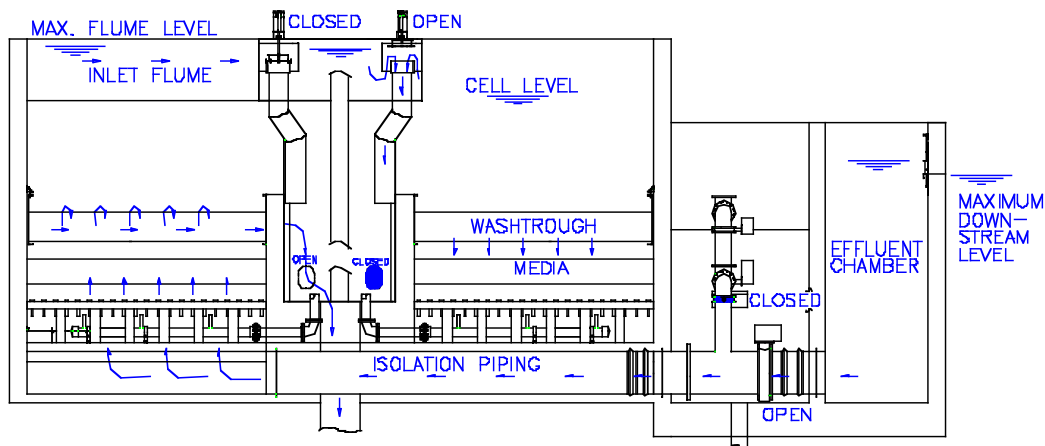




# CenTROL<sup>®</sup> LP Conventional Gravity Filters

Water Technologies

**SIEMENS**



CentROL® LP Filter Design

# CentROL® LP: A flexible process with advantages

## Gravity Filtration Redefined

The heart of the CentROL® LP gravity filter lies in the prefabricated distributor column that eliminates onsite assembly of a piping gallery. Other advantages include:

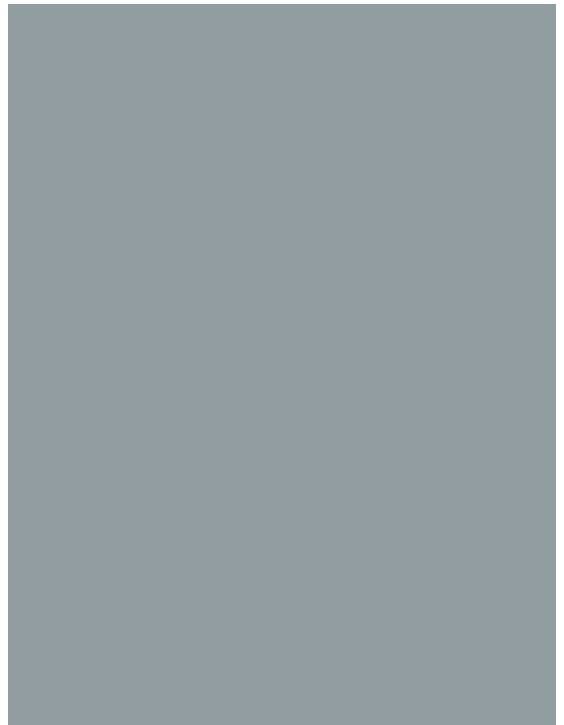
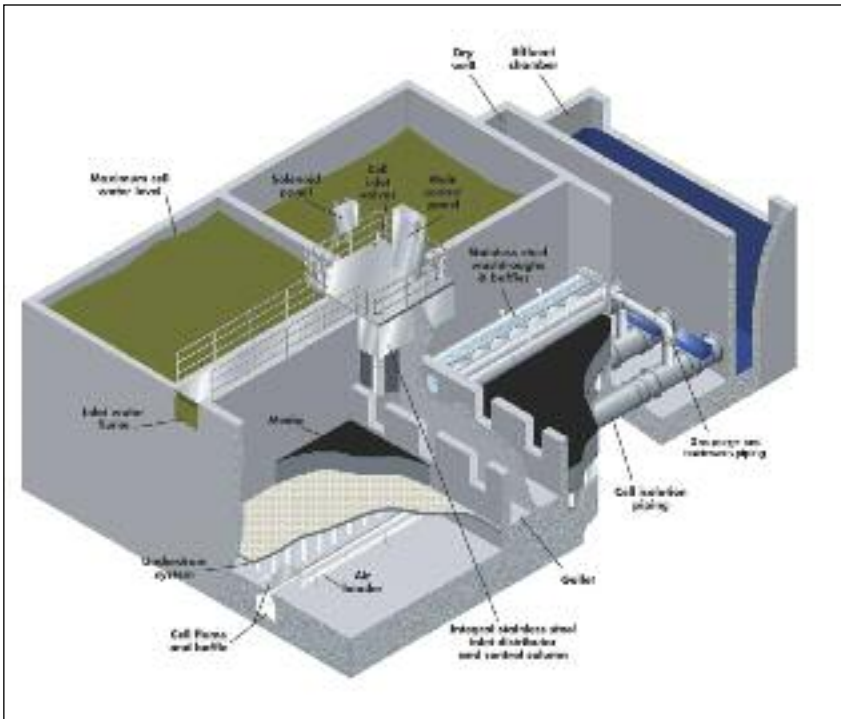
- Compact filter arrangement – maximum filter area in a smaller building space
- Versatile to fit any water or wastewater filtration application
- Filter pipe galleries and backwash supply valves are eliminated
- Mechanical/Electrical rate-of-flow controllers are eliminated
- Hydraulic flow control eliminates flow surges
- CentROL® LP furnishes its own backwash water supply from in-service cells. In most cases, backwash supply pumps are eliminated.
- Lower long term operating costs due to reduction of pumping and maintenance costs
- Convenient central control. All filter cells can be observed from the operating platform
- Multiwash® backwash for cleaner media
- Lower headloss than other splitting cluster filters

## Flexible Plant Design

CentROL® LP filters may be applied wherever a cost-effective, space-saving conventional gravity filter is desired. Customary design criteria such as filter and backwash rates, media type, size and depth, underdrain type and other common design practices are used to provide the best solution.

## Capacity

The CentROL® LP can be applied for flow rates of one to hundreds of MGD (concrete design). Multiple CentROLS are used for high capacities. A single distributor column normally serves four cells. The distributor column is designed to handle the required backwash rate.



Filter Cycle: Elevation View

## CentROL® LP: Flexibility plus cost effective gravity filtration.

### Effective Flow Control

Pretreated water flows into the distributor column and is divided among the filter cells. The water then flows into each filter cell, is filtered, and collected beneath the underdrain.

When any cell is removed from operation, by closing the inlet valve, the flow is equally split among the remaining in-service cells. The loss of head (filtering head) is observed by noting the operating levels in each cell. As the headloss increases, the operating water level rises until it reaches the maximum filtering head. At this point, the cell is backwashed.

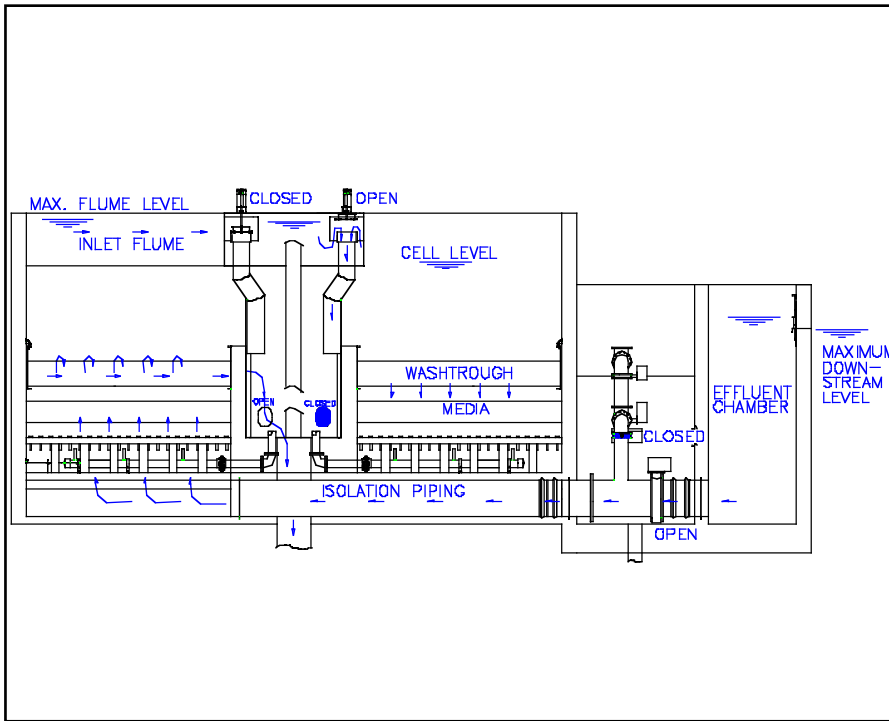
Filtered water is collected in an effluent chamber common to all cells. The filtered water flows over the effluent weir to the clearwell. No rate of flow controllers are required.

### Efficient Filtering

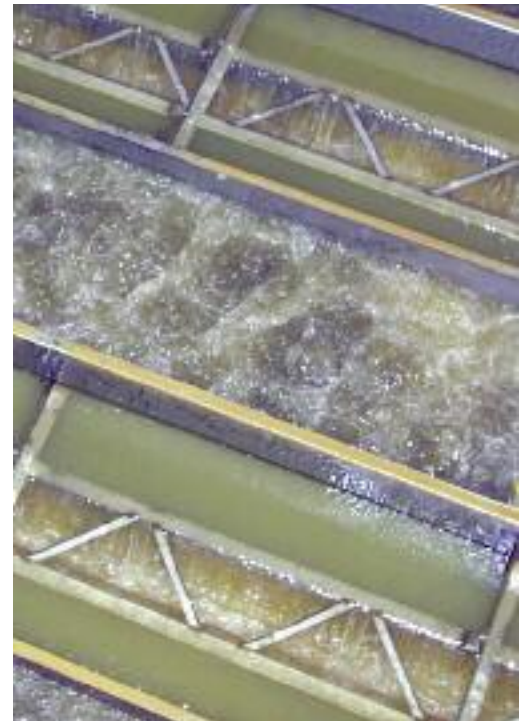
The effluent weir elevation is above the top of the filter media, therefore the filters are always under a positive head. The filtering head is the difference between the effluent weir and the water level in the filter cells. The maximum filtering head available is at the high water level in the filter cells.



8.5 MGD Grand Haven, MI



Backwash Cycle: Elevation View



MULTIWASH® Filtration

## Backwash Without Pumps

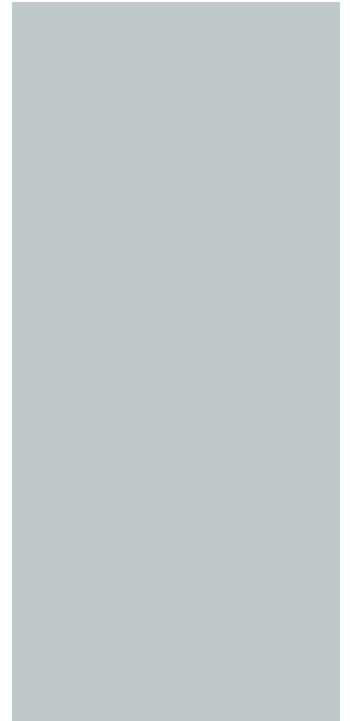
To initiate backwash, the filter cell inlet valve is closed. The cell will continue filtering until the water level lowers to a level just over the effluent weir. At this point, the backwash waste valve is opened and the water remaining over the washtroughs in the cell flows to waste. The difference between the adjustable effluent weir and the top of the washtroughs is the backwash head.

Backwash head required is calculated in the design stage for the selected media type and depth. As the water level in the cell lowers to below the effluent weir, water from the cells in service flows through the cell being backwashed. The backwash flow rate gradually increases until the cell water level has lowered to the washtroughs, at which time it reaches design rate. Any excess water produced by the in-service cells

flows over the effluent weir to the clearwell. Upon completion of the backwash cycle, the backwash waste valve is closed and the inlet valve is opened. Gradually, the cell water level increases and the cell returns to the filter mode once the water level reaches the effluent weir elevation. A Filter-to-Waste cycle may also be included for potable water filters.

## Multiwash Filtration Process Option

MULTIWASH® combined air and water backwash, can easily be incorporated into any CenTROL® design to increase filter cleaning efficiency, and extend filter run lengths. MULTIWASH® is necessary when the filter is to be used for advanced waste treatment or when design conditions put a considerable load on the filter.



## CentROL® DN Filter System

The CentROL® DN filter system clusters four filter cells around a central control column for convenient access to the cells from a common operating platform. With this arrangement, each filter cell shares a common cell wall with at least two other cells. The factory fabricated control column replaces the influent and waste piping of conventional filter systems reducing installed cost.

Water enters the filter through a common flume where methanol is fed prior to water entering the distributor.

Inside the distributor, circular weirs evenly split the flow between all on-line filter cells without the use of modulating flow controllers. The water passes downward through the filter media where nitrates and suspended solids are removed. An open plenum underdrain below the media collects treated effluent and directs it to a common effluent chamber, where effluent nitrate concentration may be monitored. Finally, the water flows over an effluent weir for further treatment or discharge. The effluent weir is positioned to maintain a positive head on the filter cells at all times, and establishes a minimum cell water level.

Selection of the filter media is based on denitrification and suspended solids removal rates required. Standard CentROL® DN filters use anthracite media. In a side-by-side comparison with sand media, anthracite consistently reduced total nitrogen to lower concentrations. During operation nitrogen gas is produced and accumulates in the filter media generating false headloss. A short duration water back flush removes the gas and restores headloss. Cell headloss is continuously monitored for initiation of gas purge and full backwash events.

Unlike many other denitrification filter designs, the waste collection troughs in the CentROL® DN filter are located near the media to reduce the backwash waste volume. Specially designed media retention baffles prevent loss of media during gas removal and backwash sequences.

Existing filters may be retrofitted for denitrification enhancement. Typically, this will require adding a carbon substrate feed system and modifying the control strategy. In addition the washtroughs, filter media and underdrain may require modification. Contact Siemens to obtain further details.



Control Panel

# Filter parts that build benefits

## Customized Controls

Operating controls, including operation of the filter function valves, may be manual, semi-automatic, or fully automatic. In semi-automatic or automatic operation, any cell being backwashed will automatically return to its filtering position in case of power failure. The controls are mounted in a console or panel and are centrally located on the observation platform. The controls are completely assembled and factory tested before shipment. Loss-of-head may be observed from the observation platform as indicated by filter water level. A backwash rate indicator is not required as the rate is limited by the difference in elevation between

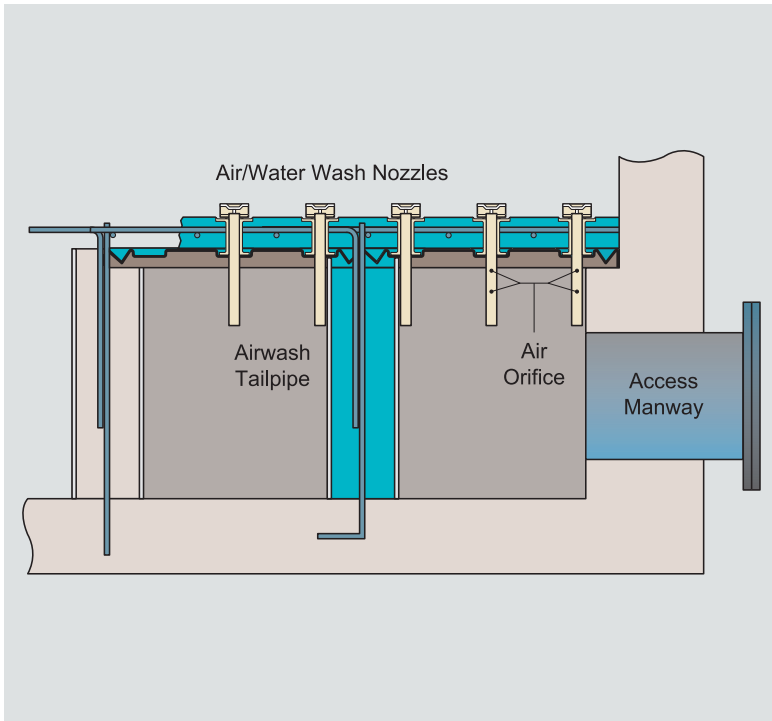
the washtroughs and the effluent control weir. When PLC controls are included, an operator interface is utilized.

## Washtroughs

Engineered Stainless Steel Design (ESSD™) filter washtroughs are standard equipment to further the corrosion resistant design. Siemens has pioneered the use of stainless steel washtroughs by development of innovative designs which make them cost competitive. MULTIWASH® Low-Profile media retaining baffles constructed of stainless steel are positive prevention against media loss during sustained, simultaneous air and water backwash.

## Isolation Valves

Filtered water is collected from each cell underdrain by independent isolation pipes which discharge into the effluent weir chamber. Remote or manually operated actuators for the isolation valves are provided as required. When filter-to-waste is incorporated, remote operated filter isolation and filter-to-waste valves are used. If filter-to-waste is not utilized, the isolation valves remain open during backwash.



MULTICRETE II with access manway



MULTICRETE II prior to concrete placement.



ESSDs with Low-Profile MULTIWASH baffles

## Plant Construction Costs Eliminated

The prefabricated Distributor Column is completely assembled with backwash waste valves control weirs and filter inlets. The entire Distributor Column is constructed of stainless steel. It is set on the bottom slab and grouted in place by the contractor. These items replace the conventional filter controls and pipe gallery, and substantial savings are realized in both material and installation costs. In some cases, this means up to 20 percent less installed costs and required space.

*To help you finalize your equipment or plant design, we offer several pilot plants equipped with the MULTIWASH® Filtration Process. Pilot plants come with either fully automatic or manual controls and with single or multiple cells. They are suitable for installation at most locations.*

*The self-contained pilot units are ideal to verify process design, to evaluate full-scale operation or to estimate ancillary equipment requirements.*

## Other Water Treatment Products

If it's in the water, our engineered processes and equipment can take it out, economically and dependably. Our comprehensive line includes solutions to simple and complex water treatment and conditioning needs, all backed by working installations and years of experience. Our line includes:

- Floc-clarifiers
- CONTRAFLO® solids contact clarifiers
- SPIRACONE® sludge blanket clarifiers
- Sludge Sucker™ sludge removal system
- Sludge thickeners
- Vertical and horizontal pressure filters
- Aerators
- AERALATER® packaged treatment
- Control consoles
- Trident® packaged surface water treatment
- MULTIWASH® Filtration Process
- Gravity filtration equipment
- MULTICRETE II™ monolithic underdrain system
- Surface washers
- ESSD™ filter washtroughs and launder systems

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