

Reverse Osmosis: Selecting a Unit for Your Aquarium

Drs. Foster & Smith Educational Staff

Clean, pure water is a priority for almost all fish and plants. No equipment is more effective in helping create ideal water conditions than reverse osmosis (RO) units. These units filter out up to 99% of the total dissolved solids (TDS) found in tap water by forcing tap water through a semi-permeable membrane.

When choosing an RO unit, ask yourself the following questions:

- How many filtration stages do I actually require?
- How many gallons per day (GPD) of purified water do I need?
- What type of membrane do I need?
- What do I want to remove from my tap water?
- Does my tap water contain chlorine?

Filtration stages

Different RO units feature a different number of filtration stages, generally between 2 and 4.

- 2-stage RO units are light and compact, making them easy to store and move around. They contain a small inline pre-filter and the RO membrane. A good choice when space is limited, 2-stage units represent good value at an economical price.
- 3-stage RO units are larger, and contain one or more large carbon or sediment pre-filters to protect the delicate membranes. They are high quality, excellent choices for regular use, and tend to last longer than the 2-stage units.
- 4-stage RO units include an additional final step of deionization, taking the 3-stage unit to a higher level. The deionization unit removes the small amount of contaminants remaining, filtering the water to greater than 99.9% pure. This is the highest level of filtration available.

Membrane types

There are several different types of membranes in today's RO units. Your decision on which RO unit to use may be partly based on whether or not your tap water contains chlorine.

- CTA - Cellulose Tri-Acetate membranes are organic and have a slightly lower TDS removal rate of 88-94%. Because they are organic, use them only with chlorinated water (water from a municipal source) in order to keep them clean and free of damaging molds and bacteria. They do not filter out chlorine, so allow the chlorine to dissipate out of filtered water, or treat it with a chemical dechlorinator.
- TFC - Thin Film Composite membranes are synthetic and remove between 94-98% of TDS. These units contain a carbon pre-filter to protect the membrane from chlorine damage. Use these membranes for water with or without chlorine.
- High Removal Membranes are synthetic membranes with much higher removal rates, between 97.5-99%, and are especially adept at removing silicates. These units also contain a carbon pre-filter to protect the membrane from chlorine damage. Use these membranes for water with or without chlorine.

Use the comparison chart below to help you choose the best RO unit for your needs.

	GPD*	# of Stages	Membrane Type	% Removal	Sediment Pre-Filter	Carbon Pre-Filter	DI	Extra Features
Seachem Pinnacle+ Series	100-200	3	High flow, TFC	97-99%	1 micron	2	n/a	Auto shut off valve, high-flow membranes, saves on replacement costs

Seachem Pinnacle Series	35-50	3	TFC	97-99%	5 micron	1	n/a	Auto shut off valve
Kent Marine Bare Bones Unit	10-60	2	CTA, TFC, high removal	88-98%	Poly fill on CTA units	1 on TFC & Hi-S units	n/a	Available with different membrane types
Kent Marine RO Hi-F	100-200	3	High flow, TFC	94-98%	1 micron	1	n/a	High-flow membranes, saves on replacement costs
Kent Marine Hi-S RO	35-120	3	High Removal	97-99%	1 micron	1	n/a	Higher level of silicate removal
Kent Marine Maxxima RO/DI	24-50	4	TFC	99-99.9%	1 micron	1	YES	Good choice if silicates in tap water are not a problem
Kent Marine MAX Hi-S	35-60	4	High removal	99-99.9%	1 micron	1	Dual stage	Good choice if silicates in tap water are not a problem
Kent Marine Deluxe MAX Hi-S	35-60	4	High removal	99-99.9%	1 micron	1	Dual stage	Pressure gauge, probe indicates when to change membrane

*NOTE: The GPD figures in this table assume the following optimal parameters: water temperature of 70°-77°F, 60-90 PSI (pounds per square inch) pressure and less than 200 ppm of TDS (total dissolved solids). If any of these parameters are not optimal, GPD decreases, sometimes up to 50%. Therefore, if you need a certain amount of water per day, and one or more of your parameters are outside the optimal range, you need to purchase a higher GPD rated unit.

Do not forget proper maintenance

As with any sophisticated piece of equipment, your RO unit needs regular maintenance to help it perform efficiently. Adhere to the manufacturer's guidelines for replacing filter cartridges, membranes, and resins. This is vital to the quality and quantity of the filtered water produced.

By choosing the right RO unit for your individual needs and adhering to a regular maintenance schedule, your aquatic

inhabitants will benefit from clean, fresh water for years to come.