

EconoBead[®]

EB-40 EB-50 EB-60



INSTRUCTION MANUAL

Introduction to Bead Filtration

How long have bead filters been in use? Bead filters have been around since the mid-70's and got their start in the food fish industry. Bead filters have been tested at various universities around the country, including Louisiana State University and Langston University in Oklahoma. In these tests, bead filters outperformed other filtration systems, when considering both bio filtration and clarification.

What is the theory behind bead filter operation?

Bead filters accomplish two goals, one being water polishing (solids capture) and the other being bio filtration. Other filtration systems accomplish these goals, but are much larger and more difficult to clean. The advantage of the bead filter is that it provides a home for beneficial bacteria with high surface area for a large colony per cubic foot and fine particulate straining all within the same vessel. The other big advantage the bead filters have over other types of filters is that they are much easier to clean. This makes the hobby of KOI or pond keeping much more enjoyable, with less work involved in maintaining a healthy environment for the fish.

How does a bead filter perform Mechanical Filtration?

Mechanical filtration or clarification is the process of removing suspended solids from water. Suspended solids in a recirculating system are generally small particles of undigested food, bacteria, and algae. These solids tend to reduce the clarity of water and cause problems in consuming tremendous amounts of oxygen, also needed by our beloved fish. Bead filters remove solids from water by different mechanisms. Physical straining is probably the most dominant mechanism removing larger particles (>50 microns). Finer particles (<20 microns) are removed at a lower rate by a process called bio absorption. The particles are captured by bacterial bio film on the surface of the bead. Studies show that bead filters capture 100% of particles >50 microns and 48% of particles in the 5-10 micron range per pass. The more passes the more solids captured. ****Important**** in order for the bead filter to perform FINE micron straining it **MUST** be fully colonized with bacteria. Depending on the temperature this can take up to 4-6 weeks, at temps. above 60-65 degrees F.

How does a bead filter perform Bio filtration?

Bio filtration depends on the establishment of a colony of bacteria on the surface of the beads large enough to convert dissolved toxic nitrogenous waste to harmless compounds. When the bacteria are given the proper environment, they grow in a thin bio film on the surface of each bead. Each cubic foot of beads contain about 600,000 beads. This is one of the secrets of the bead filters success--high surface area per cubic foot for a large bacterial colony per cubic foot of filter media. The two most common types of bacteria are, Nitrosomonas which is responsible for the break down of ammonia in the system. The next is Nitrobacter, which is responsible for the breakdown of nitrite into relatively harmless nitrate. ****Important**** in order for the bead filter to perform Bio filtration the beads must be colonized with a large enough colony to handle the load of dissolved ammonia presented to it. This may take up to 4-6 weeks at temps. above 60-65 degrees. Until the colony has grown large enough, the pond owner **MUST** be responsible for monitoring the levels of ammonia and nitrites in the pond water and taking appropriate measures to correct dangerously high levels.

How do you size a beadfilter?

Unlike the most of the traditional multi-chamber filters we do not only regard pond capacity but also to the (future) fish load. One often forgets to keep in mind that our koi grow very fast each year and we often buy a new fish. In case of a multi-chamber filter this means we need a lot of space to install the filter but in the case of an EconoBead filter the difference in dimensions is not that big. What matters is the amount of beads. The biggest model can be placed on a surface of 1m²! So first check the max. fish load for each model that suits your (future) fish load. For ornamental ponds without koi you can multiply the max. pond content by 2.

What pump do I use with my filter?

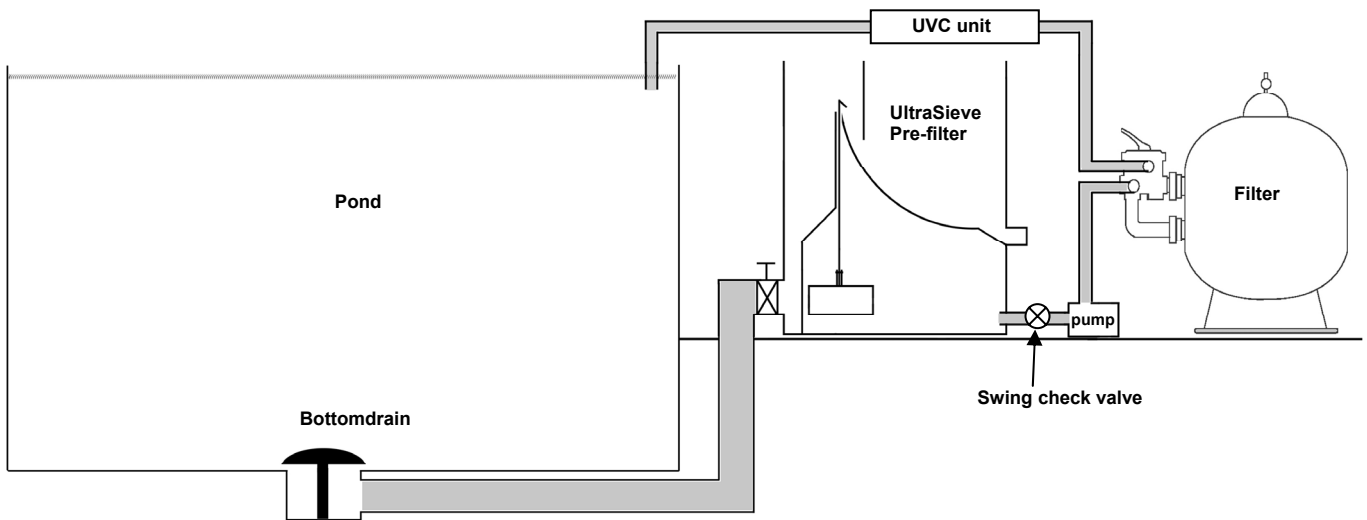
Since EconoBead beadfilters are pressure vessels, the pump sits before the filter. Almost any out of pump will work. Pumps that are very suitable are swimming pool pumps like the Hydronaut, Whisperflo or Speck pumps but also out of pond pumps like the Oase Nautilus serie and the Messner M series. Keep the head pressure in mind regarding the filter and the pipe work. A good rule of thumb is that the pump must be capable to have a flow of about 40 - 50% of the pond contents per hour with a head pressure of 0,2 – 0,3 bar (2 - 3 meter). Since the backwash operation needs some pressure, open impeller pumps like the Oase Aquamax are not suitable for the EconoBead.

Is an EconoBead filter only suitable for ponds?

No, an EconoBead filter is also very suitable for salt- and fresh water aquaria and is also very suitable for swimming ponds.

Suggested installation of an EconoBead® filter.

A swing check valve installed below water level in an easily accessed location will make keeping the pump primed much more easy and prevents the pump from blown empty during rinse with blower.



PRE-FILTERS

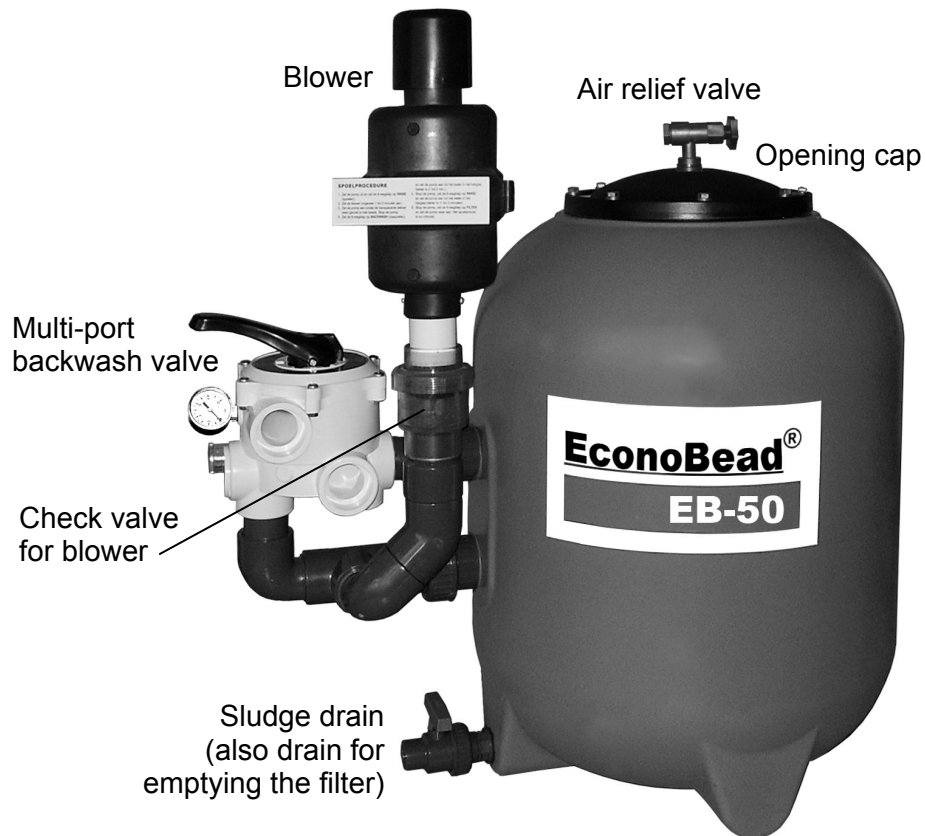
The in- and output system of a beadfilter has laterals (slotted pipe) to keep the beads inside the filter and therefore we need a pre-filter to prevent the possibility of large solids (string algae, pine needles, leaves and fish waste) coming in from a bottom drain or submersible pump. We strongly recommend the use of a pre-filter in the above-described situations.

There are several options that can be used as a pre-filter:

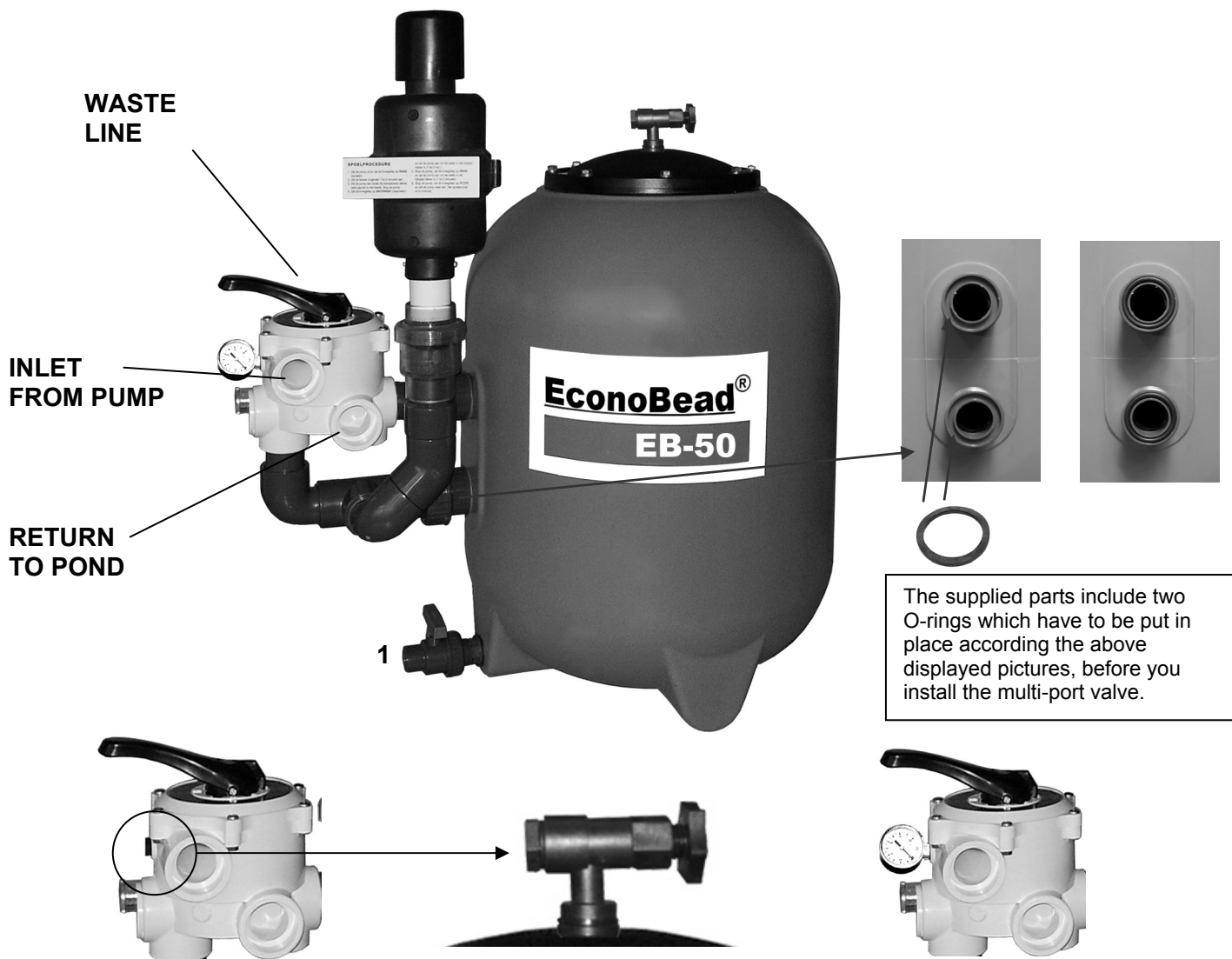
A vortex with filter brushes, the Turbo Vortex, the Ultrasieve or other systems that can keep out the larger solids.

Getting to know your EconoBead® filter

We suggest you take a few minutes to familiarize yourself with your EconoBead® filter.



Setting up your EconoBead® filter



1. Attach the ball valve part with the blue handle (1) to the union part at the bottom of the filter (close the valve). Make sure the rubber o-ring is in place.
2. Fill the tank about one half full of water. Now pour the beads into the tank from the top opening.
3. Install the air relief valve as on the picture above. Remove the black plug from the multiport valve (see picture) and use it in the open side of the air relief valve according the picture above. Install the pressure gauge in the multiport valve with Teflon tape or Loctite 5331 to make it waterproof.
4. Put the big O-ring in the cut-away of the top opening. Put the cap on the opening. First use a stainless steel washer before you use the stainless steel bolts. Gradually fasten the bolts one by one, so do not completely fasten one bolt at once.
5. Attach the multiport valve (first put the O-rings in place according the above displayed photo's). Be sure that the "O" rings of the valve are properly positioned. **** Important **** Hand tighten the unions, do not use a wrench, as you may crack the outer ring by over tightening. Insert the blower with the section of PVC pipe that came with the filter into the upper union of spring check valve for the blower attachment (**Do Not Glue**). Don't pick up the blower on the silencer side (top cap) as it is not glued to the blower. When you turn on the blower the spring check valve will open allowing pressurized air to enter the filter tank for bead agitation.
6. Make pipe connections on the 1½" female threaded sides. The pressure (pump) line, return line, and the waste line connections are clearly labelled on the valve. **** Important **** Install a swing check valve on the suction line from the pond to the pump. Install this below water level and you will have much less trouble priming your pump. See ideal installation diagram at the front of the manual. Also be sure that the waste water is directed away from the filter site, so that there is not settling of the filter system from moist ground around the filter.
7. First put the multiport valve to the WASTE position before you start filtering to clean the pipework and the filter from small plastic parts like bead and/or PVC "dust". Start the pump and keep it running until the water is clear of waste. Stop the pump, put the valve to the FILTER position and start the pump again. You are now filtering!

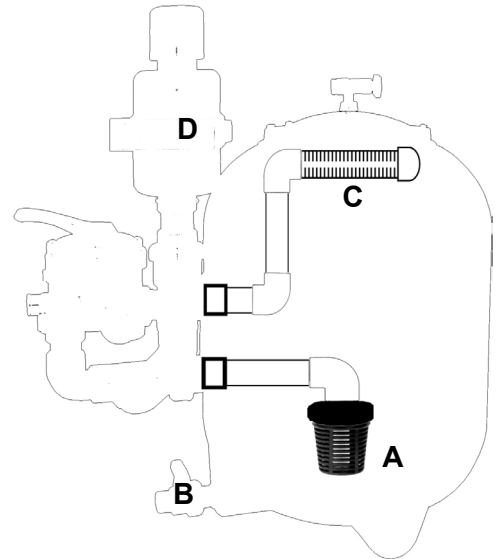
TIP: 3/3 PVC unions 1½" male thread with rubber ring x 50mm plain (see photo) for the pipe connections. With these unions the connections on the multiport valve are waterproof without the use of glue or kit, and it allows the valve to be easily dismantled. These unions are available at your EconoBead dealer as part number AB265.



BEADFILTER OPERATION

Water enters into the tank (A) under pressure from the pump. The solids are collecting in the centre of the filter, waiting to be hydraulically purged out under pressure from the pump. All you have to do is open the sludge separation valve (B) with the pump running and the filter in it's normal filtration mode and the heavier solids are evacuated in just a couple of seconds. What does all of this mean? The most unique, efficient filter of its kind. An efficient filter doesn't hold solids, it gets rid of them!

Now that the water is in the tank it is forced slowly upward in the vessel through zillions of beads about the size of BBs. On these beads are billions of nitrifying bacteria and these hungry bacteria are consuming vast amounts of ammonia, nitrites, etc. and performing what is known as nitrification. This is how we actually have clean, healthy water is due to the work these minute organisms are performing. Water continues to flow upward through the beads and exits out of the vessel via the top spray bar (C). This water then continues into the multi port valve and depending on the setting on the multi port (FILTER), the water continues then to the pond.



The **EconoBead®** series have another unique feature: the **Blower (D)**. This blower is mounted on a special air check valve. It is important that the valve be in the rinse position for the blower agitation of the beads. When the blower is active the beads and debris are dispersed throughout the interior of the filter. This breaks up the beads and releases the trapped particles. This debris then can easily be backwashed out to waste through the spray bar (C). After the RINSE cycle with air we perform a backwash in which the water enters at C and leaves the filter through A. After the backwash there will be another RINSE cycle but with water instead of air. This takes any remaining debris and sends it to waste (from A to C), instead of sending a cloud of dirt back to the pond.

THE MULTIPOINT VALVE

"FILTER" : water enters the Beadfilter at (A) and goes upward through the beads and exits out of the vessel via the top spray bar (C) to return to the pond.

"RECIRCULATE" : With the "RECIRCULATE" feature you can bypass your filter and flow the water from pond to pump to multiport and back to pond. This comes in handy when you are treating the pond.

"WASTE": allows the water to bypass the filter and go directly to waste, such as when you are performing a backwash cycle. You can also use the waste setting to vacuum out your pond without the garbage going into your filter, it bypasses the filter via the multiport and goes out to waste.

"RINSE": The first time we use the RINSE feature to wash the beads with the blower which forces huge amounts of air into the vessel and since air rises in water, the beads are broken apart by this action, making a thorough backwash easy to accomplish. After the backwash function we use the RINSE feature again but now with water instead of air. It is impossible to get every little bit of debris out of a filter and this causes these minute particles to exit in the waste line instead of going back into the pond.

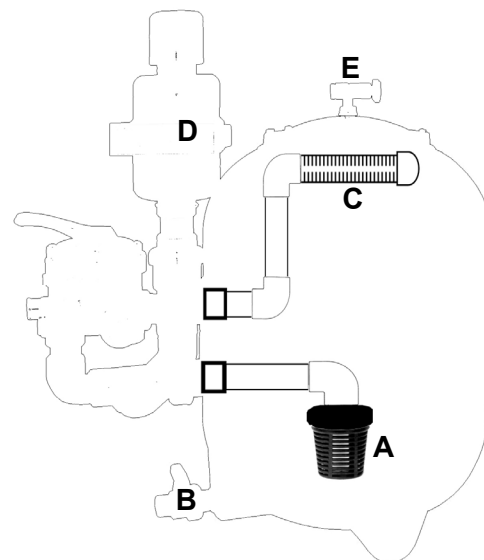
"BACKWASH": In this position we let the pump run until the water in sight glass is clear (normally 1 to 2 minutes). The water enters the filter from the top spray bar (C) and exits the vessel at (A) and goes out to waste.

"CLOSED": Valve closed. Never use this position with the pump running.

BACKWASH INSTRUCTIONS

When you first start up your filter, we recommend that you let it run for two weeks before you perform your first backwash. After that, 2 - 3 times a week during the warm season should be all that is needed. During the winter months backwashing can be reduced to as little as once every 2-3 weeks. To perform a backwash do the following:

1. With the pump running open the valve to the sludge drain (**B**). Keep it open for 15-20 seconds, then shut it. This will purge the large solids that have made it into the filter and settled out in the bottom of the tank to waste. It is very important to get them out of the system for overall water quality and more efficient filter operation.
2. Next turn off the pump.
3. Move the multiport valve to the **rinse** position. When the blower (**D**) is activated in this position, air and a small amount of water will leave the filter to waste. It is important that the valve be in the **rinse** position for the blower agitation of the beads.
4. Activate the blower unit for 1-2 minutes. During this time the beads and debris are dispersed throughout the interior of the filter. This breaks up the beads and releases the trapped particles. This debris then can easily be backwashed out to waste. Place your ear to the side of the tank. You should hear a lot of "popping and sloshing" going on inside the filter. If you only hear air moving through the filter then you need to open the tank and make sure that the beads are not gelled.
5. **!!!IMPORTANT!!!** Some water has been forced out of the filter. The tank needs to be entirely full of water before backwash is performed. To fill the tank with water, open the air release valve at the top of the filter and turn on the pump. When water sprays out the air release valve, the tank is full. Turn off the pump and shut the air release valve.
6. Move the valve to the **backwash** position. Turn on the pump and run until the water is clear in the sight glass. The water will run clear at first then dark and then clear.
7. Move the multiport valve to the **rinse** position. Turn on the pump and run until water is clear in the sight glass. This takes any remaining debris and sends it to waste, instead of sending a cloud of dirt back to the pond. Turn off the pump.
8. Move the multiport valve to the **filter** position and turn on the pump. Backwash is done.



Note The backwash instructions on the label of the blower are a short version of the above instructions.

WATER SAVING DRAIN: EconoBead filters come standard with a water saving sludgedrain. The water saving sludgedrain allows a low volume backwash if water is in short supply, expensive, or you have a low volume pond, but heavily stocked. After using the Blower or an initial hydraulic backwash to break up the bead pack, let the heavy solids settle in the water below the bead pack then open the Sludgedrain and drain them to waste. The sludge drain will allow the entire tank to be drained, without losing beads through the sludge drain. So one is only using the water volume of the filter tank to wash the beads. This saves many gallons of water that may be used with an hydraulic backwash.

NOTE: The "normal" backwash procedure does cost more water, but by refilling your pond after backwash you will make, necessary, water changes automatically! Water changes of 5 to 10% per week are a good rule of thumb for most ponds.

FILTER MATURATION

This has been stated earlier, but is very important. It takes 4-6 weeks of operation at temperatures above 60-65 degrees F (16-18°C). Before there is a large enough colony of bacteria to handle the bioconversion of ammonia and fine particulate straining. During this transition period the pond owner must watch the ammonia and nitrite levels in the pond. If they become dangerously high, steps should be taken to correct the problem, such as a water change. Also during this period fine particulate straining will not be fully mature and you may notice your water being less polished than you would like. Both of the above issues will improve with time and the growth of the bacterial colony. This will occur with any type of bead filter used. To help the nitrification process you can add bacterial cultures such as Microbe-Lift Super Start, Microbe-Lift Nite Out II, or Microbe-Lift Filter Gel (available at your EconoBead dealer).

ULTRAVIOLET LIGHT STERILIZERS

Bead filters will remove suspended particles down to 5-10 microns in size. However, some algae particles are smaller than 5 microns and will not be removed by the beads. These tiny algae cells will give the water a green cast and affect the clarity of the water. If the pond owner wants crystal clear swimming pool clarity, then a UV-light is needed. UV-lights will also remove many harmful bacteria and decrease the suspended bacterial counts in the water. We recommend the use of UV-lights for the above reasons.

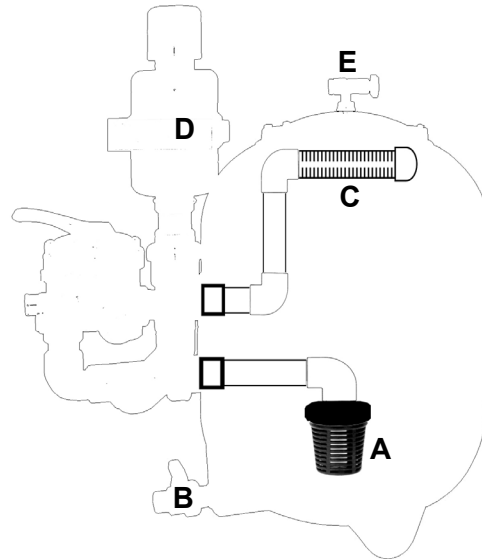
Note If you leave your filter unbackwashed for two or more weeks, it is a good idea to do an extra long blower treatment on the beads.

Word of Caution If you leave your filter unbackwashed for extended periods of time, and you live in an area with relatively soft water, you may want to buffer your pond water. The bacteria in the filter can consume enough alkalinity (KH) in the water to cause a dangerous pH drop. Total alkalinity should be kept above 50ppm (3° dH) to avoid potentially dangerous shifts. To increase alkalinity, add sodium bicarbonate, change the water, or add a commercially prepared pH Buffer like Bacta-Pur BioBalance.

NOTES ON NITRIFICATION

When ammonia removal is desired first start with MICROBE-LIFT Clean & Clear to reduce the organic waste in the pond as high levels of BOD can inhibit nitrification by competing with the nitrifying micro organisms for necessary oxygen. After applying MICROBE-LIFT Clean & Clear wait 24 to 48 hours to do its job, and then apply MICROBE-LIFT NITE-OUT II. Prior to the addition of NITE-OUT II (to start and maintain nitrification). Check to make sure that the pond's pH is in the correct range for nitrification. Adjust the pond pH to a range of 7.5 to 8.7, and check to see if adequate alkalinity is present as you must maintain a level of at least 50/ppm (3° dH) of alkalinity at all times. This is necessary as nitrifying micro organisms use 7.1 lbs of alkalinity for each pound of ammonia removed (oxidized). If proper alkalinity is not present, nitrification will not occur, and if alkalinity is lost nitrification will cease and the pond pH will drop due to the nitrifying cultures activity. To increase alkalinity add pH buffer or sodium bicarbonate until you achieve an alkalinity level of 50/ppm (3° dH) to 100/ppm (5.6° dH) (minimum), and then maintain the alkalinity at a level of at least 50/ppm (3° dH).

INTERNAL INSPECTION



We recommend that twice a season you inspect the output laterals.

1. Backwash your filter then turn off the pump and leave the valve in the backwash position. Also open the drain plug at base of the filter.
2. Open the air release valve at the top of the filter. You will notice air rushing into the filter. This represents water draining out of the filter.
3. When air stops being sucked into the filter, most of the water has drained out of the filter. Remove the cap.
4. Now inspect the beads. Do they look clean after the backwash? Are there areas of caked beads? If you find areas of dirty beads or caked beads, you may need to adjust the length of time that you use the blower, or increase the backwash time, or possibly the backwashing frequency. If you find caked beads, now is the time to break them apart. Using your hand or a stick, stir the beads and break up any clumps that you might find.
5. Wipe any beads stuck to the output laterals off and inspect them. Make sure that they clear of any obstructions. If there is material inside the laterals, use a high pressure cleaner to make the laterals clean.
6. Next, inspect the backwash laterals. They will need to be removed. This can be done by reaching down in the filter and unscrewing the union that holds the backwash lateral in place (you may have to remove a greater part of the beads). When loose inspect them for debris. Clean if needed then replace when done.
7. Replace the top cap and make sure that it is secure. Pay attention to the position of the air release valve so that it is pointed in the direction you wish.
8. When the top cap is back on, with the air release valve open, move the filter valve to the Filter position and turn on the pump. When water comes out of the air release valve, close the valve and perform another backwash and rinse cycle before going back to filtration. Now your done.

MEDICATING YOUR POND

Sometime during your career as a pond keeper you may need to medicate your pond with chemicals that will harm the bacterial colonies on the filter media. To insure that they are not damaged follow these simple steps:

1. Do a good backwash on the filter then turn off the pump.
2. Move the valve to the "recirculate position". This will cause the water to bypass the filter while your treating your pond. Turn your pump on.
3. Open the Sludgedrain at the bottom of the filter and then the air release valve at the top of the filter. Water will start draining out of the filter without loss of any beads. The bead pack will now be surrounded with air instead of water. This will prevent any bacterial loss from lack of oxygen. The beads will stay moist for several days.
4. When the medication period is over, close the sludgedrain, but leave the air release valve open. Turn off the pump and move the handle to the filter position. Now turn on the pump. You will notice air "whistling" out of the air release valve as the tank refills with water. When water sprays out of the air release valve turn off the pump. Do a quick backwash and rinse, then go to filter mode.

Note Depending on the chemicals used, it is advisable to do a 50% water change before starting the filter back up. Check with your dealer.

WINTERIZING YOUR FILTER.



Sludgedrain

It is best for all biological filters to operate 24/7. If you live in an area where you experience hard freezing, you may decide to shut your filter down for the winter. Do the following:

1. Do a good backwash of the filter. Move the multiport valve to the "winter" position (between **CLOSED** and **WASTE**).
2. Turn off your pump and open the drain plugs on the pump strainer basket.
3. Open the drain plug at the base of the main filter and then the air release valve at the top of the filter. Water will drain out of the filter, but no beads will be lost.
4. Loosen all connections and drain exposed pipes, so that no water will be trapped. This is especially important for your UV lights!

In the spring:

1. Tighten all the connections that you loosened in the fall.
2. Move the multiport valve to the filter position and open the air release valve at the top of the filter and close the drain plug. Turn on the pump. When water comes out of the air release valve at the top of the filter, shut it and turn off the pump. Now do a good backwash and rinse before going to the filter mode. Back up to full capacity. During the first few weeks of operation in the spring, it is a good idea for the pond owner to do frequent checks of the ammonia and nitrite levels.

TROUBLE SHOOTING

Decrease in water flow

1. If you notice that your water flow is decreasing the most likely cause is that the filter needs to be backwashed. The bead filter is designed to trap solids and does it very well. When fully loaded with solids, the filter may restrict flow. Perform a backwash and rinse.
2. If after backwashing the filter the water flow is still low, next check the strainer basket on the pump. Be sure that it is clean and replace.
3. If you have a TURBOVORTEX on your system. Perform a backwash. Pay attention to the amount of water flow available while backwashing the TURBOVORTEX. This water is coming straight from the pond. If there is little flow, then you have a supply problem, meaning that the bottom drain, return line, or the skimmer is in need of cleaning. If these are clean and clear then check the impellers on the pump to make sure that there are not any objects trapped that would decrease their rpm. If there is plenty of flow while backwashing the TURBOVORTEX, then the flow restriction is after the pump.
4. If flow is still low after backwashing the TURBOVORTEX and there was plenty of flow through the pump, then you need to inspect the internals of the filter. Check to see if the laterals are clear of obstruction and that the beads are not caked into large clumps. When the bead pack gets "gelled" they are hard to break apart with backwashing and doing a blower treatment. They may need to be manually broken apart. When the beads are gelled they tend to cause "Channeling," which means that the bead pack is totally clogged and water will follow paths of little resistance through or around the bead pack. When channeling is occurring you will notice that after backwashing the filter quickly clogs and flow slows in intervals that used to take 1-2 weeks, now flow slows in 2-3 days. Follow the directions in the internal inspection section of the filter operation section of the manual.
5. If you follow the above steps and your flow is still low, PLEASE, call your dealer.

Trouble Shooting Decrease in water Clarity

1. If your filter has a mature bacterial colony, which could take up to 4-6 weeks at temps. above 60-65 degrees F., and your water quality and clarity have been good then decreases, the first thing to do is a good backwash and rinse. Spend an extra amount of time with the blower agitation of the beads.
2. If your clarity does not improve or improves then decreases quickly, open the filter and inspect the internal condition of the laterals and the beads. If the beads are gelled and channelling is occurring, then the water will bypass most of the bead pack and no mechanical filtration will occur. Manually break up the beads and make sure the laterals are clear of obstruction.
3. If your water clarity does not improve, and you have UV-lights on the system, check to see if the bulbs are still working. Depending on the bulb, some UV-light bulbs will only have killing power for six months of continuous run. Others will last for a year or more. Check to see when they were last changed and replace if needed. They should be changed at least once a season.
4. If your clarity does not improve, check the water flow out of the system. The entire pond water volume should be turned over through the filter system at least 3-4 times per day. If turn over time is slow then the amount of solids that the filter can capture will decrease. Check to make sure that there are no flow restrictions. Follow the low flow trouble-shooting chart. Also make sure that your pump is large enough to move the amount of water needed for enough turn overs through the filter.
5. If after following the above suggestions and the clarity is still off, PLEASE call your dealer.

High Ammonia and Nitrite with previously stable state

If your pond has been up and running at warm temperatures (60-70 F) for six or more weeks and your ammonia and nitrite levels have been previously controlled, but you experience a spike in the ammonia level try the following:

1. Perform an extra long blower treatment on the bead pack and an extra long backwash. If the bead pack becomes totally clogged with solids, the available surface area for bioconversion drops significantly. Backwashing will open up the active surface area and bioconversion will resume.
2. If after backwashing the ammonia levels are still high, open the filter. Check the laterals to make sure they are clear, stir the beads to break up any gelled areas and then backwash.
3. If ammonia levels are still high, consider how much food is being fed to the fish. One cubic foot of mature beads can handle around one pound of 35% protein food per day. Check to see how many cubic feet of beads are in your filter and compare that with how much food your feeding.
4. If ammonia levels are still high, check the flow rate through the filter. The entire volume of the pond should be turned over through the filter **AT LEAST** 3-4 times per day. If the flow is down for some reason, bioconversion of ammonia will also slow. If you find the flow is in fact down, follow the troubleshooting flow chart for correcting low flows.
5. If all the above are found to be in good condition, consider the fish load on the pond. This actually also relates to the above discussion about amount of food fed. If you have a heavily stocked pond you will also be feeding more to the fish and thus adding more nitrogen to the pond water that will have to be bioconverted. Again, consider your filter size and what your asking it to do.
6. If the ammonia levels are still high, call your dealer.

EconoBead®

EB-40 EB-50 EB-60



TYPE	DIA-METER	SIZE A	SIZE B	POND SIZE	MAX. FISH LOAD	FOOD PER DAY	MEDIA (BEADS)
EB 40	40 cm	84 cm	70 cm	12 m ³	35 kg	max. 350 gr	40 liter
EB 50	50 cm	87 cm	80 cm	20 m ³	50 kg	max. 500 gr	65 liter
EB 60	60 cm	92 cm	90 cm	36 m ³	80 kg	max. 800 gr	110 liter

All models have a 1½" multi-port valve and a powerful blower.

EconoBead® filters are constructed from a high grade polypropylene.

There is a warranty period of **5 years** on the filter tank, filter material and pipe system!