

WATERCO

EUROPE LTD

Water, the liquid of life

Bio-Mec Filter



Installation & Instruction Manual

Waterco – Pro Filtration

Bio-Mec Filter

1. Filtering Pond Water

To maintain good water clarity and a safe environment for fish, the pond water requires a combination of the following features:

1. Mechanical Filtration

2. Biological filtration

3. U.V. Sterilisation

4. Good circulation

5. Aeration

In simple terms, the 'mechanical filtration' is basically straining the water, separating the solids from the liquid. The solid matter in a pond is usually made up from different forms of debris, which maybe found at any level in the water. The presence of these solids and suspended particles will make the pond water appear murky or cloudy, making it difficult for visual inspection of the fish. The water clarity may not necessarily be a problem to the fish, provided the debris and suspended solids are of a non-harmful nature.

However, some of the debris in a pond can create problems for the fish, often caused by Ammonia, which is produced by faecal, mucus, and other decaying matter. To overcome the build up of harmful Ammonia in the pond water, it is necessary to install a 'Biological filter'. Most often, a Biological filter is a large chamber full of media, which breeds and cultures 'good bacteria'. Within the Biological filter, the good bacteria consume and convert the harmful Ammonia into harmless Nitrate.

Conventional pond filtration systems generally keep the mechanical and Biological filtration aspects separate, and as such the equipment involved can be rather large and bulky. In addition to the size considerations, most conventional filter systems may require a high degree of maintenance and cleaning. This can prove to be very time consuming particularly during the summer months, when the frequency of cleaning can be so often, it becomes impractical.

Combined with the Mechanical and Biological filtration, it is essential that the pond water is re-circulated (turnover time) at a rate of every: 2 – 3 hours.

2. A Typical Pond Filter System

Most basic conventional Pond filter systems employ a stage process, which may comprise of the following parts.

- (i) First stage – Sedimentation chamber or Vortex
- (ii) Second stage - Aeration for Biological filters
- (iii) Third stage – Biological chamber filter
- (iv) Fourth stage – Hi Rate sand filter
- (v) Fifth stage - U.V. Sterilisation
- (vi) Sixth stage- Venturi or waterfall

In a filter system of the above type, the first stage can be a simple chamber with baffle plates, or a more sophisticated Vortex chamber, which will remove between 50 – 70% of the solid waste matter.

The second stage would be air supplied by a simple air pump and air stone, injecting the air directly into the water flowing through the Biological filters. The Oxygen provided will enhance the life and growth of the bacteria colonies assisting with the removal of Ammonia.

The third stage can comprise of several media types and may assist in clearing another 15 – 20% of the debris, though these filters can be very difficult to clean.

Whilst the Fourth stage – The Hi Rate sand filter, will work efficiently in removing the remaining solids down to 7 - 10 microns in size & maintaining water clarity. However a downside in using a 'pressure sand filter' is, that it may clog very rapidly (perhaps on a daily basis) which would cause the need for regular cleaning or backwashing.

The fifth stage – Uses Ultra Violet light to sterilise and for inhibiting the growth of Algae and other undesired organic matter.

The sixth stage – Aeration for the pond supplied either via a Venturi (and or) a waterfall. A waterfall can make a very attractive feature in the pond, though it may cool the water, which could inhibit fish growth.

Any pond filter system must run 24 hours a day – seven days a week!

This is essential to ensure that all aspects of the system work on a continuous basis to ensure a safe and healthy environment for the fish to live.

Therefore, a major consideration for the pond owner is the power and water consumption used to maintain the pond filtration. Usually, Hi Rate sand filters need a fairly powerful pump to force the water through the fine sand, and this can prove expensive when running on a continuous basis. Likewise, the frequency of backwashing will lead to a large volume of water being required. This too can prove costly in the long run.

3. The Benefits of Using a Waterco - 'Bio Mec Filter'

The principal of using a **Waterco Bio-Mec filter** is to combine the Biological filtration aspect with the mechanical filtration (water polishing) you would have with a Hi Rate sand filter. In most cases the Bio-Mec Filter can be installed instead of a Hi Rate sand filter.

By combining these two filtration aspects (mechanical & Biological), using a **Waterco Bio-Mec Filter**, the whole system can be more compact than a traditional - conventional pond filter system. Or, the Bio-Mec filter can also be used to enhance an existing system. In addition, the **Waterco Bio-Mec** filter requires far less pressure than a conventional Hi Rate sand filter, therefore the type of pump needed will require far less power. *Possibly reducing power use by 50%!*

Perhaps most important of all, a **Waterco Bio-Mec Filter** will require far less maintenance – cleaning or back washing than a typical Hi Rate pressure sand filter. This will mean you could save a considerable amount of wasted water and time, whilst keeping your pond in 'tip top condition!

4. How does the Waterco Pond Master filter work?

The Waterco Bio-Mec Filter should be installed after your strainer/Vortex and main biological filter system. A suitably sized pump must be selected to ensure the correct water flow is delivered to the Bio-Mec. Once installed, the Bio-Mec Filter will remove suspended solids down to 10 microns in size, maintaining your water clarity to a very high standard.

The pumped water is fed to the Main Multi-port valve and diverted to the lower filter inlet. The inflowing water is evenly dispersed through the special slotted pipes (Laterals) within the lower section of the filter. The contaminated water flows upwards through the filter vessel depositing waste matter between the crevices of the Polymer Media (plastic beads).

To assist the growth of Bacteria for removal of the Ammonia present in the inflowing water, you will need to charge the system with a suitable bio-filter maturing product. Once added to the inflowing water, good bacteria will begin to colonise on the filter media enhancing the biological action.

The Waterco Bio-Mec is designed to reduce the amount of maintenance (and waste water) required and ideally if the equipment has been correctly sized, backwashing will only be required on a weekly basis. The backwashing process is assisted by the use of a very powerful blower (air compressor) and the whole procedure will take less than 5 minutes to perform. (See general running instructions).

The Waterco Bio-Mec filter is designed to ensure servicing simplicity. The main filter body has a large 8" diameter lid for easy access to the internals of the filter. Both the top collector assembly and laterals can be easily unscrewed and removed for cleaning.

5. Choosing the correct size Bio-Mec for your pond

The following is the list of specifications for the size range:

Filter Diameter Size	16"	20"	24"	30"	36"
Filter Surface Area m ²	0.16	0.2	0.3	0.45	0.66
Media Volume in Litres	40.0	65.0	100	200	350
Min - Maximum Flow Rate m ³ /hr	3 – 6	5 –10	7-15	14-24	20-36
Max Pond Size m³	12.0	20.0	36.0	60.0	90.0
Max Pond size gallons	2640	4400	7920	13200	19800

Make sure the pump you use will operate at the correct flow rate!

6. Installation Instructions:



(Fig 1)



(Fig 2)

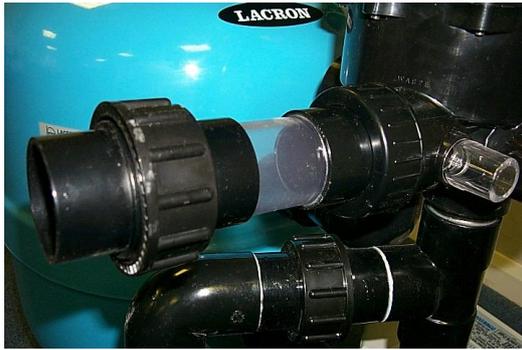


(Fig 3)



(Fig 4)

1. Prior to installation: Prepare an area large enough to stand all the equipment allowing adequate space for connecting pipe-work and routine servicing. Once you have decided on the optimum position, prepare a flat and level concrete base to accommodate the unit.
2. Remove filter – Air blower and pipe-work from packaging. Check to ensure all parts are present and are in good condition. (See fig 1)
3. Place the main filter unit on the pre-prepared concrete base making sure that both the blower and the filter vessel are secure. (See fig 2)
4. Connect the Multi-port valve onto the top and bottom bulkheads, ensuring that the 'O' rings are in place. Tighten the connecting unions by hand only. (See fig 3).
5. Connect the Non Return Valve unit between the Multi-port Valve and the blower unit ensuring that all 'O' rings are in position. Tighten the connecting unions by hand only. (See fig 4).



(fig 5)



(fig 6)

6. Connect the waste - water sight glass assembly to the waste connection of the Multi-port valve (on LHS) ensuring that the 'O' rings are in place. Tighten the connecting unions by hand only. (See fig 5)
7. Connect the isolator valve unit to the main Multi-port valve (RHS) ensuring that 'O' rings are in place. Tighten the connections by hand only. (See fig 6)
8. Screw on the return union to the remaining position (on the lower - RHS) of the Multi-port valve. Tighten the connection by hand only.
9. Use PTFE tape around the threads of the pressure gauge and screw into the threaded hole on the side of the Multi-port valve. There are two positions for this, so install the gauge to the most easy to see position and use the screw cap in the opposite hole. **Be sure NOT to over tighten the pressure gauge as this will damage the threads!**
10. Cut and glue pipe-work from your pump discharge to the small isolator valve already fitted as described in item 7 above. Be sure not to stress any pipe-work by providing suitable supports, where required. **NOTE: All pipe-work connections are in 1 ½" BSP – ABS Pipe-work. Ensure you use compatible adhesive and pipe!**
11. Cut and glue pipe-work between the waste line sight glass unit and the drain, again ensuring that all pipe-work is well supported.
12. Cut and glue pipe-work between the return union on the Multi-port valve and the pipe-work back to the pond. This return line may include a U.V. light system, but again ensure all pipe-work is supported.
13. Once all glued pipe connections have been completed, ensure adequate time for the adhesive to dry. **Most likely this will be at least 12 hours.**

- 14. IMPORTANT! Ensure the pipe-work and glued joints have had adequate time to vent any flammable fumes before starting the air blower. Ideally, run the water pump for at least an hour before testing the blower on the system.**
- 15. IMPORTANT! The electrical connection of the blower must be made by a qualified electrician and in accordance with the latest edition of the I.E.E. regulations. The blower unit must be protected by a Residual Current Device (RCD).**
16. Remove the main filter lid, then unscrew the top collector assembly. Check to ensure all the Laterals are securely in place in the bottom of the filter. Place a small plastic bag over the collector pipe-work to prevent media from entering when filling the filter.
17. Ensure you have the correct amount of media as stated in the table above in section 5 – Specifications. Carefully pour in the media into the filter avoiding any spillages. Once the whole amount is in the filter remove the plastic bag from the collector pipe and re fit the collector unit and then, the main filter lid.

7. Starting up your Bio-Mec Filter

1. Re-check all threaded connections to ensure they are watertight and select 'Filter' mode on the Multi-port valve.
2. Select the open position of the isolator valve, this will be when the white arrow is pointing to 12pm position and the handle is across the pipe-work.
3. Ensure system water level is to correct level and start the main circulating pump. Water will begin to flow through the filter, which should be observed at the top of the vessel within a few moments. With the filter and valves in this position, the filter is working in it's normal – Filter mode.
4. Once the unit has been run for a while, check all joints to ensure there are no leaks. To check that the blower is functioning correctly, follow the backwash procedure as stated below.
5. Once all parts of the system have been tested, add some 'filter start' to prime the filter for biological growth. (Consult your dealer).

8. Backwashing Procedure for your Bio-Mec Filter

1. Turn the circulating pump off.
2. Select 3pm position on the isolator valve (handle in line with pipe).
3. Select Rinse position on the Multi-port Valve.
4. **Ensure waste line is unobstructed and the circulation pump is NOT switched on!** Switch blower unit on and run for 2.5 – 3 minutes. This will agitate the media causing the entrapped debris to disperse into the available water within the filter. Some of the contaminated water will discharge to waste. Switch blower off.
5. Keep the Multi-port valve in rinse mode, but alter the position of the isolator valve back to the 12pm position.
6. Switch the circulation pump on and run for 2 – 3 minutes, during this time dirty water will discharge eventually clearing. Switch pump off.
7. Select backwash mode on the Multi-port valve. Run the circulation pump for 30 – 40 seconds. This will remove any remaining debris. Switch pump off.
8. Select filter mode on the Multi-port valve and continue to filter as normal.

IMPORTANT NOTES:

Never try to run the Blower and the circulating pump at the same time!



(Fig 8)



(Fig 9)

Regularly check the 3mm vent hole on the Blower pipe 'T' to ensure it is unobstructed allowing moisture to drain from the unit. (Fig 8)

Regularly check the Non return valve to ensure water is not bypassing, which could cause the blower to flood. (Fig 9)