

HYDAC **INTERNATIONAL**

**Filtration Solutions
for Water Production.**



Your partner for expertise in pre-filtration solutions in the production of drinking and process water.

Filtration seen as a sustainable resource.

The global demand for water is rising steadily and is already exceeding the resources currently available. Insufficient water treatment prevents millions of people from having access to adequately treated drinking water.

Industry, too, is in many cases reliant on clean process and service water. Industrial water treatment systems are used to produce clean drinking and process water from untreated water from a variety of sources. This protects natural resources in a sustainable way.

The challenge of water purification.

The aim of water purification is to produce drinking water or clean service water and process water for industry and business. The untreated water is taken from the sea or from groundwater wells, but can also come from surface water such as lakes and rivers. In times of increasingly scarce water resources, the recycling of industrial and sewage water becomes even more significant.

Industrial water treatment is a multi-stage process consisting of pre-treatment as well as main and after-treatment. As with other process engineering systems, the economic efficiency of the entire process is also a key consideration. Cost reductions for water treatment are achieved primarily by employing well-engineered pre-treatment methods since these have a profound impact on the generally more expensive processes further downstream.

Poor pre-filtration can prove expensive.

The pre-treatment of untreated water is usually the most important step in the multi-stage water treatment process, since it impacts crucially on the operating efficiency of the main treatment and after-treatment processes further downstream. Inadequate retention of solid particles (organic/inorganic) in solution or in suspension during pre-treatment (= pre-filtration) results in:

- Reduced service times of fine filters and membranes downstream
- Increased maintenance costs as a result of shorter service intervals
- Increased energy consumption
- Reduced process reliability
- Increased operating costs
- Dangerous drop in quality

Expert pre-filtration prevents subsequent expense.

Using HYDAC filtration solutions in the pre-treatment of water treatment systems ensures:

- Improved service lives of fine filters and membranes downstream
- Lower maintenance costs as a result of longer service intervals
- Lower energy consumption
- Increased process reliability
- Reduced operating costs
- Guaranteed quality



Economic efficiency through sustainable use of water resources.



The earth's water resources.

Our "blue planet" will continue to justify its name only as long as the resources of its "life-giving water" do not run dry.

Thanks to modern technologies, including those from HYDAC Process Technology, the wide variety of water resources can be used for water purification, from natural groundwater to recycled service water.

The earth's surface is made up of two thirds water, but just a vanishingly small fraction can be used as natural pure water. In comparison to the huge salt water resource accounting for approx. 97%, the approx. 3% freshwater is just a tiny proportion. Therefore where drinking water, service water and process water are concerned, sustainability is essential.



Salt water and freshwater

Only approx. 3% of the world's water is freshwater. If you deduct the frozen water at the polar ice caps, just a tiny fraction remains.

Groundwater

Of the approx. 1% of the world's water found in liquid form only a small proportion is visible on the earth's surface; the majority is found deep in the earth in the form of groundwater.



Surface water

The freshwater visible on the surface accounts for just 0.3% – a mere drop of water, by comparison.

Surface water from lakes

Approx. 85% of the surface water is made up of natural and man-made lakes which can be used as water resources.

Surface water from rivers

Rivers account for approx. 2% of surface water which is a very small proportion and yet they are important for use as cooling and process water in industry and the energy sector.



Marshland and brackish water

Marshland and brackish water account for an amazing 13% of surface water.

Seawater

Where groundwater is located too deeply, but where the sea is more accessible, people rely on seawater desalination to provide service water and drinking water.

Industrial water

The recycling of waste water through the use of innovative filtration processes not only reduces cleaning time but also protects natural resources. HYDAC filtration solutions will help in this.



HYDAC Filtration Solutions: From coarse to fine filtration, ensuring high performance in your process chain.

Pre-filtration: A guarantee of process reliability.

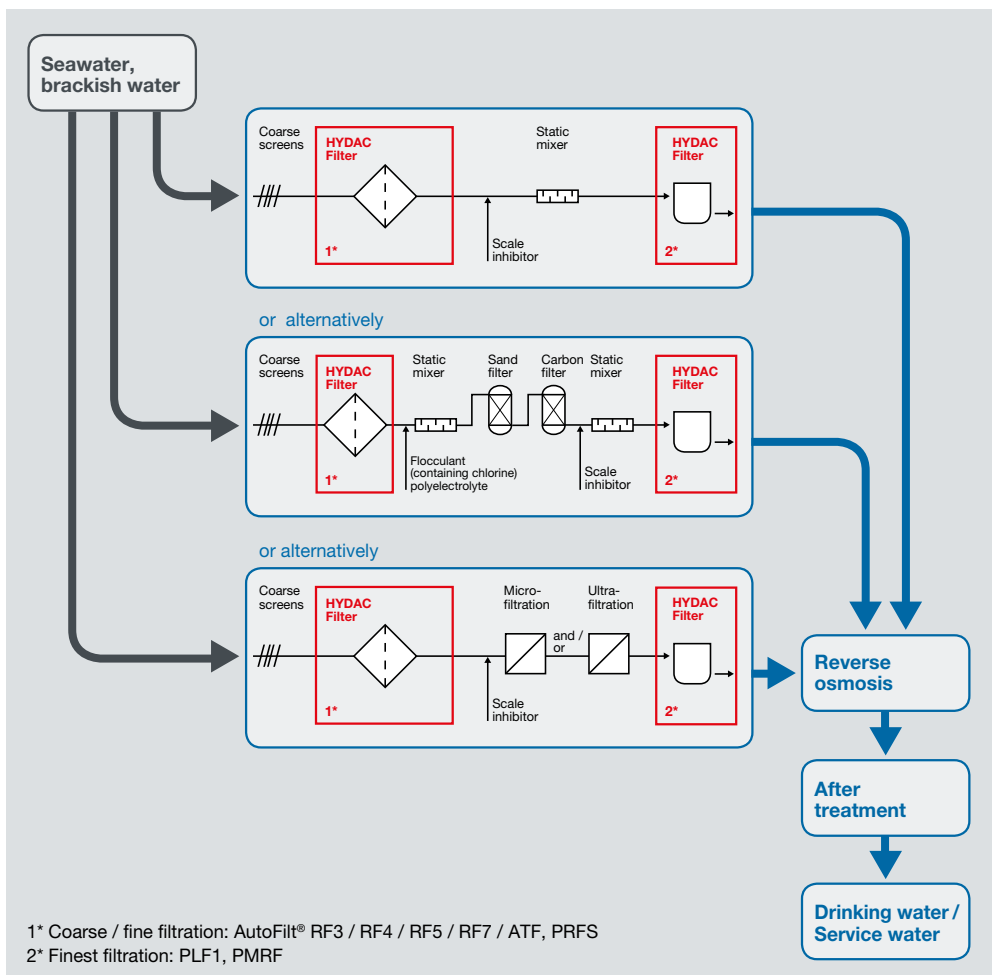


The pre-treatment is sometimes a complex process which can itself comprise several treatment stages. In order to prevent large particles from reaching the system, as a first stage, screens, strainers or coarse filters with a filtration rating of between 1 to 5 mm are generally used. In the next stage, the untreated water is treated to achieve the required feed water quality for the processes for main treatment / after treatment. Typical methods here are: coagulation, flocculation, candle filters, sand filters and activated carbon filters.

Water treatment methods used in main or after treatment frequently include:

- **Membrane filtration**
- **Chemical disinfection through the use of oxidising agents (e.g. ozonation)**
- **Physical disinfection through the use of UV systems**

Examples of pre-filtration before membrane systems.





Product range.

HYDAC process filters will protect process function, increase the life expectancy and service life of components and systems and improve the quality of the medium being filtered.

The advantage to you is reduced maintenance and production costs whilst at the same time minimising the environmental impact. As a customer, you will benefit from our many years' experience, our extensive industry expertise, the quality of our products and services as well as efficient project management which is tailored to your needs.

1 Coarse filtration

TwistFlow Strainer AutoFilt® ATF

Coarse separation by centrifugal force - with guaranteed filtration ratings

Back-flushing Filter

AutoFilt® RF3 / RF4 / RF5 / RF7

Automated coarse filtration using proven technology

Process Screen Basket Filter PRFS

Strainer filter, easy to operate

2 Fine filtration

Back-flushing Filter AutoFilt® RF3

For many years this has been the reliable solution in respect of automatic filters

Back-flushing Filter AutoFilt® RF4

Tried-and-tested function principle, compact design

Backflushing Filter AutoFilt® RF7

The automatic filtration solution for low installation height

3 Finest filtration

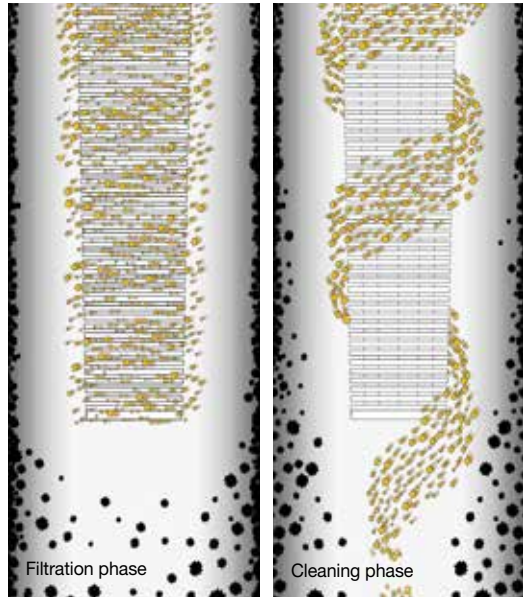
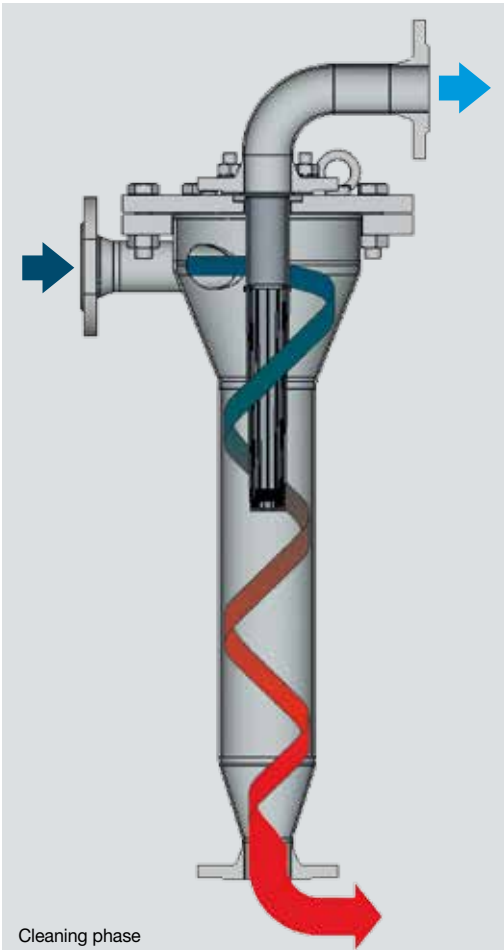
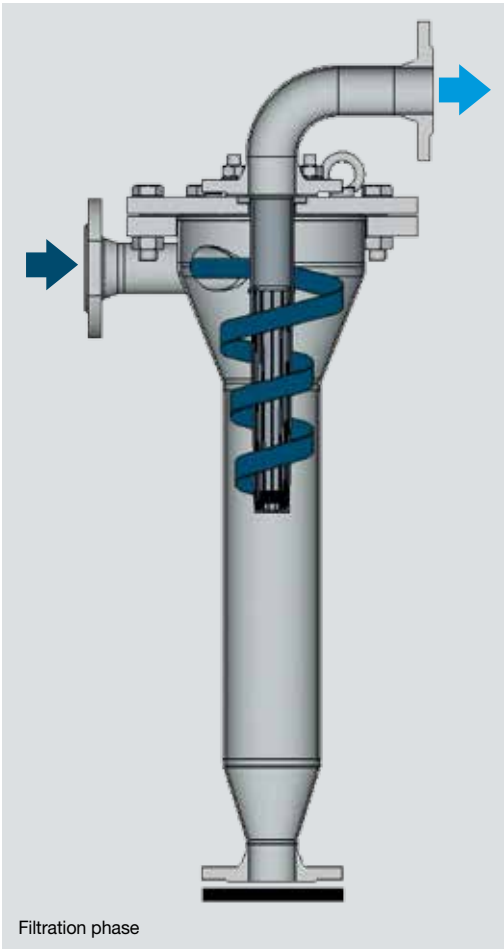
Process Inline Filter PLF1

High contamination retention capacity with high flow rates

Process MultiRheo Filter PMRF

Proven candle filter technology for finest filtration

Coarse filtration > 200 µm.



TwistFlow Strainer AutoFilt® ATF

**Coarse separation by centrifugal force –
with guaranteed filtration ratings**

Features

- Suitable for wide variability in the quality of untreated water
- Copes easily with high contamination loads
- Degree of separation associated with a centrifuge combined with defined filtration ratings
- No transfer of contamination to the clean side
- Flow rates up to 400 m³/h

Function

Special 2-stage function:

1st stage

High contamination loads are tackled by the cyclone-like flow and it is this that achieves the filtration performance and efficiency of a centrifugal separator.

2nd stage

The conical filter element guarantees the filtration rating and prevents transfer of contamination to the clean side – irrespective of fluctuations in the operating conditions.

Advantages

- Conical filter element prevents transfer of contamination to the clean side
- Consistent filtrate quality
- Continuous filtration – constant self-cleaning
- Minimal pressure drop
- No turning parts – easy to service and low maintenance
- Cleaning achieved by cross-flow with unfiltrate – no additional medium is required
- Ready-to-operate unit
- Available as system solution



Process Screen Basket Filter PRFS

**Strainer filter,
easy to operate**

Features

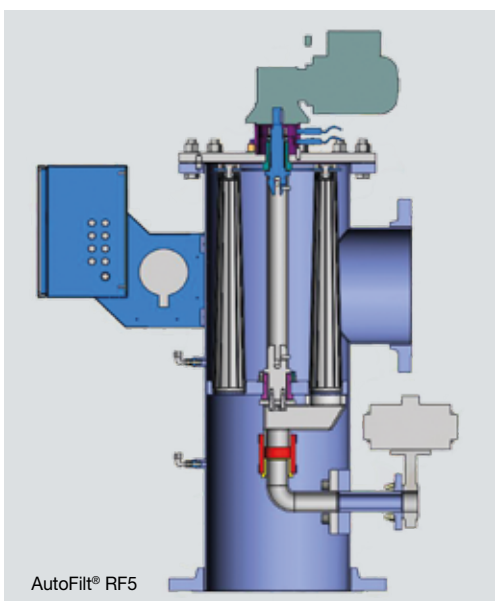
- Used as coarse filter or pre-separator
- Also available as a change-over duplex filter
- Filtration ratings from 25 to 3,000 μm
- Flow rates up to 3,600 m^3/h
- High filtration efficiency
- Simple to operate

Function

Flow through the filter element is from the inside to the outside. The separated particles remain in the stainless steel strainer and can be removed easily and quickly. Once the dirt has been emptied and after a short treatment using the pressure washer, the strainer is ready for use again.

Advantages

- Robust filter materials are ideally suited to long-term operation
- Cleanable filter materials
- Low operating costs
- Simple to operate



Automatic Back-flushing Filter AutoFilt® RF3 / RF4 / RF5 / RF7

**Automated coarse filtration
using proven technology**

Features

- Separation of solid particles from low viscosity fluids
- Filtration ratings from 25 to 3,000 μm
- Flow rates up to 10,000 m^3/h
- Automation brings efficiency
- Performance enhanced by isokinetics
- Safety assured by proven technology and experience

Function

The medium flows through the filter elements from the inside to the outside. Contamination particles then collect on the inside of the filter elements. As the level of contamination increases, the differential pressure between the contaminated and clean side of the filter increases. When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

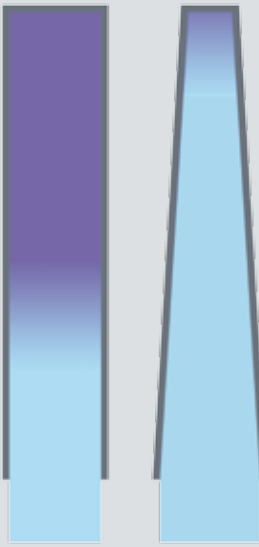
Advantages

- Fully automatic operation
- Ready-to-operate unit
- Maximum utilization of the filter area
- Full filtration performance following back-flushing
- Complete cleaning of the conical filter elements
- Low maintenance requirement
- Low operating costs

Fine filtration 200 – 25 μm .

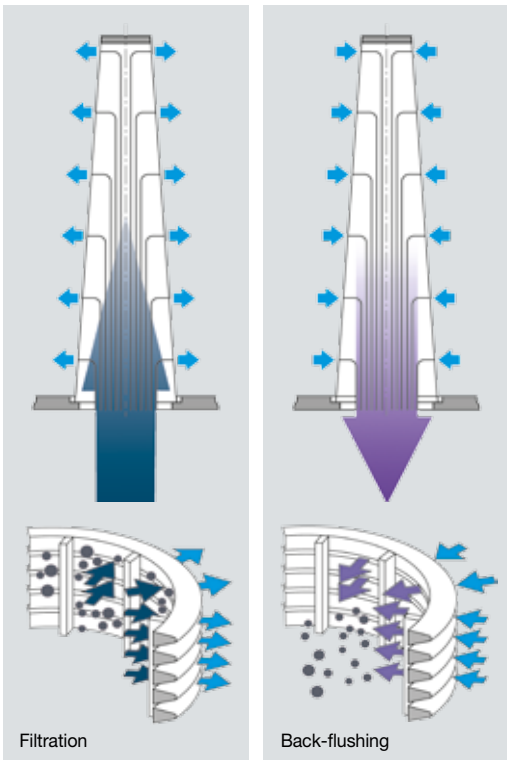
Efficiency of back-flushing

Filter elements: cylindrical vs. conical



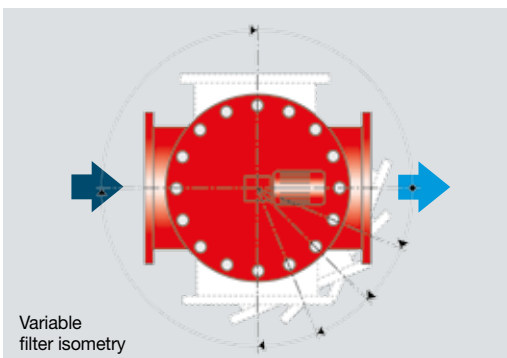
low

high



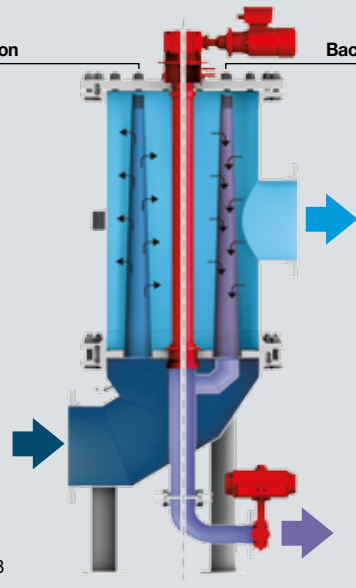
Filtration

Back-flushing



Variable
filter isometry

Filtration Back-flushing



AutoFilt® RF3

Automatic Back-flushing Filter AutoFilt® RF3

**For many years this has been the reliable solution
in respect of automatic filters**

Features

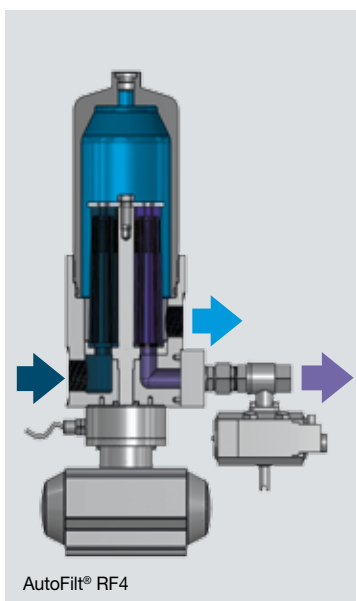
- Separation of solid particles from low viscosity fluids
- Filtration ratings from 25 to 3,000 μm
- Flow rates up to 10,000 m^3/h
- Automation brings efficiency
- Performance enhanced by isokinetics
- Safety assured by proven technology and experience

Function

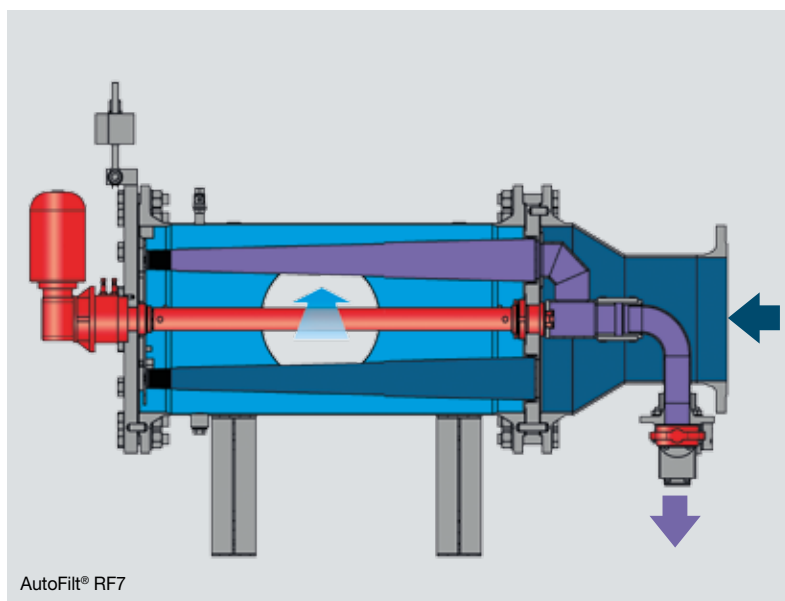
The medium flows through the filter elements from the inside to the outside. Contamination particles then collect on the inside of the filter elements. As the level of contamination increases, the differential pressure between the contaminated and clean side of the filter increases. When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

Advantages

- Fully automatic operation
- Ready-to-operate unit
- Maximum utilization of the filter area
- Full filtration performance following back-flushing
- Complete cleaning of the conical filter elements
- Low maintenance requirement
- Low operating costs
- Already proved its worth many thousands of times



AutoFilt® RF4



AutoFilt® RF7

Automatic Back-flushing Filter AutoFilt® RF4

**Tried-and-tested function principle,
compact design**

Features

- Separation of solid particles from low viscosity fluids
- Filtration ratings from 25 to 3,000 μm
- Flow rates up to 220 l/min
- Particularly resistant stainless steel model
- Automation brings efficiency
- Performance enhanced by isokinetics
- Safety assured by proven technology and experience

Function

The medium flows through the filter elements from the inside to the outside. Contamination particles then collect on the inside of the filter elements. As the level of contamination increases, the differential pressure between the contaminated and clean side of the filter increases. When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

Advantages

- Fully automatic operation
- Ready-to-operate unit
- Maximum utilization of the filter area
- Full filtration performance following back-flushing
- Complete cleaning of the conical filter elements
- Low maintenance requirement
- Low operating costs

Automatic Back-flushing Filter AutoFilt® RF7

**The automatic filtration solution
for low installation height**

Features

- Separation of solid particles from low viscosity fluids
- Filtration ratings from 25 to 3,000 μm
- Flow rates up to 7,500 m^3/h
- Automation brings efficiency
- Performance enhanced by isokinetics
- Safety assured by proven technology and experience

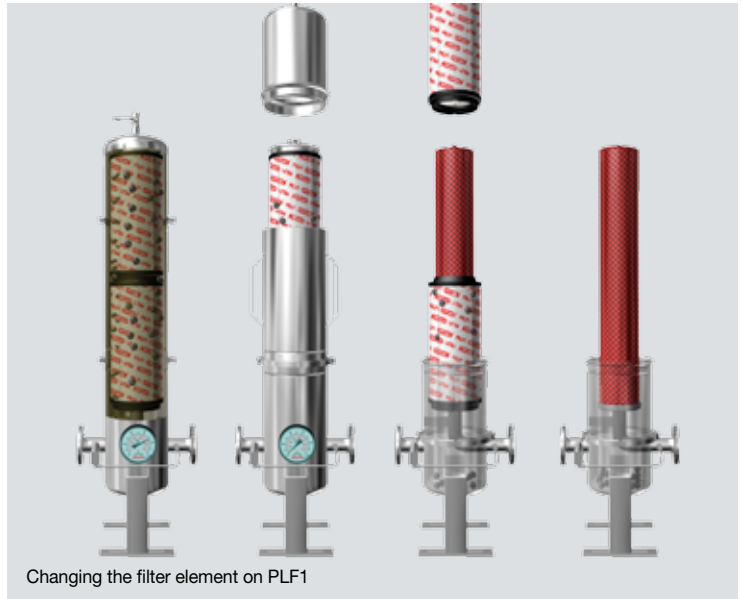
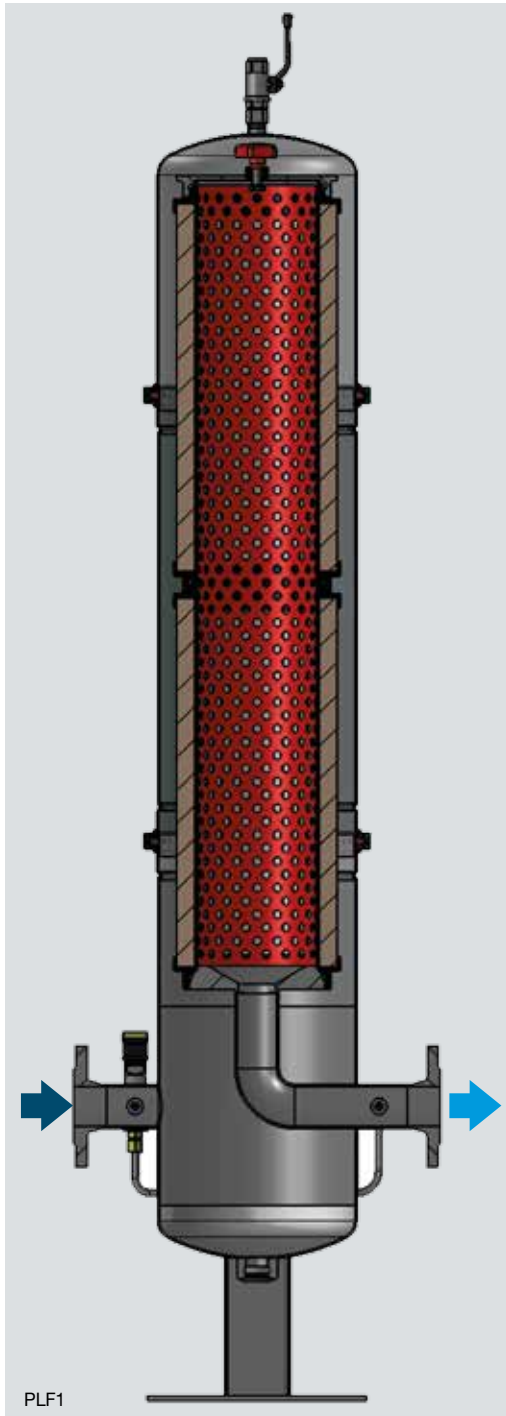
Function

The medium flows through the filter elements from the inside to the outside. Contamination particles then collect on the inside of the filter elements. As the level of contamination increases, the differential pressure between the contaminated and clean side of the filter increases. When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

Advantages

- Horizontal design reduces installation height
- Ideally suited to systems with limited space
- Pivoting lid device supplied as standard, for easy access to the inside of the filter
- Fully automatic operation
- Ready-to-operate unit
- Maximum utilization of the filter area
- Full filtration performance following back-flushing
- Complete cleaning of the conical filter elements
- Low maintenance requirement
- Low operating costs

Finest filtration 25 – 1 µm.



Process Inline Filter PLF1

**High contamination retention capacity
with high flow rates**

Features

- Separation of solid particles from low viscosity fluids
- Suitable for applications with the highest purity requirements
- Very large filter area per element ($> 5 \text{ m}^2$)
- Filtration ratings from 1 to 90 µm
- Flow rates up to $2,500 \text{ m}^3/\text{h}$

Special feature

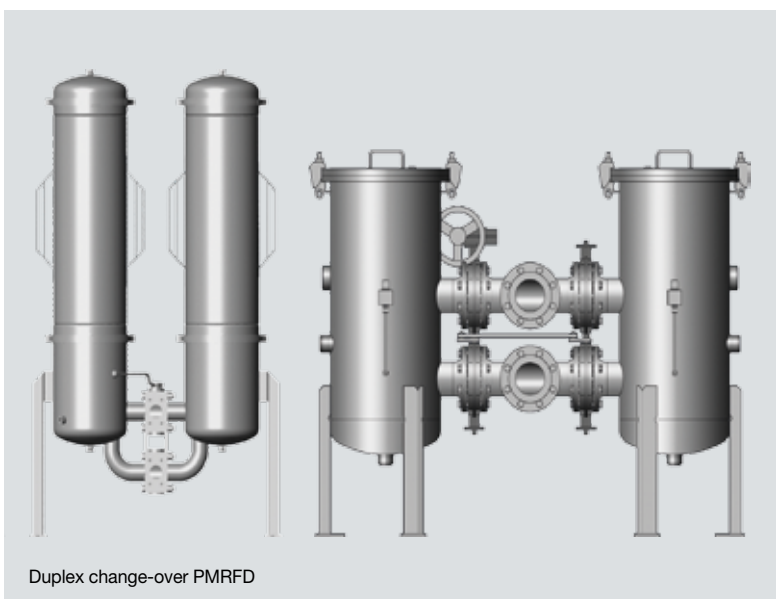
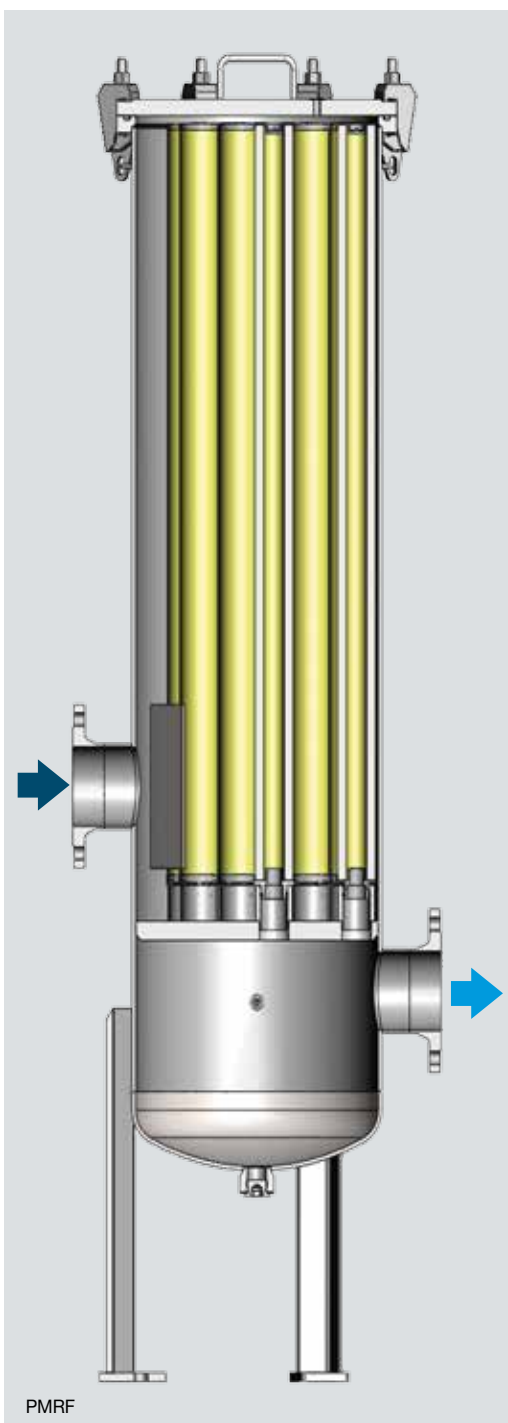
The PLF1 uses the specially developed inline filter elements PELF1. These filter elements have the following features:

- Greatest possible flow rates with lowest possible pressure drop
- Very large pleated filter area
- High contamination retention capacity
- Long service life
- Simplified filter element change

Advantages

- Innovative element geometry with very high contamination capacity
- High separation performance
- Extended changing intervals
- Protection of the clean side during element change thanks to fixed support tube
- Low pressure drops due to large cross-sections and surfaces
- Compact design with high flow rates
- Modular design gives optimal flexibility in catering for every application
- Simple operation
- Elements are fully incinerable – environmentally-friendly disposal





Process MultiRheo Filter PMRF

**Tried-and-tested candle filter technology
for finest filtration**

Features

- Separation of solid particles from low viscosity fluids
- Suitable for applications with the highest purity requirements
- Filtration ratings from 1 to 90 μm
- Flow rates up to 1,200 m^3/h
- Also available as a change-over duplex filter

Special feature

The product range of Flexmicron candle filter elements has the right filter element for every application:

- Flexmicron P (Premium)

Pleated filter elements for applications with the highest purity requirements

- Flexmicron S (Standard)

Spun Spray filter elements for applications where high fluid purity and high material purity is required

- Flexmicron E (Economy)

Spun Spray filter elements for applications where an average fluid purity and material purity is required

Advantages

- Tried-and-tested filter element technology with very high retention capacity
- High separation performance
- Compact housing with high flow rates
- Various filter sizes and filter element qualities ensure optimal flexibility in catering for the individual application
- Elements are fully incinerable – environmentally-friendly disposal



Applications.

Ozonation.

Strong oxidising agents are used to kill (destroy the cell wall) of micro-organisms (bacteria, viruses, seeds). In industrial water purification plants, ozone is used for this. The ozonation process also removes colour, smell and taste from the water. Particle contamination can decrease the disinfection effect of the ozone and lead to a deterioration in product quality.

HYDAC filtration solutions in the pre-filtration of ozonation systems:

The more particles in suspension which are retained by HYDAC filters, the more effectively can the ozone destroy pathogens and clean the water.

HYDAC filtration solutions offer the following advantages:

- **Increased disinfection effect**
- **Savings on ozone required**
- **Increase in efficiency of ozonation plants**

UV Systems.

These systems utilise UV light to inactivate micro-organisms (they prevent bacteria, viruses, seeds etc. from reproducing by destroying their DNA structure).

Particle contaminants affect UV systems in two respects:

- Reduction in penetration rate of the water being disinfected by UV light (transmission)
- "Shadow effect": Larger particles screen the micro-organisms being inactivated from the UV light, like a protective shield

HYDAC filtration solutions in the pre-filtration of UV systems:

Pre-filtration of the water is necessary so that UV systems can work efficiently. HYDAC filters help in this and can be used as pre-filters in UV systems.

HYDAC filtration solutions offer the following advantages:

- **Increased disinfection effect**
- **Better penetration of the water by UV light**
- **Prevents "shadow effects"**
- **Increase in efficiency of UV systems**

Membrane filtration.



In the area of water treatment, various pressure-driven membrane processes are employed (microfiltration, ultrafiltration, nanofiltration, reverse osmosis). In so doing, the smallest particles (retentate) are retained and removed by a membrane. The membrane consists of a thin, fine-pore barrier which can separate almost all particles above a certain size. Smaller particles can pass through unobstructed and without pressure losses and are thus selected (permeate). This process can be used to remove bacteria, viruses, seeds, colloids and in the case of reverse osmosis, also ions (such as salt ions when treating seawater) from the water.

HYDAC filtration solutions in the pre-filtration of membrane systems:

Particle contaminants can cause damage to membrane filters.
Damaged membranes increase the risk of contamination reaching the clean water side.

HYDAC filtration solutions offer the following advantages:

- **Increased process reliability**
- **Guaranteed consistency in product quality**

All membrane systems become clogged over time ("fouling") and must therefore be flushed and therefore cleaned regularly – either with their own filtrate or cyclically by adding chemicals (filtration is suspended during flushing).

HYDAC filtration solutions offer the following advantages:

- **Extends the cleaning cycles**
- **Saves energy and chemicals**
- **Increases the economic efficiency of the entire treatment process**

The use of reverse osmosis membranes in particular involves huge investment and operating costs. To protect the sensitive reverse osmosis membranes, candle filters are usually fitted upstream as so-called safety filters. These must be replaced regularly – when a certain differential pressure is exceeded.

HYDAC filtration solutions offer the following advantages:

- **Increase in service life of the candle filter elements**
- **Extends the cleaning cycles**
- **Reduces the outlay for the candle filter elements required as well as for their replacement and maintenance**
- **Lowers the energy consumption and therefore the energy costs by slowing down the increase in differential pressure across the candle filter**



Accumulators E 30.000



Filter Technology E 70.000



Process Technology E 77.000



Filter Systems E 79.000



Compact Hydraulics E 53.000



Accessories E 61.000



Electronics E 180.000



Cooling Systems DEF 57.000

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