

Why Innovative Uses For Pile Cloth Media Filters Are Multiplying



Pile cloth media (PCM) filters have a range of applications in wastewater treatment. Commonly installed as disk filters, [PCM is most often used](#) as a tertiary treatment step to remove contaminants, including total suspended solids and phosphorous, in order to help plants meet permit limits. PCM is also applied in many water reuse applications, particularly in California, Texas, and Florida, for tertiary treatment, nutrient removal, and protection of downstream equipment from solids. For operations that use UV disinfection, PCM is regularly employed to remove solids and other contaminants that could reduce the effectiveness of the UV light.

In recent years, wastewater and drinking water operations have struggled with increasingly complex or difficult contaminants, such as microplastics, micropollutants, algal blooms, and more. To address these issues, many wastewater and drinking water professionals have found new and innovative ways to apply PCM filters. This article will explain some of the increasingly popular applications for PCM, as well as how wastewater and

drinking water professionals can go about testing their own ideas.

New PCM Applications

Some of the increasingly common applications for PCM include:

- *Microplastics.* Defined as any plastic particle that is 5 mm or smaller in any dimension, microplastics pose a unique challenge to water and wastewater treatment operations, as they can have a range of sizes, shapes, and densities that make them difficult to test for and remove. However, studies have shown that [PCM can remove up to 97% of microplastics](#) from water. The complex fiber overlays trap any particle larger than 5 um while letting water pass through.
- *Micropollutants.* This is another large category of diverse substances. Some are well known and easy to remove using

standard treatment methods, such as herbicides and pesticides. But others are more difficult, including chemicals found in personal care products and pharmaceuticals. Powdered activated carbon (PAC) is commonly used to adsorb these compounds and it is therefore critical to ensure that none of this material makes it into the effluent. Pile cloth media filters are often placed downstream of systems using powdered active carbon for micropollutant removal to prevent this PAC from making it into the receiving stream.

- *Drinking water pretreatment.* While PCM is more often associated with wastewater treatment, it is being increasingly used in drinking water applications. As a pretreatment option, PCM can be used to remove grit or other solids. For example, some facilities around

the world have been using it to protect drinking water plants from problematic algae growth in their water reservoirs that were clogging up equipment.

- *Stormwater treatment.* PCM is commonly found in combined sewer systems. In particular, it is often used to treat sidestreams when the peak flow exceeds plant capacity. However, in some innovative sewer systems in Switzerland, road runoff is being captured separately and filtered with PCM before being discharged into creeks. The media can remove microplastics, oils, sand, salt, and more to keep them out of the natural waterways.
- *Microorganism removal.* PCM has proven capable of 2 and 3 log reductions in *Cryptosporidium* and *Giardia lamblia*, which makes it useful in any drinking water

or reuse application where this is a point of particular focus or difficulty.

What Makes PCM So Versatile?

There are many reasons why many water professionals are increasingly turning to PCM. One is that it is robust and durable, able to function successfully in a wide range of water environments and chemistries. In tertiary treatment applications, any individual PCM disk may last up to 10 years. Even in harsher conditions dealing with rough sand and grit or harsh chemicals, PCM can operate optimally for five years or more. Many vendors can also beef up PCM disk systems by adding scum removal or larger hoppers to stir up heavier solids.

In addition, unlike many other types of disk filters, PCM creates a complex pathway formed by thousands of overlapping fibers. This significantly increases the odds of capturing difficult contaminants and solids.

Lastly, some PCM systems, such as [Aqua Aerobic's OptiFiber disk filters](#), have specialized backwash systems that automatically trigger when the water level in the tank gets too high. A vacuum-like device pulls the fibers straight, allowing them to quickly suck up any sediment clogging the filter before laying the fibers back down.

Experimenting With PCM

Most innovative applications for PCM come directly from water and wastewater professionals who are looking to solve a unique problem. Those who want to test the viability of PCM in a new application should communicate their ideas with vendors. An experienced vendor can help perform bench-scale testing and, if necessary, run a pilot program. Vendor engineers can work to ensure that the PCM filter is being optimized for the specific application and troubleshoot any additions or modifications that may be required to achieve the desired treatment goals. ■