Cloth Media Filtration
Featuring OptiFiber® Pile Cloth Media
Aqua-Aerobic® Cloth Media Filtration
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In the early 1990s Aqua-Aerobic Systems revolutionized tertiary treatment by introducing Cloth Media Filtration utilizing a disk configuration. Since then, over 70 different media have been researched and tested with a select few that are currently being applied to five mechanical configurations in a variety of applications including: water reuse, low level phosphorus, stormwater and primary treatment.

Effective Depth Filtration

The original OptiFiber® pile cloth media is specifically engineered for water and wastewater applications and designed to maximize solids removal over a wide range of particle sizes. Deep, thick, pile fibers capture particles for the most effective depth filtration. OptiFiber media is exclusive to the entire line of cloth media filter configurations including:

- AquaDisk®
- Aqua MegaDisk®
- Aqua MiniDisk®
- AquaDrum®
- AquaDiamond®

OptiFiber® Media Advantages

- Woven, precision fibers provide strength and durability
- Discrete pile fibers effectively release solids during backwash
- Open backing minimizes potential for biofouling
- Low backwash volume results in water savings and energy reduction
- Variety of application-specific cloth including 5 µm nominal pore size media

OptiFiber® Cloth Filtration Media
Awarded BlueTech® Research Innovation Badge

Shown is pile cloth media in its natural state (left) and its conditioned state (right).
Engineered Cloth Media

OptiFiber PES-14®
MICROFIBER CLOTH FILTRATION MEDIA

The latest in cloth media advancements is the OptiFiber PES-14 microfiber media. This media is specifically engineered to remove suspended solids, turbidity and fine particles up to 50% better than other filters or microscreens.

OptiFiber PES-14® Media Advantages

- Ideal for fine polishing applications
- Proven to reduce phosphorus to 0.1 mg/l or less
- More surface area for particle interception
- 5 micron nominal pore size removes small particles to enhance disinfection
- Maintains high filtrate quality even during backwash

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Backwash System
EFFECTIVE CLEANING WITH LESS WATER AND ENERGY

Maximum cleaning of the OptiFiber® cloth media is accomplished with a unique backwash system. The backwash shoe makes direct contact with the cloth media and solids are vacuumed from the surface. During backwash, fibers fluidize to provide an efficient release of stored solids deep within the fiber depth.

Backwash System Advantages

- Filtration continues during backwash
- Initiated at a pre-determined liquid level or time
- Low backwash rates
- Less water volume required
- Low energy consumption
The cloth media “Disk” configuration was the first to enter the marketplace as an alternative to conventional granular media filtration technologies. This original configuration comprises the majority of Aqua-Aerobic cloth media filters installed today. A history of exceptional operating experience in a variety of municipal and industrial applications continues to make the AquaDisk® the tertiary filter of choice.

Features and Benefits

- Vertically oriented cloth media disks reduce required footprint
- Each disk has six lightweight, removable segments for ease of maintenance
- Low hydraulic profile
- Higher solids and hydraulic loading rates
- Low backwash rate
- Available in painted steel, stainless steel or concrete tanks
- Fully automatic PLC control system with color touchscreen HMI
- Low cost of ownership

Modes of Operation

All Aqua-Aerobic cloth media filter configurations operate on the same (3) modes of operation: FILTRATION, BACKWASH and SOLIDS WASTING. For graphical representation, the AquaDisk is used to describe each mode below.

**Filtration Mode**

- Inlet wastewater enters filter
- Cloth media is completely submerged
- Disks are stationary
- Solids deposit on outside of cloth media forming a mat as filtrate flows through the media
- Tank liquid level rises
- Flow enters the filter by gravity and filtrate is collected inside the disks and discharged
- Heavier solids settle to the tank bottom

**Backwash Mode**

- Solids are backwashed at a predetermined liquid level or time
- Backwash shoes contact the media directly and solids are removed by vacuum pressure using the backwash pump
- Two disks are backwashed at a time (unless a single disk is utilized)
- Disks rotate slowly
- Filtration is not interrupted
- Backwash water is directed to headworks

**Solids Wasting Mode**

- Heavier solids on the tank bottom are removed on an intermittent basis
- Solids are pumped back to the headworks, digester or other solids collection area of the treatment plant
The Aqua MiniDisk and AquaDrum filters feature all the same benefits and (3) modes of operation as the original AquaDisk. Both configurations are designed to provide economical treatment of smaller flows and easily retrofit into existing traveling bridge sand filters. The AquaDrum is particularly ideal where driving head is limited.

The modular design of the Aqua MiniDisk filter retrofits neatly into existing 9 ft. (2.74 m) wide concrete traveling bridge filter basins, providing more than two times the hydraulic capacity of the original sand filters.
Configurations

Aqua MegaDisk®
CLOTH MEDIA FILTER

The Aqua MegaDisk “expands” on the reliability and exceptional performance of the original AquaDisk filter, but on a larger scale. Each disk is approximately 10’ in diameter.

The unit features all of the same benefits and (3) modes of operation as the AquaDisk but with larger disks and fewer mechanical components.

Additional Features and Benefits

- Smallest footprint, operating in 80% less space than sand filters with comparable hydraulic capacity
- Up to 24 disks in a single filter, capable of treating 24 MGD
- Ideal for deep bed sand filter retrofits, new plants or expansions
- Lightweight segments removable without a crane

Footprint Savings Compared to Sand Filters

Aqua MegaDisk (left) compared to AquaDisk (right).

Internal view of the Aqua MegaDisk
AquaDiamond®
CLOTH MEDIA FILTER

The AquaDiamond filter is a unique combination of two proven technologies: traveling bridge and cloth media filters. The result is two to three times the flow capacity of a traveling bridge filter within an equivalent footprint, making it ideal for sand filter retrofits. The unit features all of the same benefits and (3) modes of operation as the AquaDisk but with vertically oriented diamond laterals and a traveling platform.

Additional Features and Benefits

- Up to eight diamond laterals per unit
- Fits neatly into existing traveling bridge filter profile with minimal civil work
- Variable speed drive platform and backwash pump provide immediate response to influent solids excursions
- Advanced drive and tracking system prevents misalignment

Modes of Operation

Filtration Mode
- Inlet wastewater enters the filter
- Cloth media is completely submerged
- No moving parts
- Solids deposit on outside of cloth media forming a mat as filtrate flows through the media
- Flow enters the filter by gravity and filtrate is collected inside the diamond laterals and discharged
- Heavier solids settle to the basin floor

Backwash Mode
- Periodic backwashing is initiated by increased headloss due to solids deposits
- The platform traverses the length of the cloth media diamond laterals during backwashing
- Backwash shoes contact the media directly and solids are removed by vacuum pressure using the backwash pump
- The platform only operates during backwashing and solids collection

Solids Wasting Mode
- Heavier solids on the tank bottom are removed on an intermittent basis
- Small suction headers collect and discharge settled solids
- The backwash pump is utilized for solids removal.
Application Profiles

Municipal Recycle/Reuse
- Hundreds of installations
- Title 22 approved
- Multiple cloths capable of producing effluent below 1.0 NTU

Phosphorus Removal
- Achieve phosphorus removal below 0.075 mg/l
- Depth of filtration means less chemical/flocculation and energy

Traveling Bridge Filter Retrofits
- 2-3 times hydraulic capacity within existing footprint
- Minimal mechanical components and no civil changes

Deep Bed Filter Retrofits
- 3-4 times hydraulic capacity within existing footprint
- Minimal mechanical components and no civil changes

Industrial
- Robust cloth media handles high industrial solids
- Applied in several industrial applications including: Energy, Food/Beverage, Textile and Pharmaceutical

Large Flows
- Ideal application for Aqua MegaDisk® and AquaDiamond®
- Smallest footprint when compared to hydraulic capacity
- Experience in large flow filter designs over 50 MGD

Power and Energy
- Coal Ash
- Coal Fines
- Reuse and Cooling Water

Stormwater/CSO
- Effectively removes TSS without chemicals
- Easily accommodates varying flows
- Can provide tertiary treatment between rain events

Primary Filtration
- Reduce organic load to secondary process
- Lower energy consumption
- Replace existing primary clarifiers
Building from a decade of experience in applying advanced process control to biological processes, Filter IntelliPro® is a control system for cloth media filters that uses real time data to optimize chemical usage for phosphorus removal prior to filtration. Among its many features, the system includes automatic optimal dose selection for metal salt, polymer, and pH adjustment. Filter IntelliPro proactively assists plants in achieving their phosphorus objective while minimizing cost.

**System Features**
- Instrumentation with mounting and communication module
- PC with IntelliPro software developed by Aqua-Aerobic Systems, Inc.
- Network settings to allow communication between the instruments, the PLC and the PC
- Process, instrumentation and software on-site training
- Free on-line support, including troubleshooting and software updates

**System Advantages**
- Advanced process control for low total phosphorus
- Chemical savings through load based control
- Automatic chemical dose response curves replace jar testing
- Improved process reliability using real time information
- Multi-point analysis of key process parameters
- Automatic composite sampling

**IntelliPro® System Layout for Ultra-Low Phosphorus**
Cloth Media Filtration
Mobile Pilot Systems

Technology pilot demonstrations can be beneficial to wastewater treatment plants by providing a snapshot of essential process operating conditions and allowing the customer to interact with the technology and Aqua-Aerobic personnel. OptiFiber cloth media filter pilot systems provide customers with the most comprehensive on-site testing and analytical services available. Our unique approach is designed to provide prompt operational feedback, allowing immediate fine-tuning of parameters for the most effective pilot/demonstration experience.

Primary Filtration Piloting

Aqua-Aerobic Systems has completed extensive testing in applying Pile Cloth Media Filtration for primary filtration that can also replace primary clarifiers. This testing has shown substantial TSS and BOD reduction to the secondary process and within a smaller footprint compared to traditional primary clarifiers. The new Primary Filtration Pilot System is equipped for on-site testing of primary filtration and primary effluent filtration applications.

Pilot System Features

- Totally enclosed, drop-deck trailer housing a full-scale Aqua MiniDisk cloth media filter
- Complete monitoring and analytical equipment
- On-board SCADA system with data logging and remote access
- Enhanced solids settling zone below cloth media disk
- Flexibility to test pretreatment options including chemical addition and flocculation
- Specialized scum removal system
- Outside-in filtration
- OptiFiber PA2-13®, OptiFiber PES-13® and OptiFiber PES-14® pile cloth filtration media available
For more than 20 years, Aqua-Aerobic Systems has been dedicated to the advancement in cloth media filtration technology through ongoing research and development. Our extensive technical knowledge of cloth media construction, testing and application allows us to maintain our leadership position in the area of cloth media tertiary treatment. No other supplier offering fabric media or microscreens compares to Aqua-Aerobic Systems’ technical knowledge and expertise in cloth media filtration.

### OptiFiber® Cloth Media Technology Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Media Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>OptiFiber® NF-102 * Needlefelt Media</td>
</tr>
<tr>
<td>1996</td>
<td>OptiFiber® NF-109 Needlefelt Media</td>
</tr>
<tr>
<td>2001</td>
<td>OptiFiber® ACR-13 Pile Cloth Media</td>
</tr>
<tr>
<td>2004</td>
<td>OptiFiber® MMK-PES Pile Cloth Media</td>
</tr>
<tr>
<td>2006</td>
<td>OptiFiber® MMK-213 Pile Cloth Media</td>
</tr>
<tr>
<td>2007</td>
<td>OptiFiber® PES-14* Microfiber Media</td>
</tr>
<tr>
<td>2010</td>
<td>Opened new Research and Technology Center</td>
</tr>
<tr>
<td>2011</td>
<td>Continued Innovation</td>
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</tbody>
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*Title 22 Approved

### Aqua-Aerobic Research & Technology Center

In 2011, Aqua-Aerobic Systems, Inc. entered into a long-term partnership with the Rock River Water Reclamation District (RRWRD) in Rockford, IL which allowed Aqua-Aerobic to build an on-site Research & Technology Center at the RRWRD’s central treatment plant. The new facility was constructed for the purpose of conducting applied research and demonstration of new products and process technologies used in the treatment of wastewater. The primary technology that is tested at the facility is Aqua-Aerobic Systems’ Cloth Media Filtration.

The collaboration allows Aqua-Aerobic access to a variety of in-plant process wastewater streams from a full scale wastewater treatment plant. This arrangement is integral in developing and testing new products and process concepts for future commercialization and applications, both domestically and internationally.

The Center is also an integral component of the company’s education and training program where customers visit the Center to learn and see full scale products in an actual working environment.
Providing TOTAL Water Management Solutions

Visit our website at www.aqua-aerobic.com to learn more about Aqua-Aerobic Cloth Media Filtration and our complete line of products and services:

- Aeration & Mixing
- Biological Processes
- Filtration
- Disinfection
- Membranes
- Controls & Monitoring Systems
- Aftermarket Products and Services

Providing TOTAL Water Management Solutions

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The information contained herein relative to data, dimensions and recommendations as to size, power and assembly are for purpose of estimation only. These values should not be assumed to be universally applicable to specific design problems. Particular designs, installations and plants may call for specific requirements. Consult Aqua-Aerobic Systems, Inc. for exact recommendations or specific needs. Patents Apply.

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