

Water Filtration



Applications

Overview

Filters have been used to treat water for many thousands of years and the technology remains an integral part of any water treatment regime.

The Springhill range of filters are divided into two broad categories; depth filtration and surface filtration

Depth Filtration

As the name suggests, depth filtration is the process of filtering through a depth of media. To obtain retention of particles in the depth media two event occur. These are known as mechanical and absorptive retention.

- Mechanical retention is when a particle is physically restricted by means of interception, sieving or bridging.
- Absorptive retention refers to the adhesion of particles to the filter media. This occurs as a result of the electro kinetic properties and hydrophobic characteristics of fibres within the filter, also known as Van der Waals force or electrostatic force.

A typical depth filter is made from polypropylene, either strung wound, or spun wound. The most common sizes are 1 micron, 5 micron, 10micron and 25micron.

Surface Filtration

A surface filter has a very thin cross-section which retains large particles on the upstream side of the media. Surface filters are particularly suited to removing rigid, irregularly shaped particles. Over time, these particles “cake” across the filter pores,



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but still allow water to flow through the filter. A typical surface filter cartridge is pleated or made of a mesh. They range from 0.2 micron to 50 micron.

Activated Carbon

Filters containing activate carbon are used for removing chlorine or organic compounds from water. This type of filtration will produce a significant improvement in taste and odour often associated with chlorinated mains water. Activated carbon is also used as a final “polishing” treatment for many water filter systems.

Most of the activated carbon used for water treatment is made from baked crushed coconut shells which produce a charcoal type of material. The charcoal is activated with high pressure stream, leaving the carbon with many thousands of minute active pores on its surface. To be effective, the water needs to remain in contact with the activated carbon for as long as possible. Sizing of the filters is crucial for effective performance.

Chlorine removal with carbon is a “catalytic” process in which the media does not become blinded or depleted, but instead it acts as a trigger to the de-chlorination process. The active sites on the surface of the media do eventually become blinded by other contaminants in the raw water (for example, iron) which means the media should be changed every 1 to 3 years dependent on the amount of water used and the incoming water chemistry.

Water Filtration



Activated carbon removes *organic* matter by trapping the molecules and retaining them on the activated portion of the carbon's surface, eventually blinding all of the media. When this occurs the media needs changing, the frequency dependent on the amount of water used and the incoming chemistry.

Maintenance

When filters become blocked they may not always simply stop the flow of water. They can often be affected by breakthrough, whereby the level of filtration reaches a threshold and particulate starts to pass through the filter. In many situations this means changing the filters at least every three to six months dependent on the incoming water quality.

Concerns relating to the trapping of microbiological contaminants in the housing also mean the housing should also be regularly checked and cleaned periodically.

Installation Guidelines

When using filtration to protect UV equipment it is recommended that a 10 micron filter be installed.

It is often advisable to install a sample tap after a filter housing so that debris left behind during the production process can be flushed through. In addition, the tap can be used to taken chemical or microbiological samples if required.

Boreholes

Many borehole supplies require some form of filtration. Where potable water is required UV equipment is often installed, in which case pre filtration to 10 micron is a minimum requirement.

Where hydrogen sulphide is a problem (rotten eggs smell) then activated carbon can be used to reduce the levels. This can be a highly effective method of treating situations where the contamination is intermittent and a more specialised method of removal is not practical.

Spring Supplies

Virtually all spring supplies require some form of filtration. Where potable water is required UV equipment is often installed, in which case pre filtration to 10 micron is required. In situations where the filter blocks very quickly, installing an additional filter with a 25 micron cartridge in the first housing and a 10 micron cartridge in the second housing can be highly effective.

Spring supplies are often contaminated by surface waters which contain high levels of turbidity or discoloration. Filters can be an effective method for removing the turbidity and will reduce the colour. Using activated carbon on discoloured water will enhance the colour reduction.