of 16" diameter already installed a riser and lid are required to be installed on the septic tank lid above the outlet discharge assembly. It is preferred that a 24" diameter riser be installed although a minimum of 16" diameter may be installed. Follow the riser manufacturer's installation instructions and comply with state and county regulatory requirements.

Once you have located and removed all inspection ports and have pumped and cleaned all of the compartments of the septic tank in accordance with state and local requirements and have adequate riser(s) with lid(s) to the grade surface you are ready to start the BioMaze™ Conversion Kit installation. *NOTE! When pumping, take appropriate precautions and refill the tanks immediately. Leaving the tank(s) empty could result in the tank(s) floating to the surface.*



Drawing is typical for BioMaze™ Products

Model BM2611 includes 1 aeration pod and 1 media pod rated for flow of 0-240 GPD domestic strength

Model BM2622 includes 2 aeration pods and 2 media pods rated for flow of 0-400 GPD domestic strength

Model BM2624 includes 2 aeration pods and 4 media pods rated for flow of 0-750 GPD domestic strength

For use in new, repair or modification installations.

Tank size, dimensions and configuration are for depiction only.

Minimum system estimated sewage flows must comply with state and local requirements.

All BioMaze™ products can be installed in any state approved one or two compartment tank that has been properly inspected.

All kits ship with the Hiblow XP80 air pump. Air pump housing includes integrated low air pressure audible and visual alarm package.

INSTALLATION

Instructions for the RioVation® BioMaze™ Conversion Kit

1. BioMaze™ Pod – Installation

The BioMaze™ Pods are easy to install. With the septic tank filled to operating level, lower the Pods into the septic tank through the riser access opening of the septic tank using the attached nylon ropes. The Pods will position themselves at the proper level. The Aeration Pod(s) are equipped with the porous ceramic fine air diffusers and air hose and are installed last. Attach the provided clips evenly spaced around the inside of the riser. Seal any penetrations to the riser using a state and county approved mastic that meets ASTM C 990. Tie the ropes to the clips for future pod retrieval. The Aeration Pod(s) should be tied in such a way to keep them near the outside edge of the riser but separate from one another. The media pods are self-positioning within the tank. The number of Pods will vary with the BioMaze™ model selected.



← Clips and SS screws included for use with poly riser.
Use anchor and appropriate SS screws with clips for concrete riser.
Anchors and appropriate SS screws NOT included. →



2. Air Pump & Housing with Integrated Alarm - Installation

A. When considering where to locate the Air Pump & Housing with Integrated Alarm, it is recommended that it be located near an existing 120-volt outlet but no further than 75' from the septic riser. If an existing electrical outlet is not available, then a weatherproof 15 or 20 amp, 120 volt outlet should be installed in the desired location in accordance with local and national electric code requirements. Once you have decided on the location for the Air Pump Housing make sure it is level. Set the Air Pump & Housing with Integrated Alarm and position in such a way that when hinged open it is **not obstructed**.

B. Remove the security screw and hinge open the housing. Remove all shipping straps. The only assembly required is the attachment of the beacon light to the top of the housing and plugging it into the wiring harness inside the housing. Simply place the beacon male fitting thorough the hole in the top of the housing and tighten the nut. Plug the wiring harness into the male spades provide on the beacon light. Run the male electrical plug on the cord from the alarm assembly through the hole provided in the housing base. Once the installation is complete the male plug will be plugged into the 120 volt outlet.

3. Connecting Air Line – Installation

A. A connecting airline must be installed between the air pump discharge hose and the Aeration Pod(s) air hose(s). Drill a 1-1/8" hole in the side of the septic tank riser (the riser which is being used to install the BioMaze™ Pods) making sure it is above the wet season water table. Dig a shallow trench between the hole in the riser and the hole in the housing base.

B. Route the air pump discharge hose with the barbed 3/4" male pipe thread fitting through the hole in the housing base and position in the trench and connect to 3/4" Sch 40 PVC pipe using a 3/4" Sch 40 PVC female adapter and Teflon tape. Using proper PVC solvent weld cement procedures, run the 3/4" Sch 40 PVC pipe and any necessary fittings in the trench to the riser. Run the pipe into the hole in the riser approximately 2". Each Aeration Pod (some models will have more than one Aeration Pod) will have a hose and a barbed 3/4" male pipe thread fitting which must be connected to the 3/4" Sch 40 PVC pipe. Using 3/4" Sch 40 PVC female adapter(s) and Teflon tape and other appropriate 3/4" Sch 40 PVC fittings make connection(s) to the 3/4" Sch 40 PVC pipe. Seal the 3/4" Sch 40 PVC pipe to the riser using a state and county approved mastic or seal tight gasket that meets ASTM C 990.



RioVation®



Air Pump & Housing
with Integrated Alarm.
Comes pre-assembled!



4. BioMaze™ Biofilm Reactor Start-Up Instructions

- A. Confirm the male electrical plug from the air pump is connected to the female cord plug from the alarm assembly. Plug the male plug on the cord from the alarm assembly into a 120 volt outlet. The alarm should momentarily sound before the pressure comes up. Looking into the riser you should see good mixing or turbulence above and around the Aeration Pod(s).
- B. Confirm there are no leaks in the piping between the air pump and riser. Backfill the shallow airline trench. Reinstall the required riser lid with security screws if required and any other required riser safety devices. Close the hinged Air Pump Housing and install the closure screw. *The septic tank is now converted into a BioMaze® Biofilm Reactor.*



The RioVation® Biofilm Reactor BioMaze™ conversion kit Model BM2624 includes:

← 2 EA - BioMaze™ Aeration Pods with
Attached Diffuser & Air Hose

← 4 EA - BioMaze™ Media Pods

← Air Pump & Housing with Integrated
Alarm

Model BM2611 Includes: 1 EA - BioMaze™ Aeration
Pods with Attached Diffuser & Air Hose, 1 EA -
BioMaze™ Media Pods and Air Pump & Housing with
Integrated Alarm.

Model BM2622 Includes: 2 EA - BioMaze™ Aeration
Pods with Attached Diffuser & Air Hose 2 EA -
BioMaze™ Media Pods and Air Pump & Housing with
Integrated Alarm.

HOW to Maintain the RioVation® BioMaze™ Biofilm Reactor

The septic tank is now a Biofilm Reactor that actively treats the influent. By utilizing biofilm microorganisms (bacteria), the reactor converts the wastewater to a clear, odorless effluent high in dissolved oxygen and aerobic bacteria which then passes to the drainfield for drainfield rejuvenation (Forced Rejuvenation®) and protection. As with any biological or mechanical system, it is recommended that the Biofilm Reactor receive routine inspection and service. This can be done by the home owner or a professional installer. It is recommended to be performed every 6 (six) months with the following steps.

1. Remove the security screws and riser lid from the septic tank along with any other security devices to gain access. Remove the security screw from the Air Pump Housing with Integrated Alarm and hinge open.
2. Make a sample bottle using a clear cylinder about one pint in size. Attach the bottle to a 4' or longer handle using appropriate tape. (PVC ½" pipe works well.)
3. Next catch an effluent sample for visual inspection from inside the treatment compartment, about six (6") inches under the liquid level. Upon inspection the effluent should have a non-offensive odor and be fairly clear in color.
4. There should be significant turbulence above the Aeration Pod(s) caused by the rising air bubbles. Proper aeration in the Biofilm Reactor is maintained by the following maintenance operation.
 - A. Clean or replace the air pump intake filter every six (6) months by first disconnecting from power source, then 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, dry and reinstall, replacing the cover and the screw.
5. Always properly reinstall any related safety devices and lids and the access riser cover(s) with security screws if required. Reconnect Air Pump with Integrated Alarm to the power source. Close the Air Pump Housing with Integrated Alarm and reinstall the closure screw.

Pumping and Cleaning the Septic Tank and BioMaze™ Pods

As with all septic tanks, the septic tank converted to a Biofilm Reactor will require periodic pumping and cleaning. This is usually necessary every 2 to 4 years but can vary with loading. Pumping should only be performed by a licensed septic tank pumper qualified to perform this task.

To pump the tank, remove any necessary inspection port covers whether risers to the surface or buried. Remove each BioMaze™ pod from the tank via the access riser using the rope connected to each pod. As you remove each pod, hold them above the water line within the riser and spray them off with a garden hose to remove any and all sludge and foreign debris. Exercise caution to ensure all sludge and debris are rinsed into the tank. Use care so as not to damage the pods. Pump all compartments. *NOTE! When pumping, take appropriate precautions and refill the tanks immediately. Leaving the tank(s) empty could result in the tank(s) floating to the surface.* Reinstall all the pods according to the original installation instructions on page 3 of this manual. Make sure the Aeration Pod(s) have good airflow. Always properly reinstall any related safety devices and lids and the access cover(s) of the tank riser along with security screws if required.

Diffuser Stone Replacement

With the riser lid removed, remove each BioMaze™ aeration pod from the tank via the access riser using the rope connected to each pod. As you remove each pod, hold them above the water line within the riser and spray them off with a garden hose to remove any and all sludge and foreign debris. Exercise caution to ensure all sludge and debris are rinsed into the tank. Use care so as not to damage the pods. Note where and how the diffuser assembly is attached to the pod. You may want to take a picture for reference. Remove the zip ties from the diffuser and unscrew the diffuser from the 3/4" male pipe tread fitting clamped to the hose. (See diffuser pictures below) 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 component. Reassemble in the reverse order using new gaskets and stones. Replace the stainless-steel screw holding the assembly together. Reassemble with new stones and gaskets making sure to align gaskets and diffuser stones properly so as to get a good airtight seal between each stone and the assembly. Tighten the completed assembly firmly by hand. Screw the diffuser assembly back on the 3/4" male pipe thread fitting clamped to the hose and tighten with wrenches using caution so as not to overtighten. Reattach the diffuser with the new zip ties provided in the kit making sure the diffuser is located in its original position on the pod. Reinstall the BioMaze™ Aeration Pod(s) back into the tank according to the installation instructions on page 3 of this manual. Always properly reinstall any related safety devices and lids and the access cover(s) of the tank riser along with security screws if required. (The replacement stone and gasket kit is available on our website.)

BioMaze™ Porous Fine Air Diffuser Stones - ASSEMBLY



Mature Biofilm →
*On the pods producing clear,
 odorless effluent*

← Effluent Sample
*from a properly operating
 RioVation® BioMaze™
 Biofilm Reactor*

