Aquarium Protein Skimmers: Guide to Type, Placement, Maintenance, Cost and Ozonizer

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A protein skimmer removes the proteins and other organic wastes from the aquarium before they have a chance to break down into more harmful elements, such as ammonia and nitrite. Removing these wastes also helps prevent algae build-up, as does the reduction in phosphates. Protein skimmers are also helpful in removing any toxins released from corals or invertebrates in the aquarium. As a result of these effects, the water quality is therefore improved, and less frequent water changes are necessary. Protein skimmers have an added advantage in increasing the amount of oxygen in the water. Many saltwater aquariums could benefit greatly from having a skimmer.

Benefits of Protein Skimming

- Remove organic wastes
- Decrease algae build-up
- Lower phosphates
- Remove toxins (e.g., from corals)
- Reduce water changes
- Improve water quality
- Increase oxygen levels

The use of protein skimmers in reef aquariums is more controversial. In addition to removing phosphates, skimmers unfortunately, also remove trace elements which are necessary for corals and invertebrates. Natural food sources, such as plankton, are also removed. If using a protein skimmer in a reef aquarium, these unwanted effects need to be taken into account. Some hobbyists will turn off the protein skimmer for 3-4 hours after adding phytoplankton.

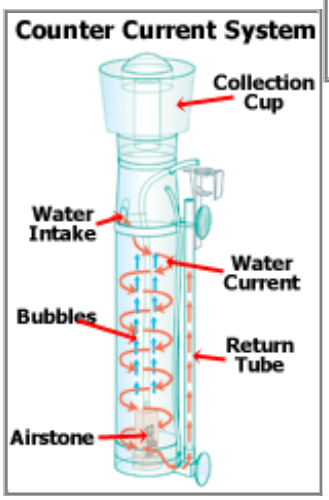
Types of protein skimmers

There are 3 basic designs of skimmers:

- Counter Current
- Venturi
- Turbo

Each of the above skimmer designs can be efficient if used properly, but Venturi and Turbo are the more effective types. Effectiveness is based on the:

- Amount of bubbles produced (influenced by air flow rate)
- Size of bubbles (0.5 - 1 mm preferred)
- Contact time of bubbles with water



Counter Current: A Counter Current skimmer requires either an air pump, or an air pump and a water pump. The skimmer has separate water and air inputs. Usually, the airstone bubbles air into the bottom of the water column, while the water enters at the top. This creates a swirling, or vortex movement, which mixes the air and water. The height of the column determines the contact time of the bubbles with the water. Column height is often the factor that limits the use of counter current skimmers to smaller aquariums.

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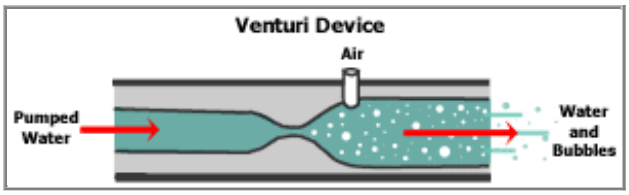
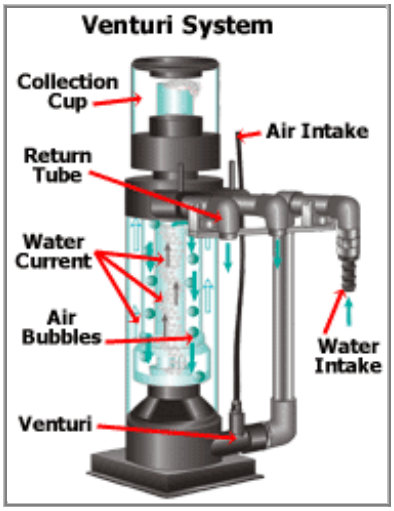
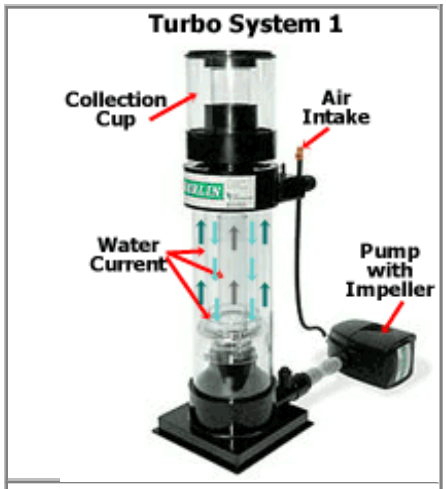
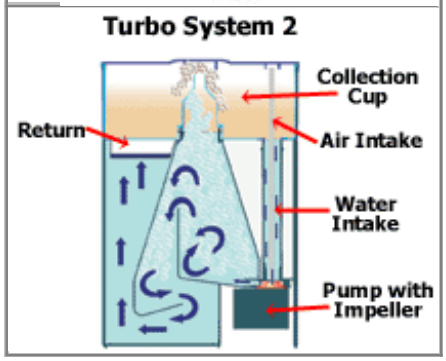




Venturi: A Venturi skimmer uses the Bernoulli principle of air injection, and relies on a good quality water pump. In a Venturi skimmer, the water pump is used to push water under high pressure through a component which has a narrowing in the middle. As the water exits the restriction, a pressure drop occurs, which sucks in air that is then mixed with the water. The higher the pressure of the water, the more air bubbles are produced. The water pump must be matched to the size of the skimmer.





Turbo: A Turbo skimmer draws air into the water intake of a water pump. There, impeller blades chop the air into tiny bubbles while mixing them with water. This creates a froth that is then forced into the skimmer chamber. Turbo protein skimmers may also be called "Needle Wheel" skimmers.

Protein skimmers may sound like the perfect filtration, and indeed they provide many benefits. But in choosing one, you will need to decide where your system will allow for its placement, how much work you are willing to put into it, how much money you want to spend, and whether you want to use an ozonizer.

Placement

Since you probably already have a system set up, placement is the first consideration. To be most effectively used, a protein skimmer should be the first step in your filtration process. If you have a wet/dry filter, getting an in-sump skimmer will be the easiest and most cost effective. If your sump does not allow that much space, an external model that sits next to the sump is best. This type is out of sight, has a lower likelihood of being bumped, and may be able to use excess flow from the return pump to run it. If you do not have a wet/dry filter, then either an internal or external hang-on-the-tank model will work depending on how much space you have behind your aquarium or how much space you are willing to give up within your aquarium.

Maintenance

How much time you want to spend maintaining your skimmer is an important factor in choosing the right skimmer for you. The larger the collection cup, the less often you have to empty it. If it has a built-in drain, you can hook up a gallon container and empty it even less often. Either way, it must always be emptied. An overflow not only can contaminate your water, but can also give off odors.

A counter current system has higher maintenance since the airstone must be replaced frequently. When selecting any protein skimmer, examine the design to determine how easily it will be to access the components that may need replacement (e.g., airstone) or cleaning (e.g., Venturi valve).

Cost

A protein skimmer's efficiency depends on the amount of crash (how hard the bubbles are forced into the water) and dwell time (the amount of time the bubbles spend in the chamber). Usually, the more expensive skimmers are more efficient and are

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easier to set up and adjust. So, it is always a wise idea to get the best one you can afford. All skimmers require cleaning to work their best. No matter what skimmer you choose, its efficiency will decrease if not properly maintained. When choosing a skimmer, do not skimp; selecting one that is slightly larger than necessary is better than choosing one that is too small.

Ozonizer

You also need to decide if you want to use ozone. An ozonizer produces ozone which can:

- Destroy disease-causing organisms
- Raise the pH
- Increase the dissolved oxygen in the water
- Increase the efficiency of a protein skimmer

The ozone is best added to the water via a protein skimmer which can deliver it in very fine bubbles. An ozonizer will need to be either manually controlled by you, or as we recommend, by an electronic controller. Not all protein skimmers can be used with an ozonizer, so be sure to check. Also remember to use ozone-resistant tubing and a quality check valve. Excess ozone is dangerous to fish, pets, and humans so if you plan on using it, use it responsibly.

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