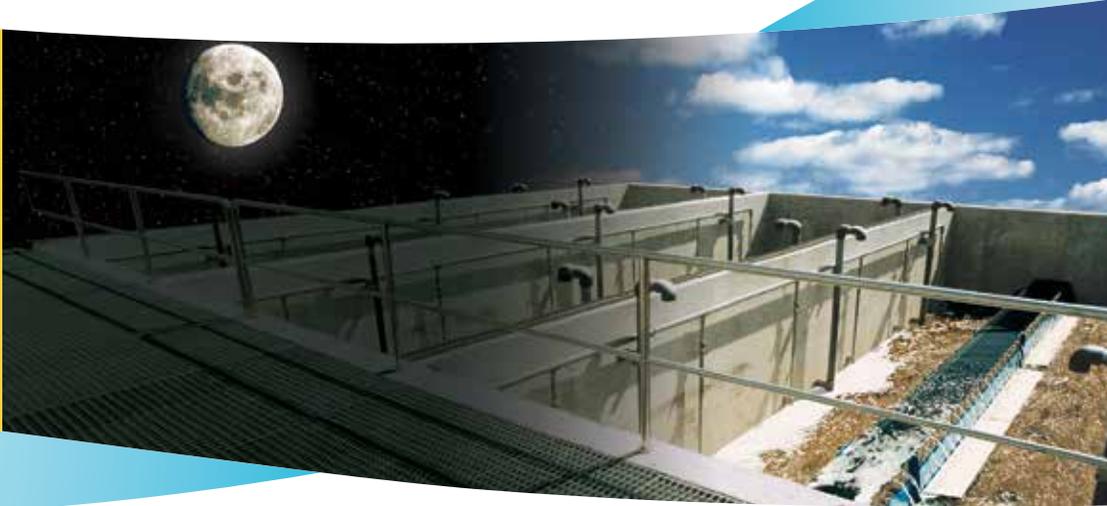




eVOQUA
WATER TECHNOLOGIES



**HYDRO-CLEAR® FILTERS:
COUNT ON THEM 24/7/365**



HYDRO-CLEAR® FILTERS

EXPERIENCE TO GET THE JOB DONE

The Hydro-Clear® sand filter was first installed in a small Ohio subdivision in 1967. We've come a long way since then, having installed over 600 units for both municipal and industrial applications worldwide. And, in 1981, the Hydro-Clear filter was approved for the California Department of Health's strict Title 22 requirements for unrestricted water reuse applications.

This same technology is probably already at work solving problems exactly like yours. Whether the upstream process is raw water treatment, trickling filter, lagoon, oxidation ditch, or conventional activated sludge; downstream treatment is RO, UV or chlorine contact; or downstream is production activity, a prize trout stream, conventional river or recreational lake, golf course or landscape nursery; we're doing it.

Our filter isn't merely an adaptation of traditional potable water filters, either. The pulsed bed, gravity flow Hydro-Clear filter was designed specifically to remove suspended particles and turbidity from wastewater treatment plant effluent. Designed to work around the clock, the Hydro-Clear filter provides unequalled efficiency, combined with the experience to keep your plant compliant 24/7/365.

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 online, 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 it to backwash with unmatched efficiency and cost-effectiveness; typical backwash rates are only 12 gpm/ft², 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.

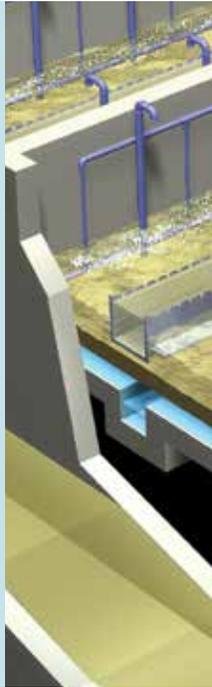
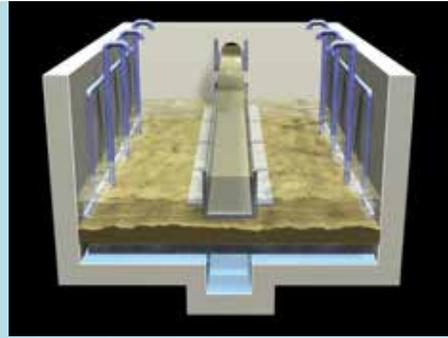
FEATURES AND BENEFITS OF THE HYDRO-CLEAR® FILTER

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.

HYDRO-CLEAR® FILTER OPERATION — HOW IT WORKS

1 Start of filtering cycle

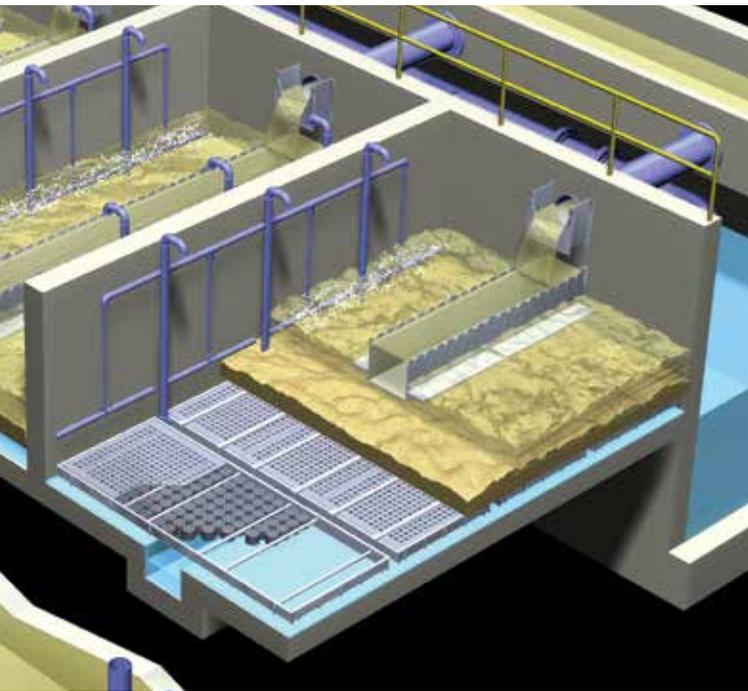
Wastewater enters the filter cells through proportioning weirs and cascades into the influent distribution/wash water trough and onto the filter sand through v-notched weirs. Splash plates help distribute the water evenly across the sand. Dissolved oxygen is added to the wastewater through this cascading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



Backwash scrubbing action



Backwash water flowing in trough, air assisted



Backwash initiated

4

Following each pulse, the liquid level above the filter surface drops, and the filtration process continues.

Ultimately, however, the filter's solids storage capacity is reached, and the pulsing is discontinued. Maximum headloss is achieved and the backwash cycle is activated. Stored filtrate is pumped up through the underdrain, pushing a pulse of air through the bed, followed by the backwash. The dirty water is directed out through the backwash trough. The backwash cycle lasts only 3.5 minutes at a rate of 12 gpm/ft², then the filter is returned to the filtering cycle.

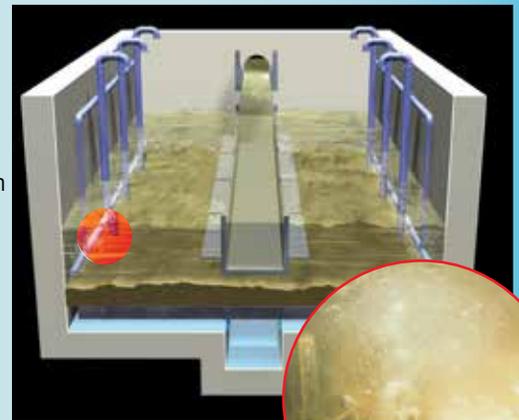
2 Initial clogging... filtering continues

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™ diffuser and Pulse-Mix® systems

The Air-Mix 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 feature provides the capability to automatically regenerate the filtering surface without initiating a backwash. During the Pulse-Mix 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.

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The Hydro-Clear® sand filter has pioneered wastewater reuse applications.

WATER REUSE LOCAL SOLUTIONS TO A GLOBAL PROBLEM

Municipalities that use water reuse systems fare better than those that don't when faced with drought-like conditions. Our Hydro-Clear® filter meets the rigid State of California Title 22 requirements for unrestricted water reuse applications. There are 36 Hydro-Clear filter installations in California, of which 25 are used for water reuse. Additional installations across the United States, Europe and Asia perform to all local requirements. In most cases, the filtered effluent is used for irrigation of golf courses, highway medians, and athletic fields. It is also used for fire and dust control. In all applications, reusing wastewater frees up potable water to be used in the way it was intended: for drinking, household, commercial and other uses.

GREASE AND OIL? NO PROBLEM!

Colloidal grease and oils build up in any filter system. Traditionally, operators have combated this build-up problem with a 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.



The Hydro-Clear® filter was designed specifically for filtering wastewater treatment plant effluents

HYDRO-CLEAR® FILTER APPLICATIONS

Tertiary Treatment

- Suspended solids
- Turbidity
- Phosphorus

Wastewater Reclamation, Reuse

- Irrigation
- Groundwater recharge
- Cooling tower makeup

Stormwater Filtration Combined Sewer Overflow (CSO) Primary Effluent Filtration (PEF) Algae Removal

Commercial and Institutional Treatment

- Residential developments
- School and military institutions
- Hotel/restaurant complexes
- Hospital sanitary wastewater
- Resorts and parks



The Chem-Clean® system restores the sand to its original condition.



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