CO2 System Basics

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Introduction to CO_2 systems

The two basic requirements for healthy aquarium plants are light and proper carbon dioxide (CO_2) levels. Through a process called "photosynthesis," aquarium plants use light energy and CO_2 to produce food necessary for lush growth. As plants develop, they use up their existing supply of carbon dioxide. Installing a CO_2 system is essential to prevent low CO_2 levels and to maintain active plant growth. These systems are available in three basic styles to ensure a healthy environment for planted aquariums of all sizes.

Manual CO_2 Systems

Most manual CO2 systems are essentially yeast fermentation systems. CO2 is generated as a metabolic byproduct of yeast and stored within a fermentation canister. The accumulated carbon dioxide travels through a reaction chamber and is then mixed with the aquarium water by means of a diffuser or a powerhead. These systems are easy to use, budget-friendly, and well suited for smaller planted aquariums. Just as their name implies, these units must be turned on and off manually to maintain ideal CO_2 levels within your aquarium.

Example of Manual Systems:

- Turbo CO2 Bio-System

Semi-automatic CO_2 Systems

Semi-automatic CO2 systems involve a bit more effort to install initially, but are timer-operated to help simplify CO2 injection. A CO2 canister supplies carbon dioxide and the amount of CO2 entering the aquarium is controlled by a series of components, including a pressure regulator with solenoid, a bubble counter, and a CO2 diffuser. The timer-operated solenoid opens during a set period of time (i.e. when the lights are on) to supply plants with carbon dioxide. These systems are perfect for mid-size and larger planted aquariums that have a greater demand for CO_2.

Examples of Semi-automatic Systems:

- Drs. Foster & Smith Semi-Automatic CO2 System
- Fluval Pressurized CO2 Kit

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Automatic CO_2 Systems

Automatic CO_2 systems share many of the same features as semi-automatic systems. The main difference is the addition of a pH controller and probe. This high tech upgrade constantly monitors aquarium pH. When the pH probe detects the pH level falling below the set point, the pH controller automatically shuts off the flow of CO_2. These automatic systems simplify CO_2 supplementation in aquariums of all sizes but their benefits shine in large systems or heavily planted aquariums that require a steady supply of CO_2.

Do I need a CO_2 system for my planted aquarium?
CO_2 supplementation is usually contingent upon light intensity. In general, heavily planted aquariums with high output light fixtures will require a CO_2 system to keep up with the greater plant demand for carbon dioxide.

Example of a fully automatic system:

- Drs. Foster & Smith Deluxe Fully-Automatic CO_2 System

No matter which style of CO_2 system you employ, it is important to routinely monitor aquarium pH and CO_2 levels. Excess CO_2 can create conditions harmful to fish including low oxygen levels and drops in aquarium pH.

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