

Water Technologies

# Hydro-Clear® Filters: The Clear Solution For Industrial Applications

**SIEMENS**



Features and benefits of the Hydro-Clear® filter	
Features	Benefits
Shallow, 10-inch bed	Low-profile design reduces excavation, concrete and related structural costs.
Mono media, fine-grained sand	Maximum efficiency. Effectively captures small as well as large particles. Positive particle barrier against solids and turbidity.
Pulse-Mix® system	Regenerates media surface, extending filter runs. Automatically keeps the system on-line during upsets.
Hydro-Scour® backwash system	Effectively backwashes media in 3.5 minutes, at low power and water rates. Cleans media without mechanical surface sweeps or complete bed fluidization, reducing media losses.
Grease removal system	Enables automatic media cleaning, without labor. No manual grease removal or media replacement.
Easy-to-operate control system. Simple, automated operation	Operates unattended 24 hours a day. Keeps plant in compliance 24/7/365.
Modular steel tanks, prefabricated package plants, or concrete tanks	Variety of sizes, flow-rates, construction options. Custom designed for your application.
Field pilot testing units	Proof at your site.
Ideal for retrofits	Enables you to upgrade filtration capabilities while using existing tanks.
Service	Qualified, experienced field technicians readily available for service and/or upgrades to your filtration system.

**EXPERIENCE TO GET THE JOB DONE**

In an attempt to cut costs, many industries are finding it cheaper to simply reuse their wastewater effluent. As a tertiary filter designed to remove suspended particles and turbidity from industrial wastewater effluent, the Hydro-Clear® rapid sand filter has excelled at this since its first installation in 1967.

That isn't all the Hydro-Clear® filter can do. Odds are, Hydro-Clear® filters are already at work solving problems exactly like yours. Whether the upstream process is raw water treatment, production water, pulp processing, biological treatment; whether the downstream application is RO, UV or chlorine contact; or the use is production, cooling towers, reuse or compliant discharge; whether the market segment is petroleum, food and beverage, metals or pulp and paper; the Hydro-Clear® filter is hard at work at over 600 installations worldwide.

**CUTTING COSTS NOT CORNERS**

The Hydro-Clear® filter features a unique underdrain system and a shallow bed of mono-media, fine-grained sand. This design permits the filter media to be "pulsed" periodically as solids build up, extending the filter runs and automatically keeping the filter on-line, despite varying loads and changing water characteristics.

Construction and excavation costs are minimized with the Hydro-Clear® filter due to its shallow cell design, typically ranging from six to nine feet deep. This design also allows the filter to backwash with unmatched efficiency and cost-effectiveness; typical backwash rates are only 12 gpm/ft<sup>2</sup>, with a total duration of 3.5 minutes. This backwash action creates high velocity jets of water for vigorous media scrubbing, providing high particle contact during the backwash cycle, scrubbing the media without completely fluidizing the bed. This makes the Hydro-Clear® filter's backwash pump about half the size of other filters' pumps. Make sure that you're not wasting money on high-energy, inefficient systems.

# Hydro-Clear<sup>®</sup> filter operation

**1 Start of filtering cycle** Wastewater enters the filter cells through proportioning weirs and cascades into the influent distribution/wash water trough and onto the filter sand through v-notched weirs. Splash plates help distribute the water evenly across the sand. Dissolved oxygen is added to the wastewater through this cascading sequence.



*Backwash scrubbing action*



*Backwash water flowing in trough, air assisted.*

Following each pulse, surface drops, and the pulsing is discontinued. Ultimately, however, the filter sand and the pulsing is discontinued and the backwash cycle is initiated. The backwash water flows through the underdrain, past the splash plates, and into the backwash trough. The backwash rate is 12 gpm/ft<sup>2</sup>, then the



# ation — How it works



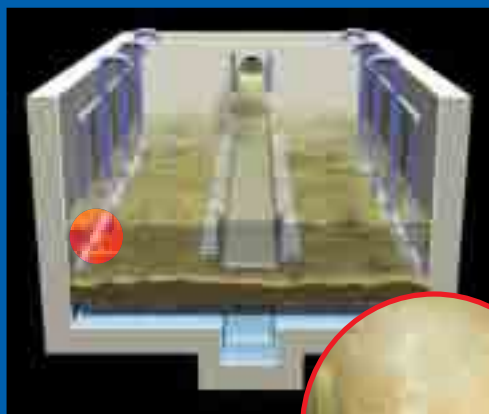
## 2 Initial clogging... filtering continues

As the effluent reaches the filter media surface, all but the very fine particles in the wastewater are retained on the surface of the media. The finer particles enter the interstices (spaces between the sand grains) and become trapped. In time, large particles may completely cover the filter media surface, causing the water level to rise over the media surface (headloss).

## 3 Rising liquid level activates Air-Mix<sup>®</sup> diffuser and Pulse-Mix<sup>®</sup> systems

The Air-Mix<sup>®</sup> diffuser uses low pressure diffused air bubbles to create a gentle rolling motion in the liquid

over the filter surface, lifting floc particles from the media surface and suspending them in the liquid. The



exclusive Pulse-Mix<sup>®</sup> system provides the capability to automatically regenerate the filtering surface without initiating a backwash. During the Pulse-Mix<sup>®</sup> cycle, the filtrate outlet valve closes, trapping atmospheric air in the underdrain. The backwash inlet valve opens and the backwash pump floods the underdrain cavity with filtered water. The rising water acts as a piston, pushing the trapped air up through the media to the surface. This 20 second duration air "pulsing" dislodges particles trapped on the media surface and entrains them in the liquid above the filter surface which regenerates the media, resulting in reduced headloss and prolonged filter runs.



## Backwash initiated

## 4

As the liquid level above the filter media rises, the filtration process continues. When the filter's solids storage capacity is reached, backwash is initiated. Maximum headloss is achieved and backwash is activated. Stored filtrate is pumped up and pushed out through the underdrain, pushing a pulse of air through the bed. The dirty water is directed out through the underdrain. The backwash cycle lasts only 3.5 minutes at which point the filter is returned to the filtering cycle.



*The Hydro-Clear® sand filtration system filters secondary effluent for a wide variety of applications, including refinery wastewaters.*

**HYDRO-CLEAR® FILTERS ARE BEING USED IN THE FOLLOWING APPLICATIONS AND INDUSTRIES:**

**APPLICATIONS**

- Effluent discharge
- Reclamation and reuse
- Raw water filtration
- Cooling water treatment
- Groundwater recharge
- Irrigation water
- Pre-RO
- Pre-UV

**INDUSTRIES**

- Steel and metals
- Automotive plants
- Pharmaceutical
- Petroleum refining
- Chemical production
- Power plants
- Plastics and synthetic resin manufacturing
- Pulp and paper
- Dairy products
- Food and beverage

**WATER REUSE LOCAL SOLUTIONS TO A GLOBAL PROBLEM**

The Hydro-Clear® filter was specifically designed to meet rigorous wastewater treatment standards. With its unique underdrain design and shallow filtering layer, the Hydro-Clear® filter can trap and store large amounts of solids, including fine particles, and withstand fluctuations in solids loading and characteristics. This makes our filter ideal to handle any industrial reuse applications that you can throw at it.

In all reuse applications, Hydro-Clear® filters have cut costs for the operating plant and kept the potable water in the community where it can be used for its intended purpose: household, drinking and other important uses.

**GREASE AND OIL? NO PROBLEM!**

Colloidal grease and oils build up in any filter system. Traditionally, operators have combated this problem with manual pre-chlorination. With the Hydro-Clear® filter, you have another option. The semi-automatic Chem-Clean® system emulsifies and removes grease trapped in the filter media, restoring the media to its original condition. As a result, there is no need to pre-chlorinate, and the effluent does not deteriorate because of the emulsified grease.

*from left to right:*

*The Hydro-Clear® filter is tough enough to withstand a variety of demanding industrial applications.*

*This Hydro-Clear® filter provides cooling tower makeup water for the power industry.*



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