



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

APPLICATION PROFILE

APPLICATION
TERTIARY FILTRATION

INDUSTRY
FOOD & BEVERAGE

AQUA-AEROBIC SOLUTION
Aqua-Aerobic® PILE CLOTH MEDIA FILTRATION

PILE CLOTH MEDIA FILTRATION FOR FOOD PROCESSING

The Challenge

The food and beverage industry is very diverse in terms of product and production methods. Non-alcoholic beverages ranging from bottled water to sports drinks, as well as alcoholic beverages and dairy. Food processing is made up of eggs, meat and poultry, seafood, fruits and vegetables for fresh, canned and frozen foods.



Food and Beverage Facility

All food and beverage processors are faced with changing production schedules and product which, combined with cleaning and sanitization programs, generate highly variable process flows and wastewater quality. In the design or optimization of an effluent treatment system, one must account for the full variance of these characteristics, and consider incorporating technologies that perform better under fluctuating conditions. Different products and production processes may generate starches, fats, oils and grease (FOG), sugars and salts (dissolved solids), in addition to traditional wastewater constituents. This includes

parameters such as pH, Temperature, Dissolved Oxygen, Alkalinity, Total Organic Carbon (TOC), Biochemical Oxygen Demand, Chemical Oxygen Demand, and Nutrients - Phosphorus and Nitrogen (Ammonia/Nitrate/Nitrite).

Food processing facilities may be required to meet pre-treatment effluent requirements for wastewaters discharged to the local, Publicly Owned Treatment Works (POTW). These requirements are typically not as strict as those who discharge to surface waters, permitted under the NPDES program or National Pollutant Discharge Elimination Service.

The Solution

In order to meet effluent requirements, the wastewater process flows, characteristics and loadings are typically treated with a combination of physical, chemical and biological steps. Before primary treatment for solids and FOG removal (if present), equalization will help to homogenize the waste stream and lessen the impact of peak conditions. Depending upon the nutrient removal and effluent quality produced by the biological (secondary) treatment, a tertiary filtration step is often employed to reduce Total Suspended Solids and to meet low Total Phosphorus (TP) limits. Some watersheds stipulate TP well below 1 mg/L, which will utilize precipitation chemistry.

Aqua-Aerobic® pile cloth media filtration has become the technology of choice due to its simple operation, small footprint, and high forward flow to backwash ratio. The family of pile cloth media filters, available in several configurations including AquaDisk®, AquaPrime® and others, features OptiFiber® media capable of producing consistent effluent water quality.

The Proven Result

Aqua-Aerobic has several cloth media filter installations operating in food and beverage wastewater plants for over 25 years.

A few years ago, a large food processor with a project to replace their sand filters considered an upgrade to pile cloth media. They chose to rent an AquaDisk® unit and monitor and evaluate performance over a six-week period of operation as a pilot test. The effluent TSS objective was 10 mg/L.

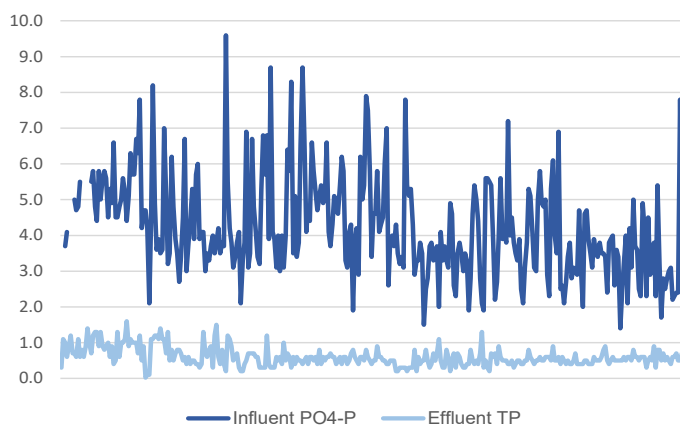
Prior to testing, a process sample taken for a bench scale feasibility test had a TSS of 45 mg/L. Anticipated process influent TSS was 10 – 15 mg/L, while the measured range during the test period was between 1 to 9.3 mg/L, with an average of 3.7 mg/L. Effluent TSS varied from 1 - 3.2 mg/L, averaging 1.6 mg/L. The flow varied from 0.27 MGD to 0.550 MGD. The process experienced an unanticipated presence of fats, oils & grease, which would need to be taken into account for the system design.

After a successful pilot study, this full scale system was based on the following criteria:

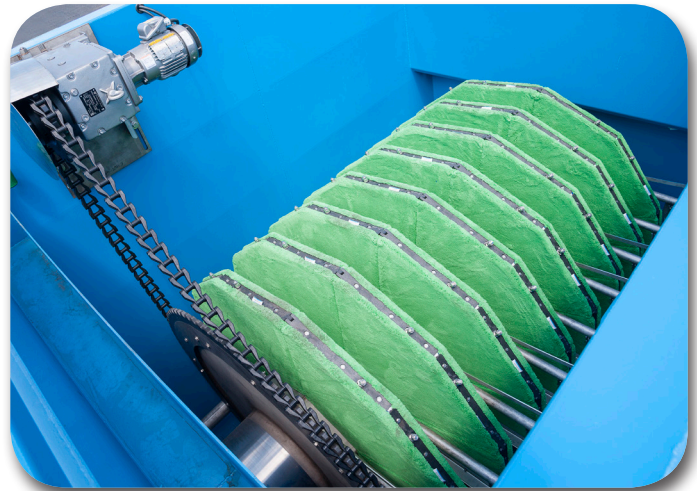
Parameter	Average	Peak
Flow	0.5 MGD	2 MGD
TSS	30 mg/L	50 mg/L
FOG	1 - 20 mg/L	<30 mg/L

AquaDisk® Pilot Design Parameters

The design was finalized with two (2), six-disk, AquaPrime® package systems, epoxy-coated steel and OptiFiber® PF-14 cloth media, 5 micron nominal. The AquaPrime model provided a step for removal of the floatable FOG anticipated in this application. The following data reflects a year of operation.



2019 AquaPrime® Operational Performance - Phosphorus (mg/L)



Internal View of an AquaPrime® Cloth Media Filter

Aqua-Aerobic® pile cloth media filters are available in a number of configurations. The exclusive OptiFiber® pile cloth media is available in a range of media from 10 micron to 2 micron and can be applied to any application. These systems offer a compact footprint, simple operation and extremely low maintenance with minimal moving parts. The recommended design will meet the hydraulic conditions, loadings, and available footprint. Retrofit options can be evaluated utilizing existing basins and tanks. While some applications may not require chemical addition, chemical feed options can be tested and considered, especially for low Total Phosphorus. The most suitable technology will be optimized for your application and unique process characteristics. Final designs can integrate preferred components, controls and materials of construction.

AquaPrime® FILTER ADVANTAGES

- Vertically oriented cloth media disks reduce required footprint
- Each disk is lightweight, with removable segments for ease of maintenance
- Backwash system fluidizes fibers for efficient release of stored solids
- Effective backwash system that fluidizes cloth fibers to release stored
- Specifically designed floatable and solids removal zones
- Available in several configurations
- Fully automatic PLC control with color touchscreen HMI
- Reduced energy costs in the secondary process due to a reduction in organic loading
- More solids for increased gas production in anaerobic digesters
- Simple start-up with unattended operation for remote locations