CHALKBOARD

TIPS FROM THE PROS

WATER FILTERS GUARD TODAY'S IRRIGATION SYSTEMS

By Efraim Donitz

As water becomes more precious and irrigation systems increase in complexity and automation, the importance of water filters grows in the golf and sports turf industry.

Whether treated or untreated, water is not the only substance carried by pipes throughout irrigation systems. Particles, just a few microns wide, in flowing water can plug nozzles, damage pumps or plug valves. Any disruption in flow or distribution upsets the careful metering of water to acres of turf and landscape plantings.

There are two kinds of impurities in water, chemical and physical. Filters in general remove only physical impurities.

As a rule, water should be tested to determine the type of impurity so you can select the proper filter to remove it. A simple jar test can give you an idea of the type of impurity in your water supply. Open a valve and let water flow for a few seconds before filling a jar. Let the jar sit for 24 hours. Sand, gravel or silt will settle to the bottom, while organic matter will float to the top, since it is light than water.

An important point to understand is that no single type of filter will eliminate all impurities. There are three basic types: screen filters, sand separators, and media filters. Each solves a particular problem.

Screen filters eliminate particles that are bigger than the size of the mesh of the screen. In my opinion, this type of filter should be on every installation.

Typical mesh ranges for irrigation systems are 40 to 80 mesh for most turf sprinkler heads and 80 to 150 mesh for drip emitters. The openings in 40 mesh screen are 435 microns wide compared to 178 microns for those of 80 mesh screen. Remember that pressure loss increases as the size of the openings in the mesh decreases. You need to find a happy medium between pressure loss and the size of particle you are trying to eliminate.

The next type of filter is the sand separator or hydrocylone filter. It has the ability to remove particles that are heavier than water. This type of filter is very important when the water is coming from wells. It is especially valuable during the later months of the summer when the water is pumped from lower strata which have more sand in them. This filter is also very effective with metropolitan water that is rich in sand and gravel.

The third type is the media filter. It is necessary whenever irrigation water is pumped from ponds or reservoirs which contain organic material. Make sure to select a media filter that is designed for the flow rate of your system. Sand is often the media contained in these filters.

Three-barrel media filter capable of 800 gallons per minute. Photo courtesy: Efco.

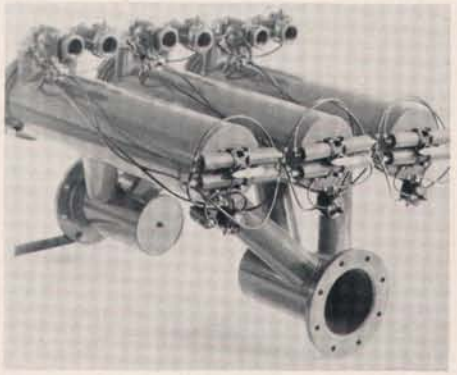
Depending upon your needs, these three basic filters can be used alone or in combinations. A popular manufactured combination filter is the circulating or spin filter. It is actually a screen filter with a sand separator and has the ability to eliminate all particles that are heavier than water, as well as all particles that are bigger than the mesh of the screen.

This filter offers the greatest amount of impurity elimination per dollar invested, and yet it doesn't occupy very much space. It can be used in place of a media filter, and has the added benefit of cleaning itself automatically, which is very important.

Before choosing a filter, first determine the type of impurity in the water and the quantity of that impurity. Then you will want to determine the flow requirement of the irrigation system so that you'll know what capacity of filter is needed.

Next you have to know the required filtration—in other words, what are the sizes of the nozzles in the irrigation system—so that you can choose the right mesh to eliminate particles which will clog that particular system. Then you need to know the maximum and minimum water pressures required by the system.

Finally you need to determine any future changes, whether they be increases or decreases in volume. Filters must have the capacity to handle the greatest possible volume.



Automatic screen filter. Photo courtesy: Amiad U.S.A.

A few examples of matching filters to impurities will help explain the process of selecting the right type and size of filter.

Physical impurity number one is sand, which is common in metropolitan water supplies and in water coming from wells. Sand can be eliminated by hydrocyclone separators or sand separators, or by circulating filters. Still, such treatment should be followed by a screen filter. I firmly believe that screen filters offer a necessary insurance policy.

The second common type of impurity is suspended organic matter such as algae. This impurity can be eliminated by media (sand) filters, not to be confused with sand separators. Organic suspended matter can also be eliminated to a great degree by using circulating filters, especially when the sprinklers have large-enough nozzles.

When using media filters, it is important to follow them in line with screen backwash

filters, which are built to filter both ways—from the outside and the inside, or the upstream and downstream side.

The third category of impurities consists of silt, organic matter, solids, and large quantities of algae. In this case, you should put a hydrocyclone separator first in line. In the worst cases, it should be followed by a media filter. In not-so-severe cases, it could be followed instead by a circulating filter.

Let's say that we have a pond or reservoir filled with reclaimed water, which is growing a tremendous "soup" of algae, and we have to filter that water. In such a case, we would have to use both hydrocyclone and media filters in combination.

On the other hand, let's say we have a canal or river, which transfers water from point A to point B, and we are in the middle. The impurities in this water are changing all the time. In this case we could use a hydrocyclone separator, followed by a circulating filter or two, depending on the situation.

Now let's go to the fourth type of impurity—clay, either with or without organic matter. In this case we must use media filters with very fine sand media, followed by a circulating filter as a control filter.

Special attention has to be given to the flow rate inside the media filter itself, which should be relatively low. Let me explain that.

The water has to move very slowly through the media to discharge the clay particles, which are very, very tiny. In other words, let's say we have a media filter which has the ability to discharge 200 gpm. We would use it to discharge only 75 gpm. Therefore we are using a low flow inside the media filter.

Hydrocyclone filter. Photo courtesy: Efco.

The circulating filter that follows the media filter should be working at full capacity. In the example that I just gave, the circulating filter should be working at 75 gpm, which is indeed its full capacity.

And now we get to the type of water that will probably have the most interest golf course and park superintendents. This is reycled water, which contains the sixth type of impurity we will discuss: recycled sewage effluent.

It is recommended that each case here be considered separately, according to climate, the amount of chlorine in the water, and the degree of treatment that has already been applied to clean the water. But as a general rule, media filters at maximum flow, followed by circulating filters at the correct flow rate, constitute a good starting point for cleaning recycled water.

These are a few examples of the various types of filtration that should be used in removing specific impurities from water that will be utilized in institutional irrigation systems.

One point to remember in today's world is that a large amount of scarce, expensive labor goes into cleaning sprinklers. This labor can be eliminated by using proper filtration on the water in the first place.

With low-volume systems becoming popular, the nozzles are getting smaller. So proper filtration becomes correspondingly more important to the sports turf manager.

Editor's Note: Efraim Donitz is an irrigation consultant and the president of EFCO, Inc., North Hollywood, CA. The company makes all types of filters for both landscape and agriculture.