

Saltwater set-ups

The final set-up with plastic plants and coral sand, being matured before adding any fish
Photos by the author

In part two of our 'Aquarium Essentials' series, Dr David Ford looks at the basics for the marine set-up

As explained in part one, the traditional metal framed tank began life as an aquarium 150-years ago. These housed freshwater tropical fish newly arrived from colonial explorations of the tropics by Northern Europeans. Saltwater aquariums started many centuries earlier when the Romans kept seawater creatures in Venetian glass jars.

The traditional 10 or 20 Imperial Gallon marine tank became popular in the 1950s. Hobbyists filled the metal-framed, glass-in-mastic design with natural seawater to keep our

American manufacturers saw the potential of marine fish-keeping and their research and development scientists and engineers soon offered life-supporting equipment and artificial seawater to the marinists. Importers of freshwater tropical fish started demanding the exotic tropical marine fish. Initially this demand was met by collecting wild species from the Coral Reefs with destructive chemicals such as Sodium cyanide or even dynamite. The trade is very different now with legally controlled collection and fish-farmed species.

hoods were also popular in the 60s and 70s and these actually killed the marines by seawater splashes dissolving lethal levels of Iron or Aluminium into the aquarium. This was solved by building wooden hoods – usually in pine or beech to match the cupboard-style base unit.

The all-glass Silicone Sealed aquarium solved the rusting frame problem – as well as the weight problem. The wooden-topped, all-glass unit with matching wood base contributed greatly to the attraction of the marine aquarium as a living ornament in the family home. So too did the availability of artificial seawater mixes, of resin-sealed motor units that powered pumps and filters, protein-skimmers, aerators and ozonisers. More on all this technology later in the series...

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local sea species in captivity. With little knowledge of Nitrogen cycles or saltwater chemistry it was a challenge to keep fish and inverts alive. Only hobbyists living near the shores were successful via frequent (and free) seawater changes.

German, then British and

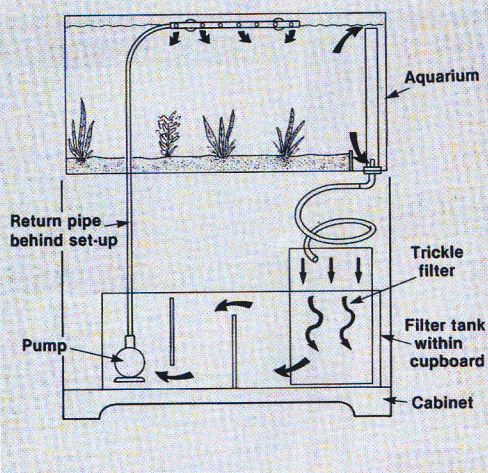
The saltwater problem

Marinists soon discovered that saltwater is very chemically active. The metal-framed tanks rusted away. Coating with protective plastic failed because even a pin-hole allowed ingress by the corrosive salts. Metal

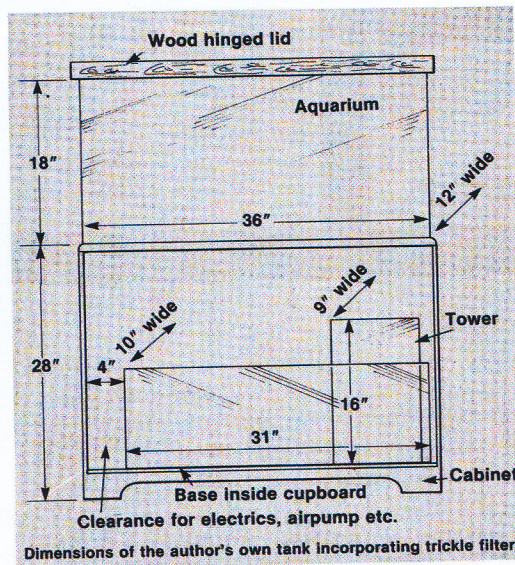
Polymethyl methacrylate

This amazing chemical (see Part one) is called Acrylic and, being totally immune to seawater damage, proved ideal for the marine aquarium. Its use spread around the world as public

The filter in operation, showing flow pattern through aquarium and the media below it.



The main set-up for converting a freshwater aquarium to a sump marine tank



The sump is added and bio-balls (actually hair rollers threaded on nylon string)

system and that pipe will just become a siphon that will deposit seawater all over your carpet. Note that the down pipe is a double one for the same reason. The inner pipe is where the water overflows down into the sump. The outer pipe sucks water from the base (as well as the top) but this has to flow up to the top of the inner pipe before exiting.

The trickle filter's tower is filled with a chunky medium for bacterial growth, such as Coralife's Bio Balls, Rena's Ceramic Rings or Bio-Chem Stars. A less efficient but cheap alternative is plastic hair rollers. A thin layer of polyester filter wool over the top spreads the water inflow to evenly wet all the bio-balls. This also traps solid dirt and is easily replaced regularly – the bio-balls can be left for a year or more before cleaning.

The up and over, down and up, compartments can be filled with anything of your choice. Polyester filter wool, coarse coral sand or gravel, or simply pebbles, will polish that seawater before it is returned to the main tank by the pump in the final section. Most aquashops and watergarden centres sell suitable pumps by international manufacturers such as Rena, Tetra, Eheim, etc. A small submersible pond pump is the cheapest. Throughout and flow rates will be discussed later in this series.

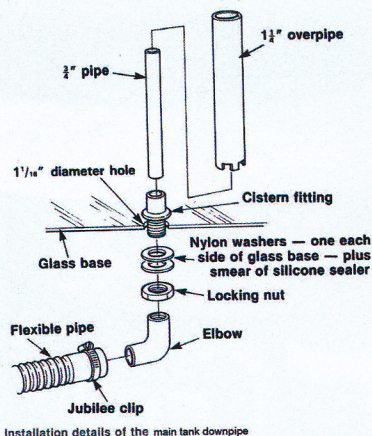
Note that the height of that inner outlet pipe determines the water height in the main aquarium. The meniscus will climb two-millimetres above the top edge before cascading down the tube, so allow for this in the original calculations of tube length.

Catch up

If you did not read part one (The freshwater tank) in this series a copy is available on the author's personal website www.drdford.com – click on the 'articles' page or can be found on the Tropical Fish website at www.fish-keeper.co.uk. **FIN**

HAVE YOUR SAY

Log onto www.fish-keeper.co.uk and visit the forums section, to make any comments/suggestions or ask any questions relating to this article

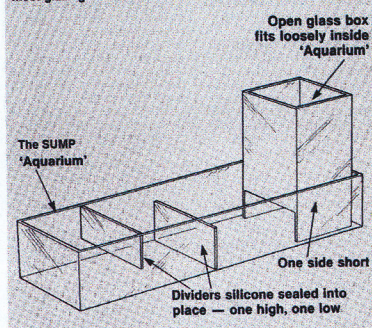


Installation details of the main tank downpipe

The design of the author's system showing his dimensions

Design of the SUMP 'aquarium'

The body of the trickle filter isn't all that complex to construct, using rectangular pieces of glass which you can get pre-cut by most glazing firms.



used by freshwater hobbyists is not adequate. The popular filter system for the modern marine set-up is the 'sump' filter. This is an under-tank, all-glass box with compartments. The water flows from the display tank into the first 'compartment' which has a constant level... this makes it ideal for a protein skimmer to be included. This overflows into another compartment to trap the waste material and then a final compartment to polish the seawater before returning it to the main tank. Some devices even have Caulerpa and lighting. Custom-built units are available by UK firms such as Ocean Reef Aquariums Ltd.

The DIY sump

For the DIY sump a 'trickle' filter (also known as a 'wet & dry' filter) is simple to build and the diagrams show the design (with the dimensions I used for my marine aquarium – modify as needed). The box is made from pre-cut 4mm glass from a glass merchant. It is important to include ground edges in the cutting costs for safety reasons – unpolished edges of such thin glass sheet will cut like a razor. Just glue together with aquarium quality Silicone Sealer.

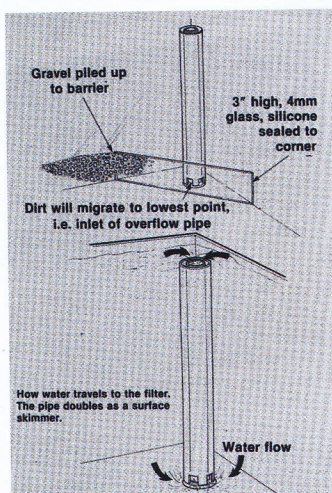
The other cost is grinding a hole in the main tank's base – this needs a diamond drill, which the glazier will possess. Do not fit an external supply pipe, as used in freshwater power filters, because the sump is an open

by 12-inches), 30-gallons or more preferred (48 by 15 by 15-inches). Acrylic is expensive, especially seamless moulds of those sizes, so the miniature marine aquarium was developed with low stocking levels and inbuilt, powerful biological filtration. Suddenly the beauty of the Coral Reef could be brought to the smallest living room or the desk of the business executive.

The DIY marine tank

Most marinists start out as freshwater aquarium keepers (often an even earlier goldfish-keeper). It is possible to convert that freshwater tank to marine providing all metals are excluded. However, note that some metal hoods (such as Rena's Aqualife series) have Aluminium covers but these are 'anodised' to make them impervious to saltwater. Check with the manufacturers of your particular model that it is safe for both fresh and salt waters.

Biological maintenance of the seawater is essential and the usual small internal or external power filter



A typical commercial marine tank using Acrylic (an Orca Nano tank)

aquaria were able to house their local seawater animals in aquariums large enough to be called 'seas'.

The marine hobbyist needed large tanks too – the more seawater it held, the slower the chemical changes that occurred and the more dilute the fish's excreta. 20 (Imperial) gallons was the norm (36 by 15