



INSTRUCTIONS FOR THE SULPHUR NITRATE FILTER

Suitable for freshwater and saltwater up to Up to 400/600 litres

Important Principles

Operation of the Sulphur Nitrate filter is based the natural principle of REDUCTION of nitrate NO₃ to nitrogen gas N₂ using a colony of anaerobic bacteria in a low oxygen environment.

It is important therefore to understand that for the unit to work you must create a STABLE bacterial colony and if you allow too much air rich water into the reactor before the colony is stable then it will crash and you will have to start again from the beginning.

The bacteria require a food source and oxygen to survive. The food source is the sulphur and as they are anaerobic bacteria and only grow in the low oxygen water they must obtain the oxygen from another source. The bacteria take the oxygen from the nitrate molecule by reduction, first from nitrate NO₃ to Nitrite NO₂ and then further from nitrite to nitrogen gas N₂.

When the unit is new there is a tendency for the first colonies of bacteria to be the aerobic type as the water is still oxygen rich. These bacteria will act like normal oxidising bacteria turning ammonia NH₄ to nitrite and nitrate therefore initially you may see an increase in the nitrate level. The aerobic bacteria will use up the oxygen in the unit and create an environment in which the anaerobic bacteria will start to grow. Initially the anaerobic bacteria will only partially reduce the nitrate to nitrite and you may detect this however the bacteria within the tank will turn it straight back to nitrate. Finally the oxygen level, (redox) will be low enough in the reactor for the bacteria to convert all of the nitrate to nitrogen and it is time to slowly increase the flow.

Installation

Stand the Sulphur Nitrate NO₃ filter vertically in a sump or beside the tank. Note: The NO₃ Filter can only operate in the vertical position. Always put the Micro-Filter on the inlet to the reactor to stop the tap from blocking and always control the water volume on the way in and not on the way out.

Commissioning

Flush through the reactor with water before use to remove all dust particles and throw away this water. Connect the reactor to the output of a main sump pump by means of a bypass, small independent power head or alternatively gravity feed the unit from the main aquarium into the sump. At all times ensure that the siphon can be broken in the case of a power failure. The water from the output can simply drip directly into the aquarium or the sump according to the installation.

Settings

Fill the unit with water from the aquarium and switch off the tap. Leave the unit to stand full of water for 3 days to allow oxygen within the reactor to be used up. CAREFULLY open the tap and regulate the flow rate at the outlet to one drop per second or lower if possible, but not less than one drop every three seconds. Measure the Nitrate concentration at the outlet after four days. If this has not dropped to zero wait until it has done so. This can take up to 10 days or longer, especially when the temperature is low, near 17 C and if the nitrate is below 25 mg/L. Once you have had a zero reading for over two days, you can increase the drip rate slowly by about 25-30%, (we accept that initially this small increase is not easy to assess). Wait again for a zero reading for two continuous days and then increase the drip rate again by 25-30%. Wait again until you have two days of zero nitrates and then increase again and so on. Ultimately you will get to 7 litres per hour, then 8, then 9 litres per hour until finally it is possible to increase the rate to 10 litres per hour. We recommend as the flow increases that you wait four days with zero reading before moving on. The Filter is now commissioned.

Information

It is possible under the right conditions to further increase the performance of the Nitrate NO₃ filter up to a maximum output of 15 litres per hour when there is a high concentration of Nitrate NO₃ in the water, however you should be aware that the PH coming out of your Nitrate filter will be very low and for small tanks it is better to run it slowly. The Nitrate will fall but it will take a little longer and will require less buffering.

Buffering: The water leaving the NO₃ filter has a very low PH, approximately 6 to 6.5, or lower in fresh water. This water can be dripped over coral sand to raise the PH before entering the aquarium, or through a container with an air stone in it. This is particularly important on fresh water as coral sand could harden the water.

If you exceed at any time the maximum flow rate until the bacterial colony can deal with it then you will add oxygen, raise the redox and the system will crash requiring you to start again with the above procedure.

Maintenance to Micro filter

It is important to regularly flash the Micro filter trough with vinegar to maintain constant flow. Replacement Micro filters can be obtained from your nearest retailer.

NOTE The bacterial colony will not grow below 17C and will increase considerably at higher temperatures.

For further information on this or other products visit our web site at www.theaquariumsolution.com