

# DynaSand<sup>®</sup> EcoWash<sup>®</sup>

## Hybrid Filtration

- Utilizes the Benefits of Continuous and Traditional Filters without any of the Drawbacks
- Operates Based on Solids Instead of Hydraulics Like Continuous Filters
- Doesn't Require Ancillary Equipment or Redundancy Like Traditional Filters

# Features

## Sand Movement Verification System

- No sand movement alarm
- Remote monitoring

## Reject Water Reduction Process Control

- Automatic reject control valve
- Programmed differential pressure control
- Programmed time control

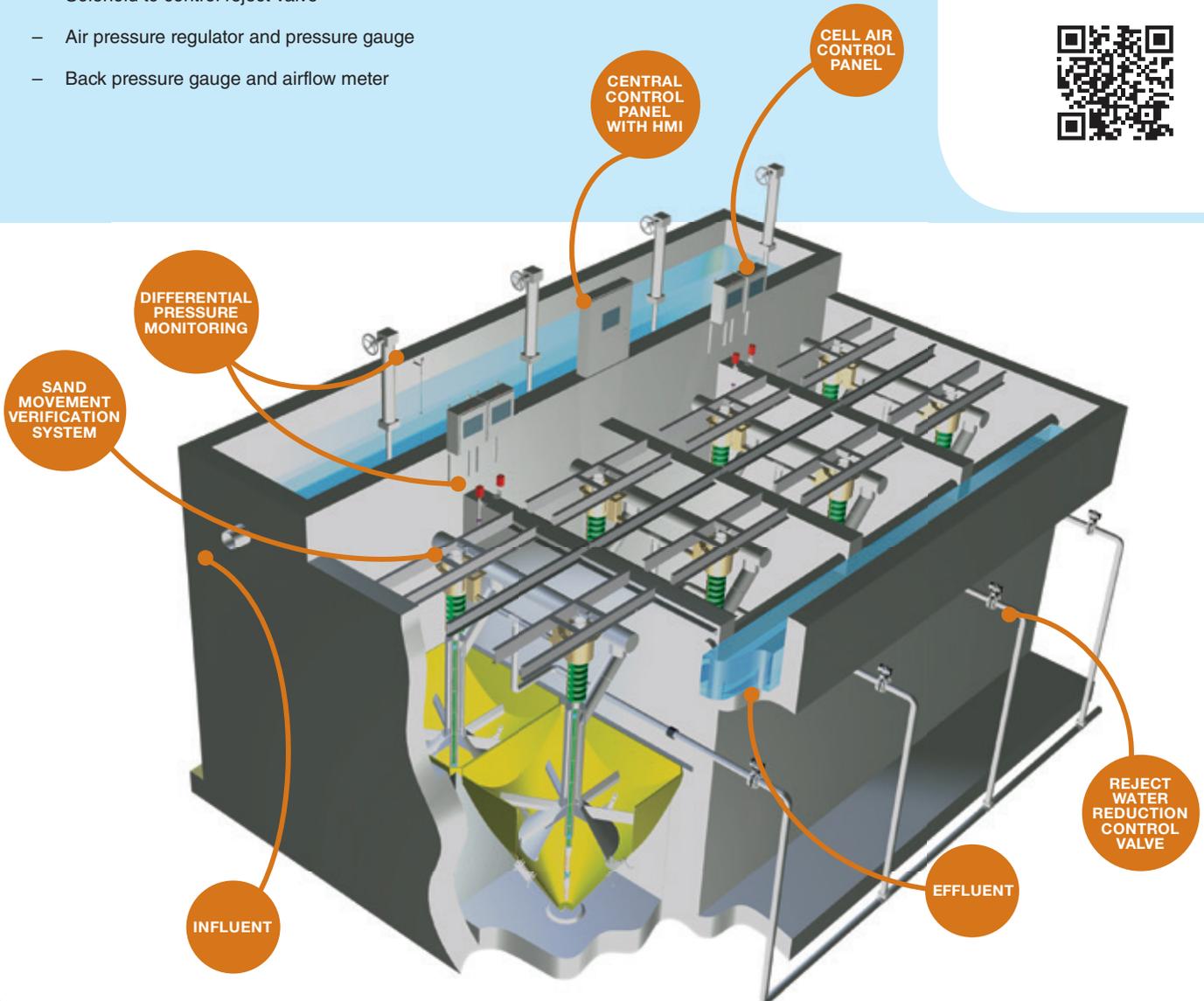
## Cell Air Control Panel

- Solenoids to control dual airburst, and normal airlift operation
- Solenoid to control reject valve
- Air pressure regulator and pressure gauge
- Back pressure gauge and airflow meter

## Central Control Panel

- PLC based electrical control panel equipped with a touch screen HMI
- Ethernet communication with plant SCADA system
- Ethernet TCP/IP to communicate with other plant PLCs over the network
- HMI equipped with data logger and remote monitoring capability

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**Depth filtration** is widely used throughout the wastewater industry for final water polishing, water reuse, phosphorus removal, enhanced nutrient removal (ENR), TSS reduction, color removal and much more. Depth filters are best utilized when there is a need to capture a mass of solids (as opposed to the need for an absolute barrier such as surface filtration) or when the bed itself is utilized as a treatment system, such as in microflocculation or when used as a media for biological treatment such as ENR.

When utilizing depth filtration for any of the above stated systems, the two major technologies utilized are traditional gravity filters and continuous backwash filters. When comparing gravity filters to continuous backwash filters there has always been give-and-take with either technology.

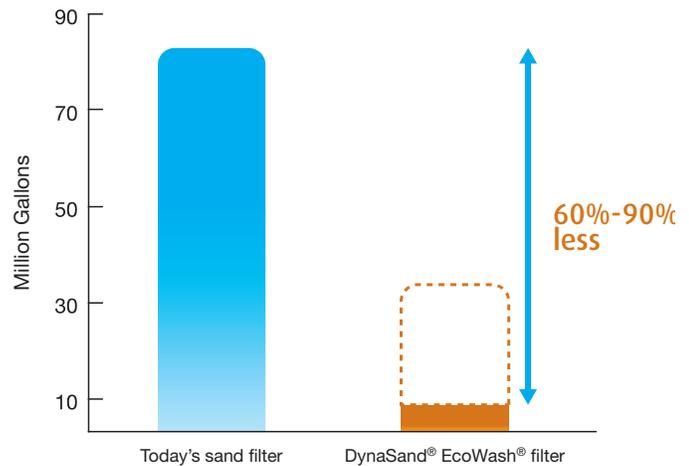
The basic difference at the core of these two filters is that traditional gravity filters operate based upon solids, whereas continuous filters run based upon hydraulics.

**Gravity filters** use a static filtration bed in which the waste stream is passed through to remove contaminants. As solids build up, the filtration performance increases until a point of diminishing returns (when the pressure loss becomes too great) and the filter is shut down and backwashed.

**Continuous backwash filters** pass water through a media bed in the same manor, however while the sand filter is in operation, dirty sand from the bottom of the filters is passed to the top through an air lift (so named because it uses air to displace and lift the sand) to the top of the filter and is then passed counter current to a side stream of the clean water. The velocity of this side stream is regulated through design so that it will be fast enough to carry away the solids on the sand to a reject stream, but slow enough that the sand will be able to fall past it and back on to the top of the filter. The very large benefit of this is that the filters do not have to be taken off line at any time. Therefore, there is no need for redundancy, which eliminates the need for additional filters.

Also, the process is driven completely hydraulically except for the air supplied to lift the sand. There is no need for pumping, valves, etc. Because a side stream of the clean water is used to clean the sand, there is no need for backwash tanks, pumps or valves.

## Annual reject water production



16 filters (50 SqFt), 5.76 MGD facility,  
typical reject 10 gpm/filter

Although this design reduces the capital cost and required footprint, it is not without its negatives. Sand cleaning occurs at the same rate whether the bed needs it or not. In a gravity filter, the bed is allowed to fill with solids, resulting in higher performance, before cleaning.



The frequency of cleaning is therefore only dictated by hydraulics. Second, the side stream of cleaning water for continuous backwash filters is driven purely by the difference in height of the weir in which it leaves the system (reject weir) vs the effluent weir.

The same volume of water will be used to clean the sand regardless of how much water is fed to the filters. Because of this, plants with variable flow are not well suited to continuous backwash filters.

The patented **DynaSand® EcoWash® Hybrid Filter** utilizes a continuous filter, but instead of operating it based upon hydraulics, it is instead operated like a traditional filter, which is based upon solids. This system takes the pros of both systems (gravity and continuous) and combines them into one filter. So the better performance and the ability to be run in variable flows, and solids loading efficiently, remain. The solids dictate when the backwash occurs; therefore variations in flow are no longer an issue.

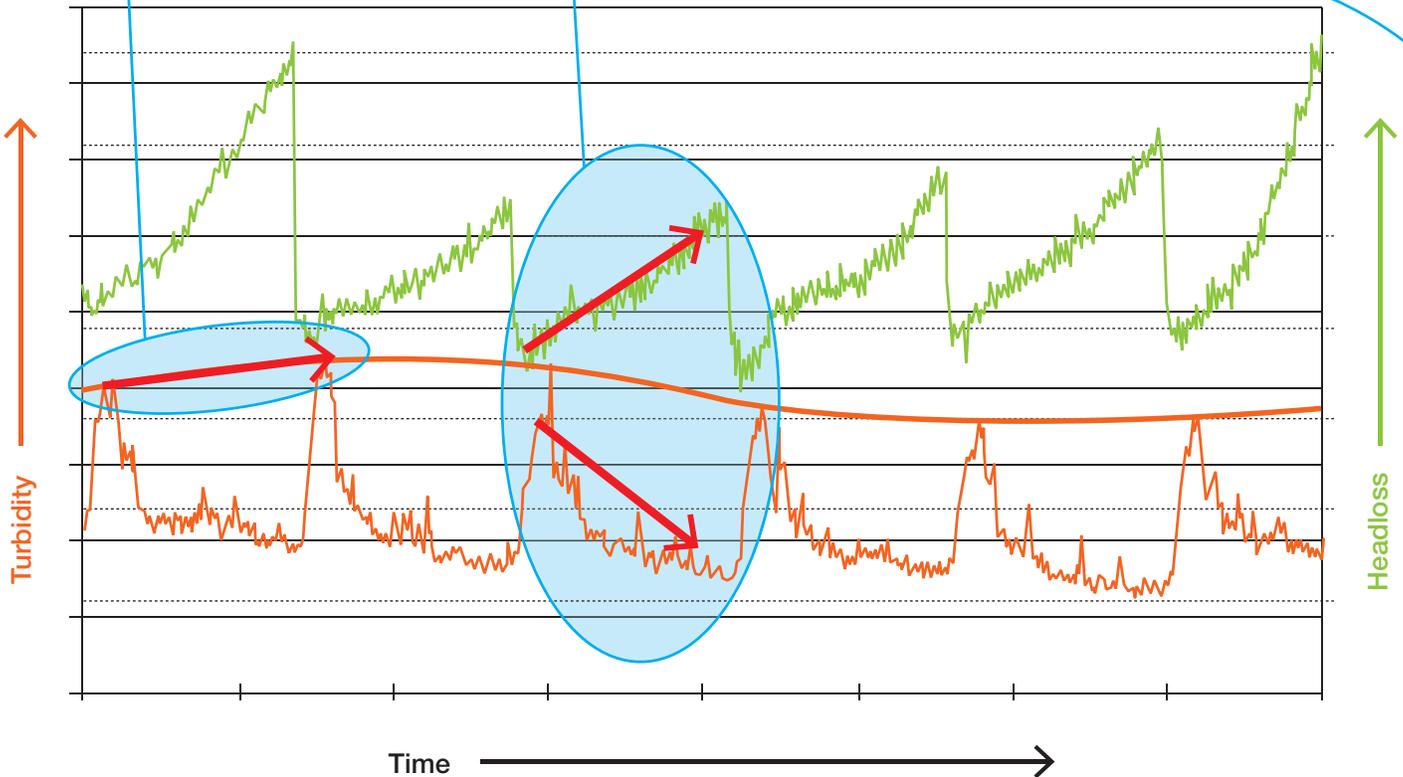
The result of this hybrid system is greatly reduced backwash and energy usage vs continuous filters along with improved performance.



Continuous Filters Clean Sand Blindly Maintaining a Static Level of Water Quality By Not Allowing Solids to Build Up in the Bed and Aid in Filtration.

When the Bed is Allowed to Remain Static, Such as in Traditional Filters, the Accumulation of Solids Allow for Increased Water Quality. However, Headloss Also Increases and in Traditional Filters, the Cells Must Be Taken Offline to Clean, Causing a Large Redundancy Requirement.

**Dynasand Ecowash** is a patented system that is a **Hybrid** of These Two Technologies that Allows for the Increased Benefits of a Static Sand Bed, but Doesn't Require the Extra Redundancy, Cost, Equipment, Maintenance or Space of Traditional Filters.



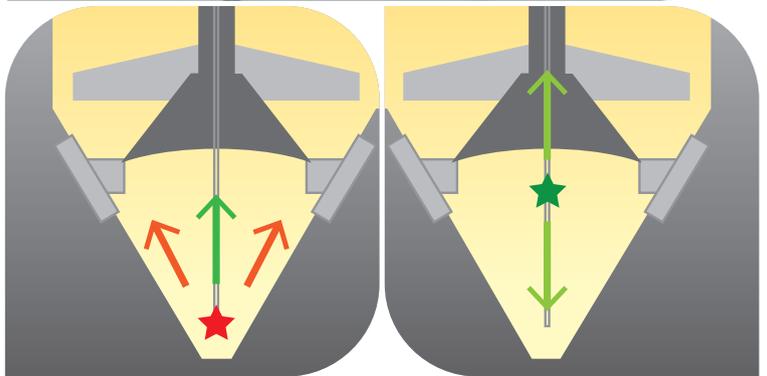


## Overcoming Obstacles

Two of the biggest obstacles that have precluded this breakthrough technology in the 30+ years since the continuous filter was introduced to the market have been the need to continuously monitor filter status, and the need to reduce turbidity spikes upon filter start up. The innovative ways in which Parkson has overcome these long standing barriers to successful intermittent operation of a continuous filter have resulted in award of a patent on the technology.

## Instantaneous Status Monitoring

By monitoring the hydraulic profile within the filter, the EcoWash System can instantaneously verify proper sand movement, valve positioning, sand cleaning and air and water movement simply, effectively and economically.

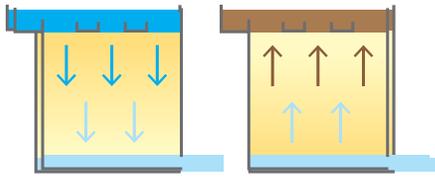


Sand movement verification system

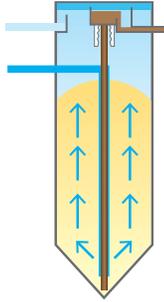
## Dual Airlift for "Soft Start"

When sand cleaning is initiated, the air introduction into the airlift can cause release of solids from the bed. EcoWash utilizes a dual air burst to act as a "soft start." By initiating the first air introduction higher in the airlift, the energy is dissipated within the airlift without effecting the sand bed.

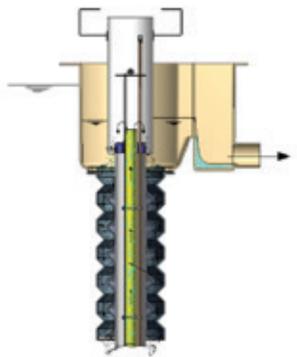




**Traditional filters** backwash based upon solids, which can be better for performance, but require redundant filters and ancillary equipment.



**Continuous filters** backwash based on hydraulics, which may sacrifice some performance, but doesn't require additional redundancy or ancillary equipment.



**EcoWash is Hybrid of these two.** EcoWash uses a continuous filter, but operates it based on solids like a traditional filter, giving the best of both worlds.



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