

Commercial Filtration System Considerations

Over the past ten to fifteen years the number of pond filters that are available commercially has proliferated. Filtration systems range from simple single stage units to bubble-bead, vortex, pressurized and multi-staged units with multiple features. Despite the tremendous range of filtration options, there is still more to setting-up an effective filtration system than merely purchasing the filter unit and walking away. The following article will address some of the issues associated with setting-up commercial filtration systems.

One of the first things to consider in the purchase of a new system is the physical dimensions of the system, and the site location. While this might seem obvious, it sometimes can be overlooked. Make sure that your proposed site can accommodate the size filtration system you require. While we're on the subject, make sure that the filtration system is designed to handle the fish load that you have in your pond. Most commercial filtration systems express the fish load as a percentage of food fed per day, or in terms of the body mass of the fish (or both). While some of the claims of commercial filtration systems should be taken with a grain of salt, most are reasonably accurate.

Next, decide on the method of delivering water from the pond to the filter. Will the water be gravity-fed to the filter, or will it be pumped to the filter? There are pros and cons of either method, but you must choose one of these methods to get the water from the pond to the filter. Next, you should determine whether you'll use a bottom drain, weir skimmer, or surface skimmer (or a combination of all three) to collect the water to send to the filter. Once again, there are pros and cons of all three collection methods, and most pond keepers use a combination of a bottom drain(s) and skimmer to deliver water to the filters.

Finally, the return from the filters to the ponds must be considered. Water return is also accomplished by gravity or pump action, and the method of return is also important. Many systems split the return between a waterfall and a straight-forward return pipe to the system. Some systems use a separate pump to power a waterfall, and place an additional biological filter or vegetable filter in the return sump of the waterfall. An ideal return system would incorporate a venture jet system around the pond perimeter, so that additional current and aeration is provided for the returning water.

Once the water circulation aspects have been settled, there are a few additional considerations which require planning. Circulation systems all require one constant – the use of a pump to move water. There are several pump styles to choose from, but the primary design criteria are whether the pump will be submersible or external. Generally speaking, external systems are easier to maintain and service, and also provide more water-moving ability than submersible systems. You should consider how much water you will require to be moved (remember to consult the water handling abilities of your filtration system.) If your system can only accommodate 3,000 gallons per hour, and you purchase a pump with a capacity of 5,000 gallons per hour, you will either need to step-down the pump's water moving capabilities, which is not a good idea, or divert some of the water to another feature, such as a waterfall.

Once the filtration system, location, pump, water collection devices, and overall system design (gravity fed at front or back end of system) have been completed, you can now proceed to site set-up. Once again, this is not always as simple as it seems. Make sure the site is level, not only so the filters won't become damaged, but also because systems that aren't level often leak. In setting-up our new pond, we located the filtration systems on a slight grade (about a 5% slope). The pond kept leaking and I had two separate pond construction firms try to locate the problem. Finally, one day I noticed that water was overflowing from the third vortex chamber of my system, because it was approximately three inches lower than the first two settling chambers. (Yes, the simple things can be the most difficult, and the easiest to fix).

Also make sure that your return pipes are of sufficient diameter to handle the water load to and from the pond. Nothing is more frustrating than planning your system only to have it not work properly because the piping was not the right size (yes this has happened to me as well). For most applications, the use of flexible PVC pipe is your best bet. This material is easy to work with, and can be fit in places where rigid pipe work can't fit. Only very large diameter pipe applications would preclude the use of this material.

You should also plan for a simple procedure for water discharge when cleaning the filtration system. Most commercial filters have a bulkhead fitting for water discharge that can be fitted to rigid or flexible PVC piping. Locating the water discharge system near a

garden actually solves two problems: it provides a place to drain the filters and also provides fertilizer for your garden beds.

Finally, the choice of filtration medium is another important consideration. Commercial filtration systems use a range of material for establishing colonies of bacteria which provide the "bacterial" component of water filtration responsible for the nitrogen cycle. These materials range from Japanese matting to beads, sand, pads, brushes, rocks, and foam. All have advantages and disadvantages in everyday use. Look for a product which does not require heavy maintenance, and make sure that there is adequate mechanical filtration before the biological stage.

We could end the article at this point, but there is one more factor to consider: aeration. In order for bacteria to start the break down of ammonia into nitrites and then nitrates, they consume large amounts of oxygen. It is therefore a good idea to introduce heavy aeration into the biological component of the system. Many manufacturers are finally adapting their systems to accommodate the heavy aeration requirements of a biological filter and have added a mechanism to introduce aeration to their filter systems. Often, these aeration devices require a greater initial outlay when it comes time to purchase a system, but the extra money is worth it when you add up the cost of retrofitting a system later.

To summarize, there are many commercial filtration systems available for every pond size and budget. A little up-front homework pays-off when designing and installing a new system.