AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

# Filtering Through The Latest In Primary Wastewater Treatment

Of course, the whole wastewater treatment equation starts with primary treatment. Although a critical first step in the process, primary treatment rarely receives as much attention from innovators as processes further down the line. It's about time that changed.

To talk about the latest innovation in primary wastewater treatment and wet weather flows, Water Online sat down with John D. Dyson, product channel manager for Aqua-Aerobic Systems' AquaPrime™. We discussed the benefits of cloth media, needs on the wastewater market, and avoiding a worst-case scenario in filtering technology.

### How can filtration be used for domestic primary treatment?

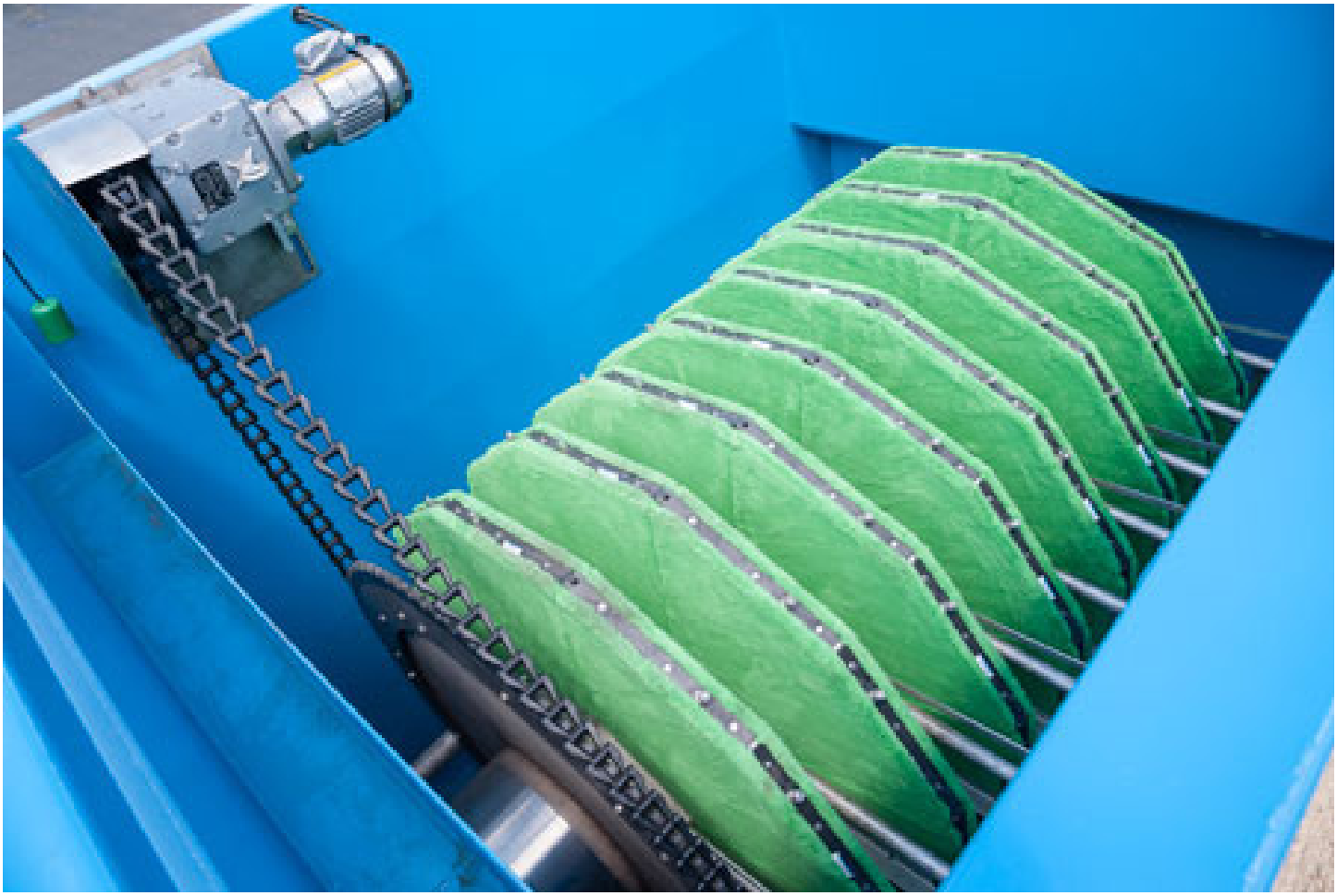
The use of cloth filtration is new to the domestic primary wastewater treatment market. There has been very little innovation in the area of primary treatment for decades. Typical solutions are conventional settling and enhanced settling with chemical addition. Cloth media filtration has the capacity to filter the high solids levels and provide a higher effluent quality than conventional technologies without the use of chemicals.

### What are the benefits of utilizing cloth media?

Cloth media filtration produces an extremely high-quality effluent. This improved effluent quality reduces the total suspended solids (TSS) and biochemical oxygen demand (BOD) loads to the downstream secondary treatment process. This results in a reduced aeration requirement to the secondary treatment process, resulting in significant energy savings within the treatment facility since aeration is typically the largest portion of energy consumption within a facility. Secondly, the additional solids removed with cloth media filtration can be used for the production of additional biogas which can be used as a fuel for heat or power generation.

### What applications can AquaPrime accommodate?

AquaPrime cloth media filtration can be utilized for many applications within a wastewater reclamation facility. It can replace existing primary clarifiers or be placed after existing primary clarifiers, providing a reduced load to the secondary treatment process. Due to the high-quality effluent produced, cloth media filtration can be used to treat wet weather flows (sanitary sewer overflow, combined sewer overflow (CSO), and stormwater) in the treatment facility or even remotely.



Due to the capabilities of cloth media filtration, AquaPrime can be used for tertiary filtration during dry weather conditions and can easily transition to accommodate wet weather flows when needed.

### What types of operations are ideal candidates for it?

The ideal operational candidates for AquaPrime vary widely. Below is a partial list of what operations can best utilize the technology:

- Installations which need improved primary treatment for increased energy efficiency and a more sustaining treatment facility (biogas production).
- Extended aeration plants needing more capacity or ability to meet new biological nutrient removal requirements.
- Plants needing to increase capacity.
- Facilities with a wide range of flow conditions due to wet weather events with such factors of three to one or greater.
- Sidestream treatment of wet weather flows (blending).
- Remote treatment of wet weather flows.

### What need in the market inspired the development of your AquaPrime filtration system and its use of OptiFiber® cloth media?

The market is looking for new treatment solutions that can reduce operating costs at a treatment facility or in the collection network. AquaPrime and the OptiFiber cloth filtration media remove the TSS and BOD loads to the secondary treatment processes to levels not achieved by conventional technologies. TSS removal is typically greater than 80 percent, and BOD removal is typically between 40 and 65 percent, depending on the colloid fraction in the influent.

Secondly, many utilities are being asked by their state agencies to address untreated wet weather overflows at the treatment facility or in the network. Due to the high TSS removal capability of AquaPrime cloth media filtration, AquaPrime provides a very compact footprint, easy startup/shutdown, and high-quality effluent required for wet weather applications.

### What are some of AquaPrime's features and benefits?

The OptiFiber PF-14 cloth filtration media is a main component of the AquaPrime filtration system and is specifically designed for the applications of primary treatment and wet weather applications. AquaPrime technology utilizes outside-in

filtration to further allow the natural settling of solids for easy removal. In addition to the filtration media, AquaPrime utilizes three forms of solids removal in the treatment technology, settling, filtration, and floatable removal, which are essential for the primary and wet weather treatment applications.

**What different types of filter media are available on the market?**

There are many types of cloth media and screen filtration technologies on the market. AquaPrime utilizes a specifically designed microfiber, pile cloth media which can handle the high solids load and also be effectively cleaned. Filtration methods utilizing screening versus cloth media will blind off almost immediately, requiring continuous cleaning. If a cloth media is utilized, the media must be designed to have a storage capacity so blinding does not occur, and the backwash design must be capable of being in direct contact with the media to remove the large amount of solids in the filtration process.

**What can be a worst-case scenario if the wrong cloth media filtration technology is chosen?**

If a technology is selected with ineffective solids storage capacity and backwash, this would lead to the system having high waste volumes and potentially not being able to recover the backwash vacuum through the cloth media. Secondly, if the system doesn't have the proper removal methods for settled solids and floatables, these will accumulate in the system and overload the technology.

**How long have you been offering cloth media filtration?**

Aqua-Aerobic Systems has marketed its cloth media filters since the early 1990s, but just recently introduced the AquaPrime filter for primary filtration and wet weather applications in 2016. We have been doing research and testing on primary influent, primary effluent, and wet weather flow for about four years. Our research included pilot studies with a potential customer in California and at our research and technology center in Rockford, IL, located at the Rock River Water Reclamation District. The center allows us to have access to wastewater flows throughout the facility and the ability to test new and existing technologies to verify capabilities and performance. The company's dedication to continuing the advancement of cloth media filtration is ongoing.

**Can you share any particularly powerful case studies from that history?**

There are two initial projects we would like to highlight. The first is a project that is in design which is in Oak Hill, WV. The existing installation needs to add additional capacity with limited land available for expansion. To achieve this additional capacity, the AquaPrime was piloted to determine if the loads could be reduced to the sequencing batch reactor (SBR) process allowing for increased capacity. Due to removal efficiency greater than 80 percent TSS and 40 percent BOD, the existing SBR basins could be utilized for additional capacity as needed.

The second is in Rushville, IN, which is in construction and will need to treat the wet weather CSO overflows at the treatment plant. The AquaPrime filter system was piloted at this installation and achieved greater than 80 percent removal of TSS during wet weather events (TSS as high as 350 mg/L). This will allow the plant to blend the excess wet weather flows entering the treatment plant over the maximum plant design and the plant's main flow to achieve the National Pollutant Discharge Elimination System (NPDES) permit. Both examples demonstrate the AquaPrime filter's capability to achieve a high-quality effluent along with providing a compact footprint and cost-effective solution to meet the utilities' specific needs. ■