HUBER TECHNOLOGY
WASTE WATER Solutions

CONTIFLOW® Sandfilter CFSF
Continuous Upflow Volume Filter

Rapid sand filter for large flow applications
Experience with more than 5000 installations worldwide

- Several systems options available
- Low operating costs
- Minimum maintenance

The Situation

➤ Shallow recipient ➤ Polluted bathing water ➤ Surface water with a high organic load ➤ High effluent charge	A high nutrient and germ concentration in the effluent of the wastewater treatment plant demands a process method that is able to meet maximum requirements.
High process water demand	The development of additional sources (groundwater / surface water) or internal water conditioning demand additional processes which are able to meet the high requirements.
High iron and/or manganese concentration in drinking water	A high concentration of iron, manganese and arsenic impairs the drinking water quality.
Algae in surface water	Algae impair drinking water recovery and endanger surface water (eutrophication).
Standing water with a high concentration of particular material and germs	Water quality is very important for fish culture for example.
Water recovery for agricultural use	Water recovery for agricultural use is the focus of attention in areas with limited water resources.
Drinking water recovery from rivers	Plankton density varies seasonally. The concentration of finest disperse colloidal material changes rapidly and the water temperature is low after precipitation.
Increased effluent quality through nutrient elimination	Phosphorus elimination and precipitation by means of anorganic flocculants Nitrogen elimination through biological activity in the sand bed.

The Solution

The CONTIFLOW® Sandfilter with sand bed heights between 1 and 2 meter fulfils the high requirements on effluent quality. In combination with a physical-chemical treatment stage (precipitation/flocculation) also dissolved material (e.g. orthophosphate) is carried over into the solid phase and separated in the filter. Colloidal material is agglomerated to filterable material is flocculated to filterable material.

The rough surface of the grit paricles allows the growth of biomass. The nutrients contained in the inflow, such as nitrogen, are eliminated through biological degradation.

Iron/manganese can be carried over into the solid phase in preceding treatment stages and separated by filtration. Elimination of nitrogen and degradation of organic substances is achieved by means of the biologically intensified filtration.

Measurements have shown that the CFSF significantly reduces the number of germs. In case of increased disinfection requirements, installation of a subsequent disinfection unit is possible due to the low concentration of solids in the filtrate.

Functional Description

Feed is introduced at the top of the filter and flows downward through an opening between the feed pipe and airlift housing. As the influent flows up-ward through the moving sand bed, the solids are retained in the filter sand. The filtrate exits over a weir at the top of the filter. The sand and the filterable solids are transported through the airlift into the washer in the upper filter section where the solids are separated from the sand. As the sand falls through the washer, a small amount of filtered water passes upward, washing away the dirt, while allowing the heavier, coarser sand to fall through the bed. The wash water, which consists in a certain amount of filtrate water and separated solids, exits near the top of the filter and is returned to the wastewater treatment plant.

The system is available as a steel tank design or concrete basin design for large flow applications. The concrete basin design consists of several modules. Their number can be tailored individually to particular flow and process requirements – up to 10 modules.

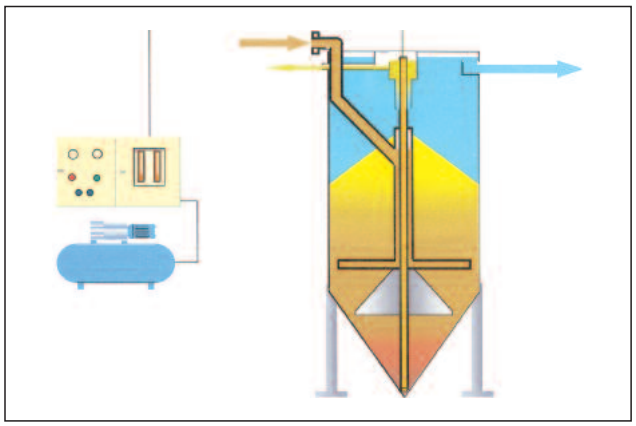
The Sandfilter is also used as a reactor for nutrient reduction.

- Chemical phosphorus elimination through precipitation. Precipitants and flocculants, such as iron or aluminium salts, can be dosed directly into the filter inflow. Due to the reduced precipitant consumption the economic efficiency of chemical phosphorus elimination in the Sandfilter is higher than the economic efficiency of conventional simultaneous precipitation.
- Biological reduction of the nitrogen load through development of a biofilm on the surface of the sand grains. The anoxic conditions in the filter allow the denitrifying biomass to grow and ensure thus conversion of the nitrates into gaseous nitrogen.

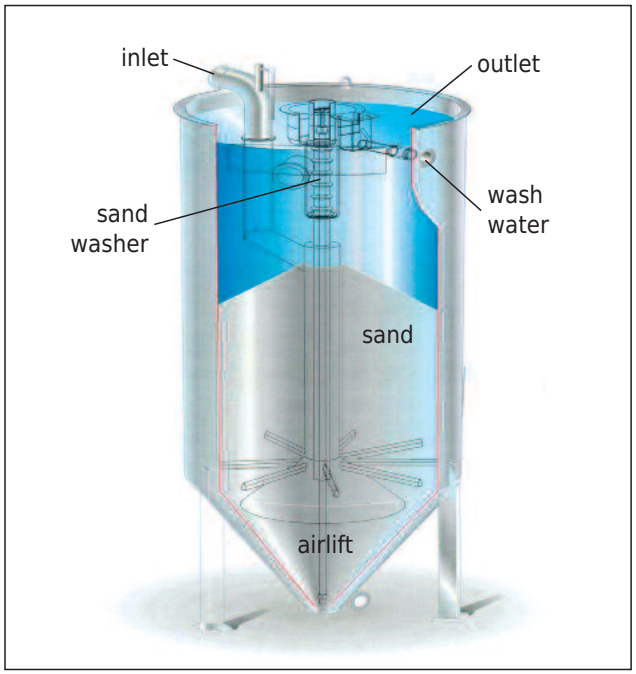
The modular tank design and large scale concrete basin design allow for treatment of any flow rate.

Applications

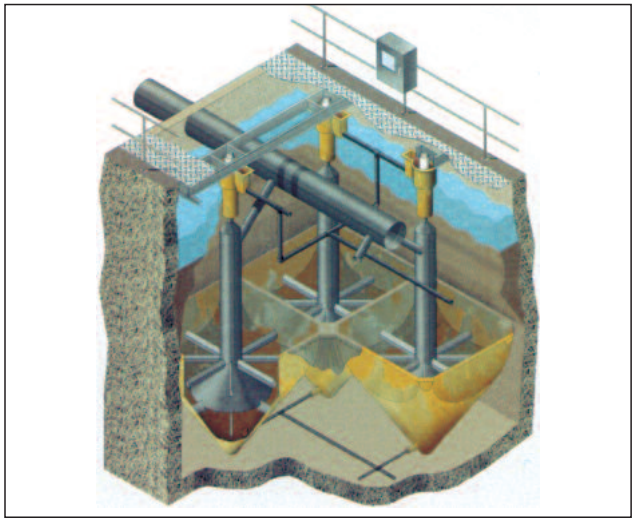
- Advanced wastewater treatment and removal of turbidities
- Process water treatment
- Product recovery
- Algae filtration
- Industrial wastewater
- Chemical processing
- Denitrification
- Phosphorus precipitation



Process diagram of a CONTIFLOW® Sandfilter CFSF



CONTIFLOW® Sandfilter CFSF stainless steel tank version



Concrete basin design with GRP or stainless steel cones

The simple design of the CONTIFLOW® Sandfilter offers significant advantages over conventional filter systems:

Advantages	The customer's benefits
Simple and easy-to-maintain system	High system availability Low maintenance requirement
Continuous or optionally discontinuous sand washing process with continuous filtration	Increased separation performance to meet high filtrate quality requirements
Wearing parts reduced to one	Long life Reliable operation
No shutdowns for backwash cycles	No shutdowns for backwash cycles No filter surface reduction
Constant filtrate quality	High operational reliability
Simple wash water treatment	No need for wash water tanks and pumps for backwashing
Minimum pressure drop	Gravity feed without pumps

Standard Features for Packaged Units

- Stainless steel tank
- All stainless steel or wastewater resistant plastic internals
- Optionally with compressors
- Air-control panel
- Standard or double bed filtration

CONTIFLOW® Sandfilter reference installations

- WWTP Wolfratshausen, 24 filters, 2003
- WWTP Rincon de Leon (Spain), 50 filters, 2010
- Kuwait National Peterol Company, 44 filters, 2009
- WWTP Alcantarilla (Spain), 14 filters, 2009
- Another 5,000 installations worldwide

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