

Clean Up Your Wastewater - with Filters



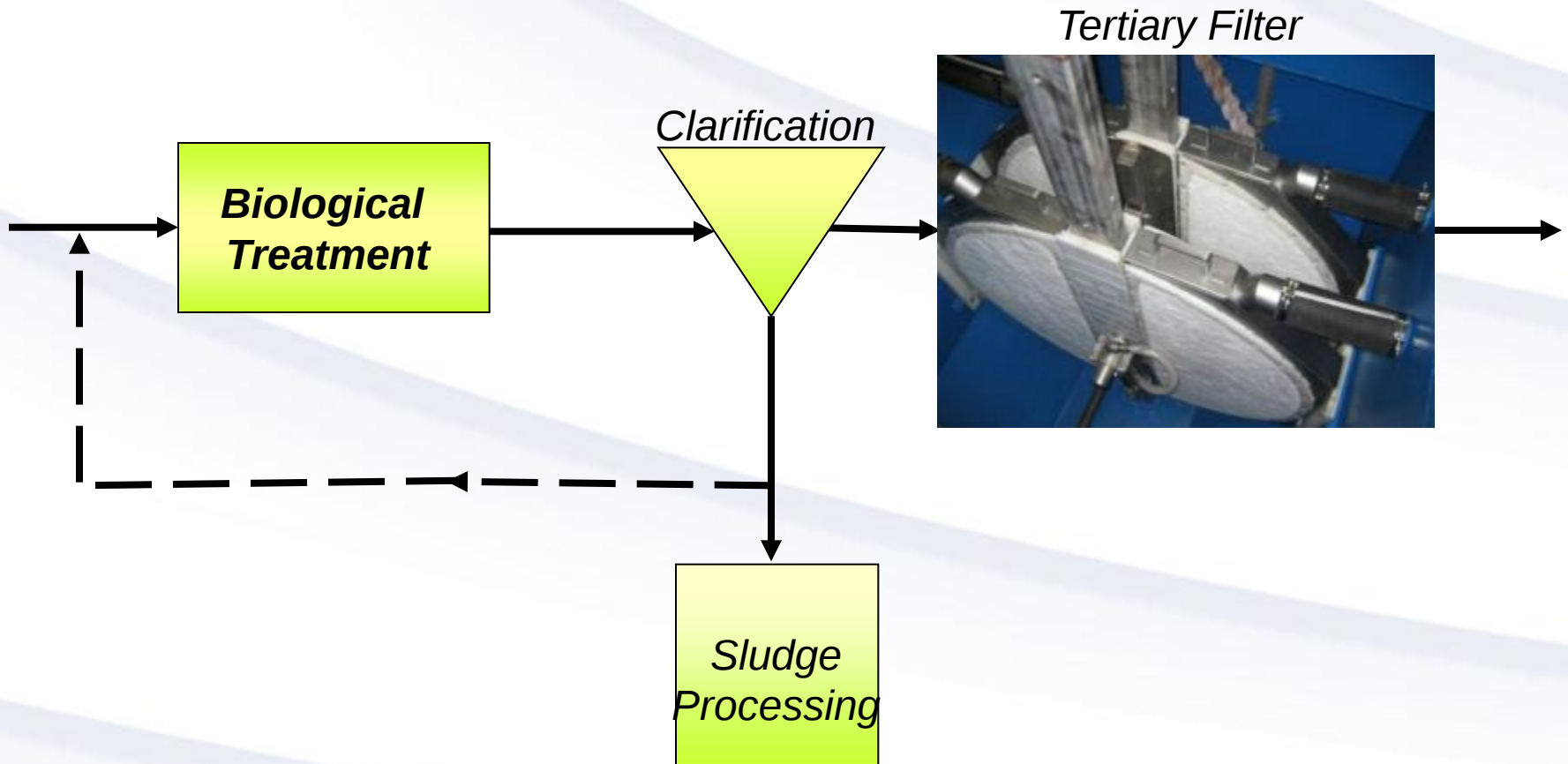
Presentation Overview

Clean Up Your Wastewater – with Filters

- *Filtration Technologies*
- *Why use disc filters?*
- *What is a disc filter?*
- *Backwash and solids removal*
- *Disc configuration*
- *Design Highlights*
- *Case Study*
- *Questions and Answers*

Tertiary Filtration

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Filtration Technologies

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- *Traveling Bridge Filters*
- *Synthetic Media Filters*
- *Sand Filters*
- *Membrane Biological Reactors (MBRs)*
- ***Cloth Disc Filters***

Why use Disc Filters?

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More wastewater treatment facilities are upgrading to tertiary treatment to meet new stringent discharge requirements.

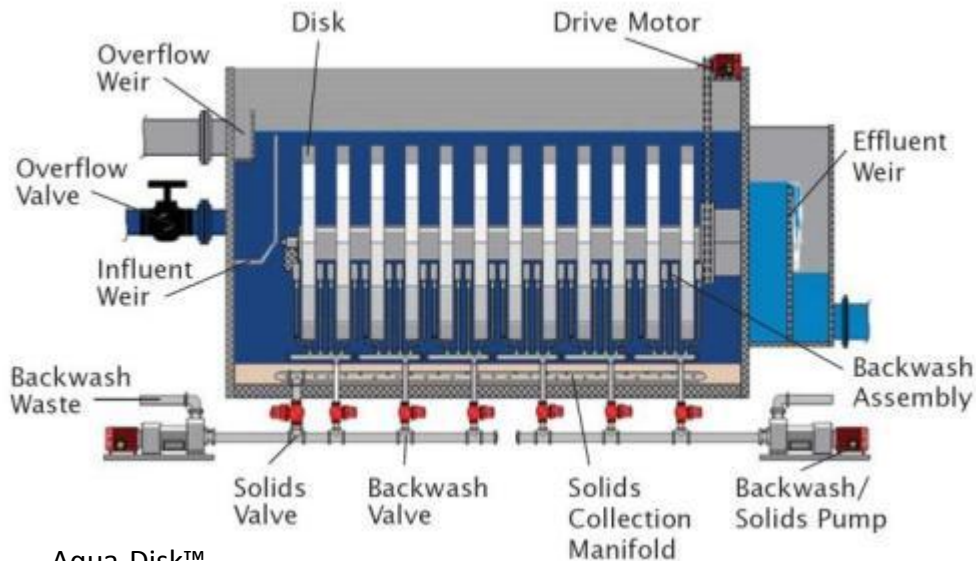
The use of cloth disc filters is becoming more common because of

- *Effluent quality ($TSS < 5 \text{ mg/L}$)*
- *Small foot print*
- *Low backwash rates*
- *Simple design*
- *Low maintenance*

What is a Cloth Disc Filter?

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- *A series of discs covered in cloth media in a tank or concrete basin*



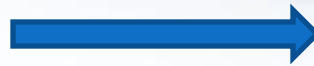
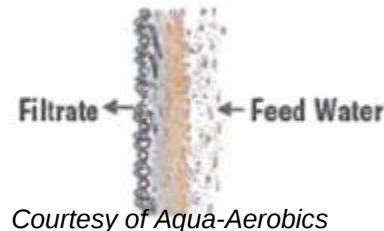
Aqua-Disk™



What is a Cloth Disc Filter?

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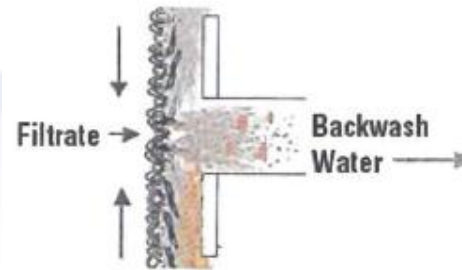
- *Flow passes thru the cloth media and particulates are trapped within the fibers*



What is a Cloth Disc Filter?

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- *The level in the tank will rise as solids accumulate on the cloth gradually restricting flow of liquid through the cloth*
- *A backwash cycle is initiated when the level reaches a predetermined set point.*



Courtesy of Aqua-Aerobics

- *Filtration continues during backwash cycle*

What is a Cloth Disc Filter?

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- *Flow path can be used to classify cloth disc filters*

OUTSIDE – to – INSIDE

- *Water to be treated flows into the basin and surrounds disc*
- *Flow passes thru the disc and particulates collect on outside of disc*
- *Clean filtered effluent collects on the inside of the discs*

What is a Cloth Disc Filter?

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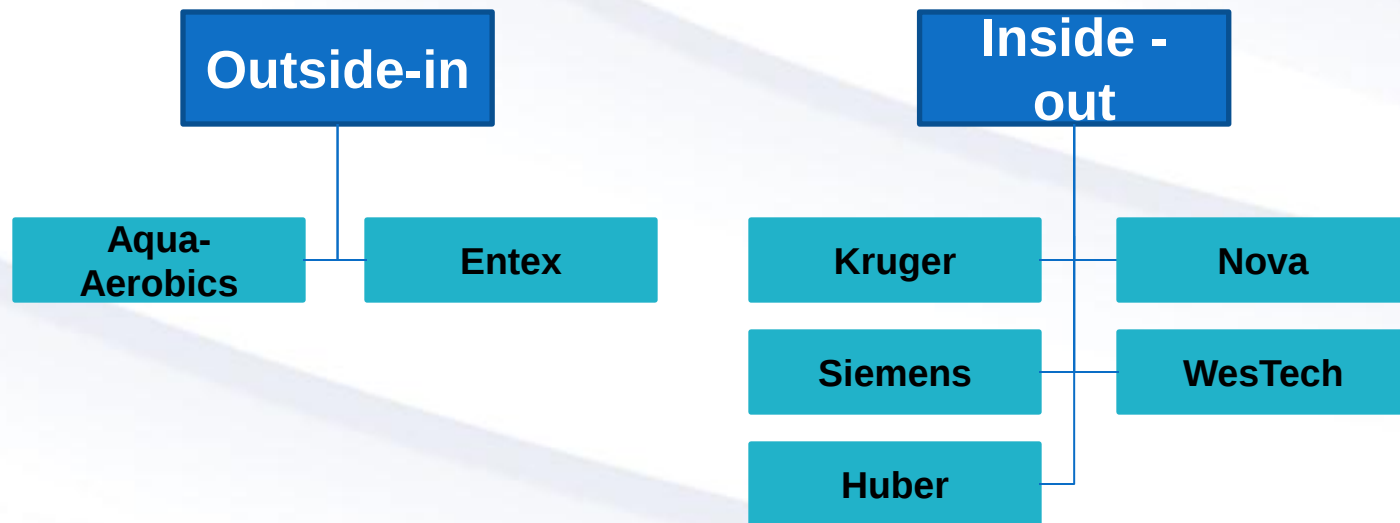
- *Flow path can be used to classify cloth disc filters*

INSIDE – to – OUTSIDE

- *Water to be treated flows into the discs from a center drum*
- *Flow passes thru the disc and particulates collect on inside of the disc*
- *Clean filtered effluent collects in the basin*

What is a Cloth Disc Filter?

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What is a Cloth Disc Filter?

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- *Filter media can also be used to classify cloth disc filters*

Manufacturer	Product	Filter Material	Flow Path
Aqua Aerobics	AquaDisk	PES pile cloth	outside-to-inside
Entex	FlowTex Disc Filter	PES pile cloth	outside-to-inside
Huber	RoDisc Rotary Mesh	Fine mesh woven from SS	inside-to-outside
Kruger	Hydrotech Discfilter	PET mono-filament fabric	inside-to-outside
Nova Water	Ultrascreen Filter	AISI 316 SS micronic mesh	inside-to-outside
Siemens	Forty-X Disc Filter	PET mono-filament fabric	inside-to-outside
WesTech	SuperDisc	20/13 polyester fabric	inside-to-outside

Backwash and Solids Removal

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➤ *OUTSIDE – to – INSIDE*

Backwash

- *Because particulates to be removed are on the outside of the disc -- a vacuum head is used*
- *A vacuum is applied to a “vacuum head” that moves along the surface of the cloth*
- *Clean effluent from the inside of the disc is pulled back thru the cloth and collects particulates trapped in the cloth fibers*
- *Backwash water is sent to the head of the plant for reprocessing*

Backwash and Solids Removal

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➤ *OUTSIDE – to – INSIDE*

Sludge Removal

- *Because the tank is full of dirty influent (outside of the disc) solids will accumulate on the floor of the tank*
- *A perforated pipe attached to a vacuum pump removes solids*
- *Sludge removal water is sent to the head of the plant for reprocessing*

Backwash and Solids Removal

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➤ *INSIDE – to – OUTSIDE*

Backwash

- *Because particulates to be removed are on the inside of the disc -- a spray is used*
- *The discs pass under the spray, wash water is sprayed through media from the outside*
- *Wash water is filtered effluent*
- *Backwash falls into a collection tray and is removed*
- *Backwash water is sent to the head of the plant for reprocessing*

Backwash and Solids Removal

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➤ *INSIDE– to –OUTSIDE*

Sludge Removal

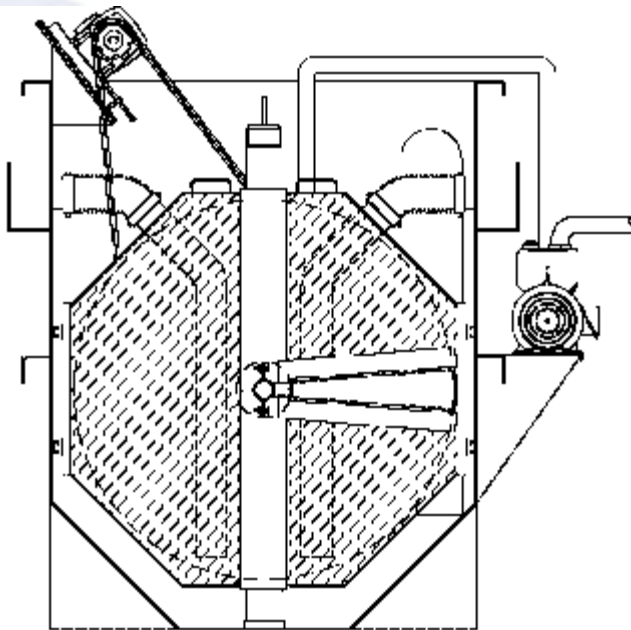
- *Sludge removal is not required – typical of inside-to-outside filters*
- *Because the disc is full of dirty influent (inside of the disc) solids only accumulate on the inside of the disc*

Disc Configuration

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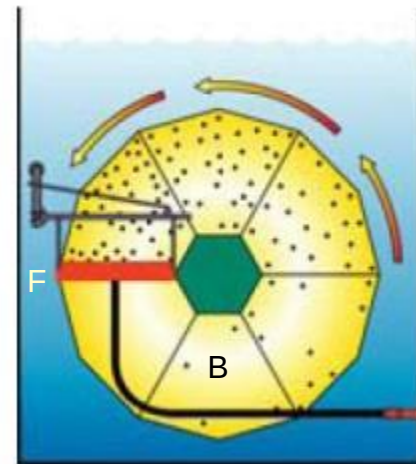
➤ What makes up a disc?

- each disc is made up of 2 segments
- with individual effluent ports
- disc submergence is 100%



Entex FlowTex

AquaDisk



- each disc is made up of 6 segments
- one common effluent center tube
- disc submergence is 100%

Disc Configuration

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➤ What makes up a disc?

- each disc is made up of 6 segments
- disc submergence is 60%



Huber RoDisc

Kruger Hydrotech



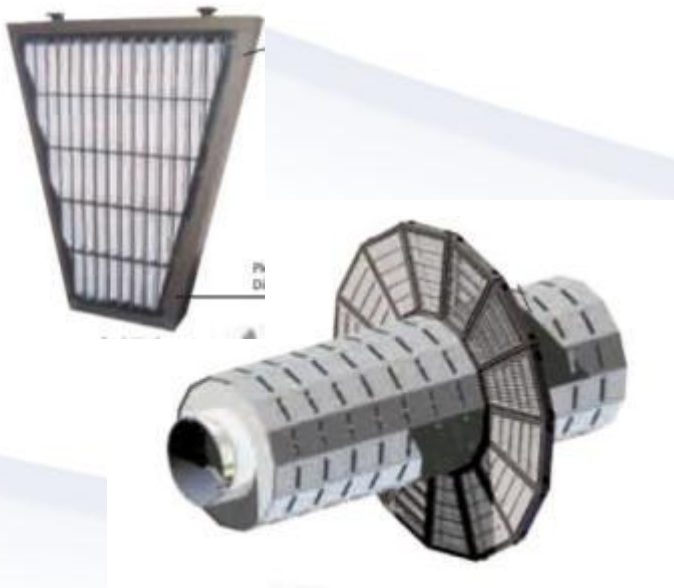
- each disc is made up of multiple segments (depends on model)
- disc submergence is 40 - 60%

Disc Configuration

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➤ *What makes up a disc?*

- each disc is made up of 16 segments
- disc submergence is 65%



Siemens Forty-X

Nova Ultrascreen



- each disc is made up of multiple segments
- disc are not fully submerged

Disc Configuration

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➤ *What makes up a disc?*

- each disc is made up of 10 segments
- disc submergence is 60%



Westech SuperDisc

How to size a Disc Filter?

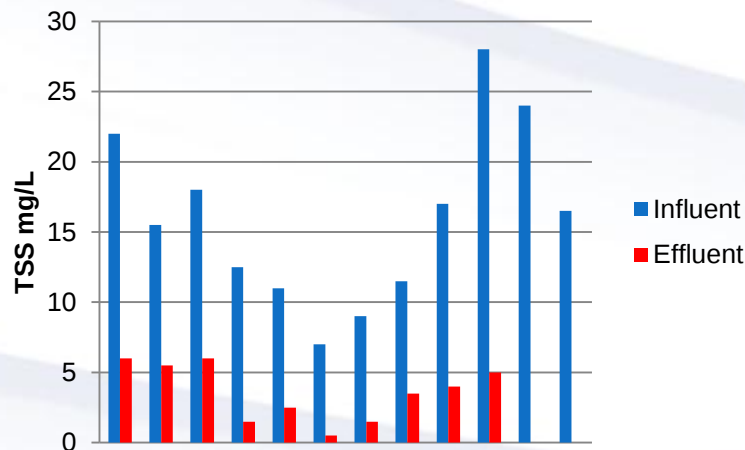
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- *Factors to consider when sizing a disc filter*
 - *Typical hydraulic loading rates*
 - *3 gpm/ft² filtration surface area at average flow*
 - *6 gpm/ft² filtration surface area at peak flow*
 - *Typical solids loading rates*
 - *Not to exceed 3 lb/day/ft²*
 - *Need to know surface area of disc*
 - *Need to look at disc submergence to get EFFECTIVE surface area*
 - *Need to look at maximum number of discs per filter*

Case Study?

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- **Moneta, VA**
- Six disc filter for installation in a concrete basin
- 2 of the 6 discs were installed in 2006 to treat the current flow of 500,000 gpd.
- Future expansion to 6 discs will treat 1.5MGD average flow.



Questions?

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