

The Optimum Marine Reef Aquarium

Today we have better biological understanding and ranges of new products that make it easy to have a marine reef aquarium. You need to implement the right system by following our step by step guide to setting up and maintaining your *Reef Aquarium*. We only recommend the methods and products we use to manage our own tanks. Let us first deal with a few things which you should consider when buying your Marine setup and then move into the setting up.

Selecting and Positioning your Tank

Choose a tank with the largest volume and surface area possible. Pet City has a huge range of quality manufactured Raw and Varnished Pine, Painted Timber and Stained Colonial stands, cabinets and hoods. Remember, a slightly larger aquarium will not have cost you much extra and will allow you to keep your reef fishes and corals in less stress and a more stable environment. If you have an older style all glass aquarium, you will need to place coolite foam under your aquarium to take out any irregularities. Backing scenes, once selected, should be taped to the back of the aquarium with masking tape. Position your aquarium to avoid direct sunlight which can cause excessive algae.

Choosing a Filtration System

After choosing your furniture, you must decide what filtration system you need in your *Reef Aquarium*. *Pet City* offers you a couple of options that can satisfy your needs and your budget.

We must look at the options as complete filtration systems which provide the *total disposal* of all organic wastes produced in the aquarium. By total disposal we mean *extraction* as skimmer waste, then *aerobic* (oxygen rich) *biological conversion* then *anaerobic* (no-oxygen) *biological conversion*.

Essential to the success of your Reef Aquarium, regardless of which aerobic filtration system you employ, is the preparation of a *static cavity* of water under your substrate. This provides an anaerobic environment to balance your typical aerobic filtration. This shall be further discussed in the "Setting Up" section later.

Filter Types

Option 1 *Extreme Filtration "Nature's Reef"*

The best marine filtration available in the marketplace is our "Nature's Reef" trickle filter, which provides all our pre-requisites in a compact and easily concealed package. You will find it far different to most trickle filters on the market which offer only aerobic conversion of waste into nitrates. Our Nature's Reef system provides;

- Strong water movement using a *RIO 1700* return flow pump., providing high oxygen levels.
- Primary "Venturi"protein skimming using the *Queen Turbo Skimmer* driven by a second *RIO 1700*.
- Aerobic conversion using a functional drip tray and *Super BioMatt* bio-cubes/balls
- Anaerobic conversion provided by a *static cavity substrate bed*.
- Post mechanical and chemical filtration chamber.
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You have the flexibility to add chemical media to the final chamber. Our suggestions are a high grade activated carbon like *Seachem Matrix Carbon* or even better the rechargeable *Seachem Purigen*. A phosphate remover like *Phosguard*, helps control algae by keeping phosphates low. You may also want to add a fine filtration pad.

This filtration system will support the largest variety of marine life in the extreme, but needs to be linked to a gravity overflow.

We offer two types of overflows. The first can be used on any existing tank and simply hangs over the side of the tank. The better setup is to have an internal overflow installed. This requires that the tank be drilled and is the most inconspicuous system. Internal overflows can be installed to the left centre or right depending on preference.

Option 2 *Canister Filter and Air Operated Skimmer*

Our second option is more budget priced but will give quite good results. This is achieved using a good canister filter like the *Eheim, Via Aqua* or *Fluval*s in conjunction with an internal air operated skimmer like the *ORCA* units. A canister filter used on a marine tank needs to incorporate the best biological media like *Seachem Matrix*.

A canister filter provides the best freshwater filtration and adequate saltwater filtration. That is why we always do very special prices on canister filters to *Pet City Club* members. It provides flexibility in their fish keeping in the long term allowing people who have a canister on their freshwater tanks to progress to marine fishes at minimal cost. A canister will provide three important functions; Strong Water Movement, Good Aerobic Conversion and Good Mechanical and Chemical filtration. The *ORCA* Skimmer provides the Waste extraction and a properly prepared substrate provides the anaerobic conversion.

Option 3 *Hang-On Style Reef Filters*

The last range of options are the hang-on style filters like the *Ack-Pak* ofilters. These provide good protein skimming and moderate aerobic conversion. Water movement really needs to be supplemented and they don't provide a great deal of flexibility with respect to mechanical and chemical filtration. What they do offer is fair priced performance for small to medium sized tanks. You must also include a *static cavity* under your substrate when using these hang-on style filters to take advantage of the natural disposal of nitrates.

The final option are Fluidised Bed filters. Unfortunately they provide good aerobic conversion and nothing else. They are far too inflexible in our opinion and therefore rate poorly.

Setting up your Substrate

Ok, you have chosen the furniture and filtration type which suits your requirements and budget and you have positioned your tank. Now it is time to set up.

Pet City offers two substrate mediums. The most popular is coral sand which is clean and attractive. We also offer shell grit in the form of bird shellgrit (non-medicated), but this is very dirty and needs to be washed thoroughly.

To achieve total waste disposal in your reef tank using anaerobic bacteria, your tank should be prepared with a *static cavity of water below the substrate*. This is best prepared using undergravel filter plates to create an anaerobic environment in the cavity in the coral sand. There is no water movement through the cavity just motionless water, so don't use the uplifts.

Place your undergravel plates on the bottom of the aquarium and add enough saltwater to cover the plates well. Above the filter plates place three centimetres of coarse and medium coral rubble. A layer of fly screen should be placed above next to prevent fish and inverts burrowing down into the anaerobic layer.

Finally on top of the fly screen lay a two to three centimetre layer of fine and medium coral sand. This completes the preparation of the substrate allowing the development of anaerobic bacteria, in the lower layer of coral rubble, which convert nitrates back to gaseous nitrogen. Excessive nitrates are the most common cause for failure in marine systems and can be avoided with this system. Water naturally exchanges between the static cavity and the upper tank, creating an equilibrium with virtually no nitrates.

There is also a second benefit in that the lower pH below the substrate will slowly dissolve the calcium carbonate providing good buffering and an exceptionally *stable pH*.

Adding Water

Once you have prepared your substrate bed you can fill the tank with saltwater. We sell natural water in exchange 20 litre drums or artificial salts such as *Aquasonic* or *Marine Environment*. *Reverse Osmosis (R/O) water* produces the best artificial saltwater as there are no impurities like phosphate, as in tapwater. Set your specific gravity between 1.022 – 1.025 using a chamber (best) or floating hydrometer by either adding freshwater or more salt. R/O water is also best for evaporation top ups.

Connect your filtration and ensure you have sufficient water movement to provide a highly aerated environment. You really cannot have too much water movement, so an extra powerhead can be a real bonus. We prefer not to use air to achieve extra movement as this causes a lot of salt crusting from bubbles bursting on the surface.

Cycling Your Tank In

When setting up your tank, use base *live rock* to begin building your reef. This will provide a living diverse bacteria culture to seed your tank rather than using commercial starter cultures. Bacterial supplements like *Waste Control* and *Cycle* are best used on a regular basis after this to optimise filtration. Add progressive amounts of *fancy live rock* as your tank matures. Add small amounts for several weeks so that the load on your tank builds slowly. Before you add your fishes you need to monitor your waste levels. The best test kit for your reef tank is the *Seachem Marine Basic Test Kit*, which tests Ammonia, Nitrite, Nitrate, pH, Alkalinity.

After setting up you will initially need to test *Ammonia* and *Nitrite*. Once your Nitrite levels are low you can start adding fishes and corals slowly.

Everyone wants to know: " **How long before I can put fish in** "

The answer is : **When your Nitrite level is low**. Unfortunately there are far too many variables to give an answer other than this; "The sooner you put live rock in and the more live rock you put in, the sooner you can add fishes". Remember, *live rock is the balance* to your tank, being nature's filter.

Once you generate a little *Nitrate*, the anaerobic bacteria in the static cavity will convert that nitrate to gaseous nitrogen. This completes the cycle and removes the need for excessive water change management of nitrates. You can see the results in our tanks. It is still a good idea to check nitrates weekly as the de-nitrating capacity of the anaerobic bacteria will not cope with excessive waste levels (i.e. Too many fish). Remember that Reef tanks do best with plenty of corals and a few fish added slowly over several weeks.

Maintenance of your Reef Tank

A Reef Tank set up the way we recommend is a pleasure to maintain without the need for excessive water change management of nitrates. You will only need concern yourself with simply cleaning algae off the front glass of the tank, feeding fishes and corals.

Adding Corals and Fishes

Once your tank has cycled in, you should add your animals slowly. Set up your live rock structures so that individual corals can be positioned in prominent positions where they are not touching. Some corals are quite predatory, meaning that they can sting and kill others, so it is important that corals do not touch. Make sure you give soft corals like Leathers plenty of room to open fully. More detailed information can be obtained from several good books on the subject or our staff.

It is always a good idea to have some algae grazing fishes that will not eat corals. Only add a single inhabitant from each hierarchy of species on the reef.

For example :

1 Centropyge (Dwarf Angel), 1 Tang, 1 Clown type, 1 Goby.

Feeding Fishes

Marine fishes have a very high metabolism which works harder than freshwater fishes, so ensure that your fishes eat the best foods, fed in small amounts regularly. Some Reef tank fishes will also constantly graze from algae on the live rock. Always provide a wide range of prepared, frozen and live foods. Feed at least twice daily. Once a day with quality prepared foods like *Tetra Bits* or *Tetra Marin* in the morning when you have less time and once in the evening with a frozen food mix. We stock a large range of frozen foods. Live brine shrimp makes an extra special treat every now and then.

Supplements for Corals and Rock

There are principally two processes going on with corals in our closed reef systems; feeding and growing a skeleton, excepting soft corals. We need to supplement for both processes. The *Seachem* range of additives work well and offer the best blend in the most economical form. Three Seachem products do what other ranges achieve with ten products.

Corals have a relationship with zooanthellae algae living inside their water bloated polyps. Iodide and Molybdenum are the principal trace elements depleted by the algae's photosynthesis and need to be supplemented. *Seachem Reef Plus* is the best for this. Building coral skeletons requires Calcium and Strontium to be bonded with Carbonates to produce *Calcium Carbonate* structure. *Seachem Reef Calcium* and *Reef Complete* contains calcium in two forms (Ionic and Organic) and Strontium.

These three essential products are available at a discounted price in the *Reef Pack*. Reef Complete is also available in an economical dry form, *Reef Advantage*.

The carbonates needed to build skeletons are obtained from *Reef Builder*, a powdered additive. *Reef Builder* will raise Alkalinity, which is depleted by the corals growing. pH can be raised separately and easily with *Marine Buffer*. Maintain pH at 8.1-8.3 and alkalinity at 3.5 – 6 using the *Seachem Marine Basic Test Kit*.

Lighting

Adequate lighting is essential for corals to feed. Light provides the means for the zooanthellae algae living inside coral polyps to multiply thereby helping their host. For tanks up to 500 mm deep, fluorescent lighting is sufficient. We recommend combinations of Arcadia and Aquastars for white lighting and Actinic Blues and Aquacorals for actinic lighting about 50/50 (White/Blue) and up to four fluorescent tubes. For tanks deeper than 500mm Metal Halide Lighting is essential. Most metal halides available for reef tanks today have a 10000K (kelvin) colour temperature rating. We have 150w and 250w lighting available. All currently available lighting uses double ended bulbs although Eddison screw bulbs are still available for that type of fitting.

Chilling in Summer

Corals will not stand temperatures in excess of about 28 deg. C. If your tank gets hotter than this, you will need to consider a chilling unit. We have the Italian TECO chillers available. They cost a pretty penny, but they are worth every cent when they save your pride and joy from cooking. You will need to heat in winter.

High Tech Equipment

We also have a range of other equipment available to the "extreme hobbyist" customer. UV Sterilisers, Calcium Reactors, Ozone Generators are all carried in stock or available at a week's notice. All these products have a use, but we don't consider them essential to most hobbyist systems. For more information and brochures simply ask our aquarium staff.

Problem Solving

The most common problem we see with reef tanks is *marine white spot (oodinium)* caused by overcrowding STRESS. The best treatment for oodinium in a fish only tank is to treat with one of the copper based cures such as *Seachem Cupramine*. Unfortunately copper kills invertebrates. CATCH 22.

So, there is no easy way to treat oodinium in invertebrate reef tanks. Although products like *Organicure* and *MarinOomed* can often cure oodinium in Reef Tanks, they may not if the fishes are still stressed. You may remove your inverts to another tank and treat your fish with copper based *Cupramine*. After the treatment *Cuprisorb* will remove the Cupramine from your system. This will allow you to safely add invertebrates again afterwards.

It is always better to avoid the problem than have to treat in this manner. We cannot stress strongly enough that the most common cause of Oodinium in marine tanks is quite simply from overcrowding stress. **DO NOT OVERCROWD YOUR REEF TANK.** A reef system really should have far fewer fish than a fish only system. A few happy fish is always better than lots of sick fish.