FAQs: Water Pumps

Drs. Foster & Smith Educational Staff

What are water pumps used for?
The primary role of water pumps is to move water to or from the filtration systems in freshwater or saltwater aquariums. There are two main types of setups:

- Pushing water from the aquarium through a canister filter system (pressure setup).
- Pushing water back up into the aquarium after being filtered in a wet/dry type of filtration system.

Water pumps can also perform other functions in your aquarium… they can be used to create currents in your tank, drain/fill your tank, or push water through other devices, such as UV sterilizers, protein skimmers, and wave makers.
[Back to Top]

What is flow rate? Are there standards for this?
A good rule of thumb is to try to turn over your aquarium volume four times an hour. This means that the pump you choose should be capable of moving 5 times as many gallons per hour as your tank holds. In other words, if you have a 30 gallon aquarium, your pump and filter should produce a minimum flow rate of 150 GPH.

Keep in mind that there are many variables that reduce flow when calculating GPH. These include head height, elbows or sharp turns in your plumbing, in-line canister filters and smaller-than-recommended outlet tubing.
[Back to Top]

What does "in-line" mean?
In-line pumps run outside of water… they must be kept completely dry, and are connected to your filtration system using a bulkhead, inlet hose and an outlet hose.

In contrast to in-line pumps, submerged pumps run underwater, normally in the sump of your wet/dry filter, and do not require drilling a hole in the filter's sump.
[Back to Top]

What are the differences (advantages/disadvantages) of in-line/submerged pumps?
Submerged pumps - These pumps are much easier to install, and are generally quieter. But they can add heat to the water as they are water cooled. Additionally, they may take up valuable space in the sump area.

In-line pumps - The main advantage to in-line pumps is that they may add less heat to your aquarium water. Installation of an in-line pump may require a bulkhead in the filter in order for water to flow into the pump. This may mean drilling a whole into the side of your filter sump. Additionally, in-line pumps are often noisier than submerged pumps.
[Back to Top]

How do I size a water pump?
First, you need to determine how many gallons per hour you will need your pump to produce. Next, determine the head height. The head height is the distance between the pump and the highest point the water will be pumped to. Using these two figures, refer to a flow chart for the specific brand of pump that you are interested in, and choose the model that delivers the GPH you need at the appropriate head height.

Next, you will need to make an adjustment to the size of the pump to compensate for restrictions that are placed on the pump.

These restrictions include: elbows or sharp turns in your plumbing, in-line canister filters, and smaller-than-recommended outlet tubing.

Typically, purchasing a pump that is one size larger than the model that you decided on in step one will allow for the normal restrictions caused by bends and elbows in the plumbing. However, if an in-line canister filter is being used, you may want to step up two models to compensate for this large amount of restriction.

In either case, we recommend to install a ball valve on the outlet side of the pump so the water flow can be turned down if too large of a pump was installed. In other words, you can always turn down the water flow with too powerful of a pump, but you cannot increase the water flow if the pump you purchased is too small.
[Back to Top]

Do I need to purchase hoses, adapters, valves, etc, separately?
Yes, as water pumps do not include any of the hoses connectors, clamps, and ball valves you'll need to have to set up your system. Drs. Foster and Smith offers a complete line of plumbing components especially suited for every aquarist's need.
[Back to Top]

What is the difference between the pumps that are designed for pressure set-ups vs. free flow set-ups?
Certain in-line water pumps utilize different impellers depending if the pump is designed for a pressurized or a free flow application. The reason for the different impellers is if a pump is to be used on a free flow set-up, a smaller motor with a free flow impeller can be used to push as much water as the larger motor with an impeller that handles pressurized systems. This reduces the energy consumption of the pump.

The downside to these pumps designed for free flow applications, is that they do not handle back pressure that results from very high head heights or canister filters.
[Back to Top]

Are there special considerations/features for saltwater pumps?
No. All of the water pumps we carry are 100% safe for use with saltwater. However, if you purchase one of the Lifegard self-priming pumps, we recommend purchasing an optional saltwater shaft seal if you plan to use this pump on your saltwater aquarium.
[Back to Top]

How do I know what size tubing to buy for use with my pump?
As a general rule, always design your system to use the same size tubing as the inlet and outlet pipe fitting threads. This information is always provided as part of the water pump specifications. Remember, you must never reduce the inlet size on any pump. You can however, reduce the outlet tubing size to alter your flow rate. We strongly recommend that if a reduced flow rate is desired, you achieve this by using a ball valve rather than a smaller tubing size.
[Back to Top]