

Filtration of Pond Solids

By: Mike Anger

Filtration refers to the removal of all solid and suspended waste materials from the pond. This is in contrast to bioconversion or biofiltration which utilizes bacteria to convert toxic substances to other forms, such as ammonia to nitrite to nitrate.

There are a variety of basic methods for filtering solids, such as screening, settling and vortex action. These all remove solid wastes such as algae, fish poop, soil, dust, and leaves. The filtration portion of your pond will be high maintenance and therefore should be designed for ease of cleaning so that water quality can be maintained with minimal effort. It is crucial that water flows through your solids filter(s) BEFORE it goes to the bioconverter to prevent the bioconverter from getting clogged and becoming useless.

Mechanical filters may be opened or closed systems. Open mechanical filters have water gravity fed through them or have the water pumped to them and then gravity flows the water back to the pond. One example is a filter box located at the top of a waterfall. Closed mechanical filters require water to be pumped through them. Common examples are rotating drum or bead filters.

Filters often used on swimming pools such as sand filters won't work well on a Koi pond. In a pool, various chemicals like chlorine are used to destroy algae as well as other microscopic organisms. When they die, their structure is destroyed and little is available to clog up the filter. Koi ponds have many more solid debris such as algae that clog the sand and greatly restrict flow rates. As a result, a sand filter would need to be backwashed several times a day to break up the clogs.

In a larger pond, it may be necessary to have several filters to handle the volume. Filters set in parallel have the total water flow distributed to multiple filters at the same time. More commonly, filters are set in series, one after the other, such that the first filter handles large solids, the second filter handles suspended solids, and the third is used for biofiltration. If a single filter is used to handle both large solids and suspended solids, it will require more frequent backwashing, and a higher pressured pump(s). No matter the configuration of the mechanical filters, the clean water from the mechanical filters should be used to feed the bioconverter.

Another way to separate solids is to use settling chambers. This is where water traveling through a pipe reaches a low pressure area or a larger body of slower moving water. The heavy solids being carried by the fast moving water drift to the bottom when the flow slows down. Often a baffle arrangement is used to accomplish this, and is known as inertia settlement. Vortex filters use centrifugal force to settle particles. Settling chambers should again be placed before the bioconverter to reduce bioconverter clogging. Settling chambers must be designed so that settled waste can easily be flushed and cleaned, and should be totally isolated from the pond system to avoid the seepage of biodegraded organic products from contaminating the pond.

A variety of media may be used for filtration. Materials such as gravel, plastics in a variety of shapes, open cell plastic foam or matting, plastic box strapping, brushes or screens are options. Each has advantages and disadvantages, but in general, water flow must continue to access all areas of the filter in order for it to operate efficiently. When part of the filter clogs, it is called channeling, and the work accomplished by the filter is greatly diminished. Thus, whatever material is used, it should be designed and then positioned in the filter to reduce channeling.



Generic Filter Using Course to Fine Matting

Remember, filtration functions to remove solids and wastes from your pond to keep your water clear. It is still imperative to have a bioconverter to handle the nitrogen waste cycle. The filtration system is a high maintenance part of your pond. Easy to maintain systems allow efficient cleaning more often, and provide more time to sit and enjoy the pond.