Pumps: Choosing Flow Rate

Drs. Foster & Smith Educational Staff

A properly selected aquarium water pump will have a flow rate that allows your inline filtration system to work its best. Your aquarium will stay cleaner longer, providing a healthier environment for your inhabitants.

For most aquarium systems, the water pump should be strong enough to turn over the total aquarium volume at least five times per hour. For example, if you have a 100-gallon aquarium, you will need a pump and filter rated at a flow rate of at least 500 gallons per hour (gph).

Pump Selection and Making Sense of GPH Rating

Before selecting a pump, determine the required flow rate of your aquarium by multiplying the total gallons of your aquarium by five. This figure will be the minimum required flow rate. Look for a water pump that has a gph rating in this range. However, keep in mind that the gph rating listed on pumps is the maximum flow rate at optimal conditions or at a head height of 0 feet.

Since flow rate progressively decreases with each vertical foot water needs to travel, and most aquariums are generally three to four feet off the floor, a water pump selected at the minimum flow rate will already be slightly underpowered. In general, select an "oversized" or the next larger pump.

An oversized pump will compensate for natural reduction in flow rate caused by head height as well as elbows and sharp turns in plumbing. A larger pump with a higher flow rate can be adjusted with ball valves but an undersized pump cannot produce more flow than what it was designed for. While the listed pump gph rating can give you an overview of pump performance, refer to the pump flow rate chart to get a better sense of how it will function under different head height conditions.

Different pumps for different applications

- **General Purpose Pumps** - Most general purpose pumps are primarily designed for low-pressure application with minimal resistance. These pumps are great as a return pump for wet/dry filters or for basic filtration systems.
- **High-pressure or "High Head" Pumps** - Pressurized inline canister filters, filter modules, and elaborate filtration systems require a water pump capable of efficiently pushing water without significant reduction in flow rate. High-pressure or "High Head" pumps are specifically designed for this purpose.

The right pump with the proper flow rate can make a big difference in the health and happiness of your aquarium inhabitants. Research pump type and flow rate to make aquarium-keeping a much more enjoyable hobby.

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