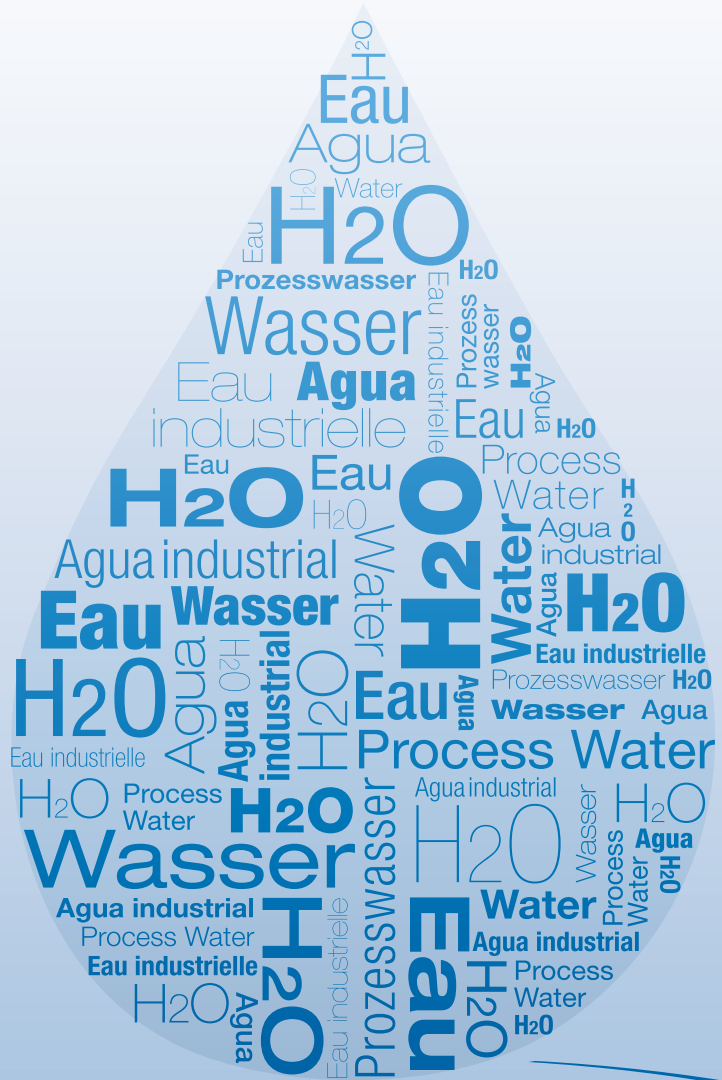
HYDAC INTERNATIONAL

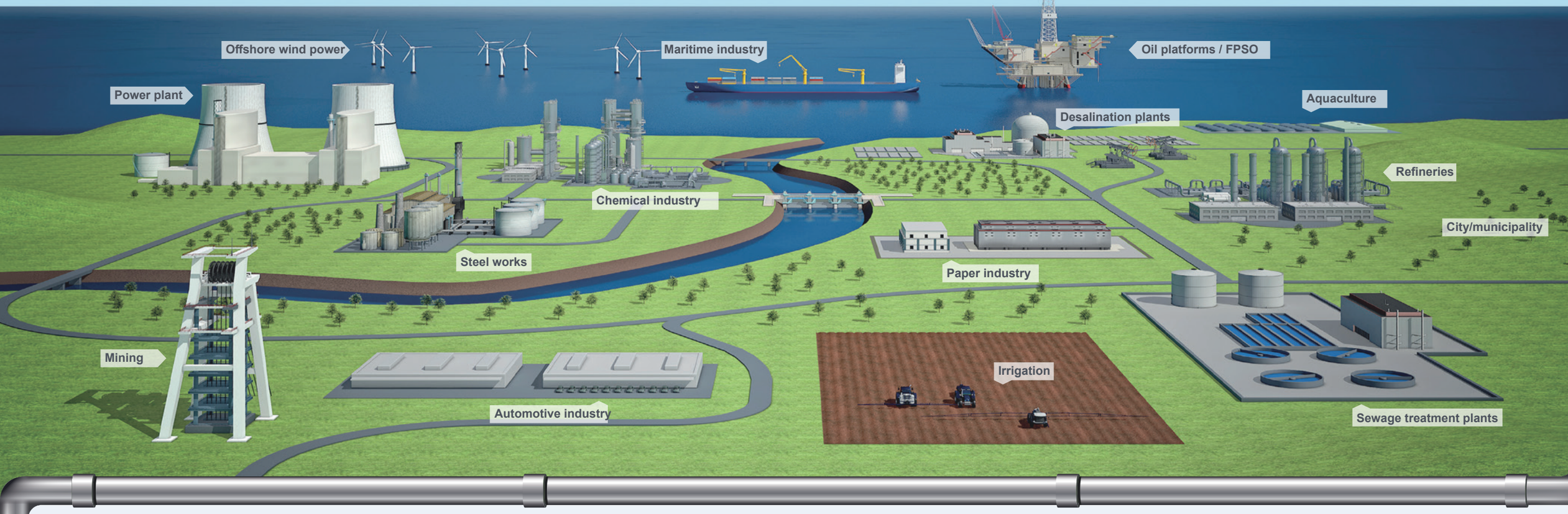
HYDAC
Process Technology
Water Filtration

Product overview



EN 7.807.4/08.24

Solutions for water filtration in many different applications



Every drop counts...

Our “blue planet” will only bear its name for as long as its life sustaining water resources continue to flow.

Thanks to the use of modern filter technologies, water resources can be used efficiently and recycled, making a long-term contribution to conserving our Earth’s water resources.

Certified environmental management

DIN EN ISO 9001
DIN EN ISO 14001

Member of German Water Partnership

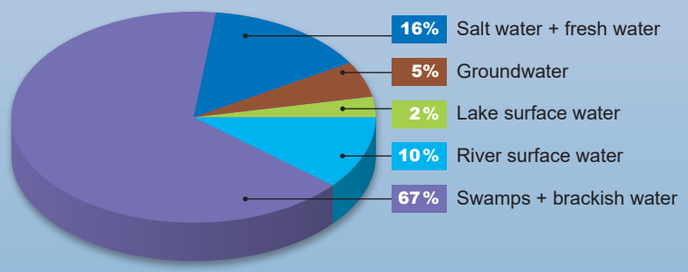
BLUECOMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

Filtration as a sustainable resource

HYDAC process filters for efficient filtration of...

- Process water
- Membrane feed water
- Scrubber water
- Cooling water
- Service water
- Sealing water
- Injection water
- Ballast water
- Spray water
- and much more

The earth’s water resources



Reduce operating costs with HYDAC filter solutions

Membrane filtration

→ Various pressure-driven membrane processes are used in water treatment:
- Microfiltration
- Ultrafiltration
- Nanofiltration
- Reverse osmosis

→ In this process, tiny particles (retentate) are retained and filtered out of untreated water by a membrane.

"Poor pre-filtration can cause damage and become expensive..."

Challenge

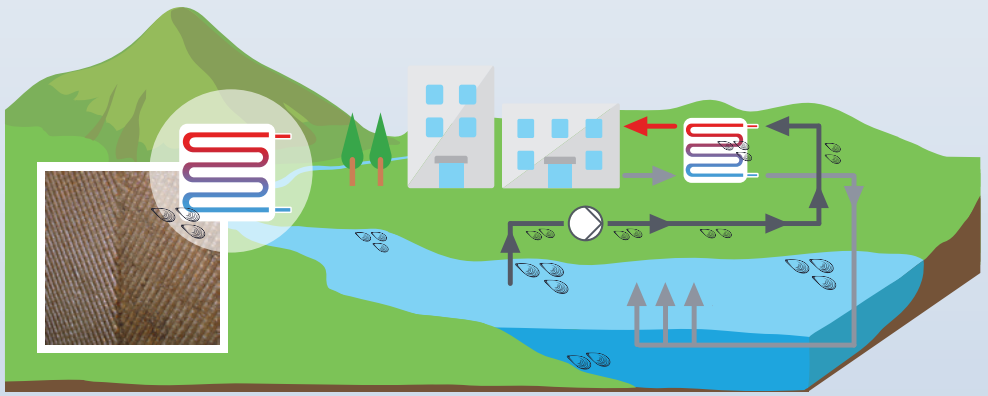
Particulate contaminants can result in damage to membrane filters:

→ Damaged membranes increase the risk of contamination on the clean water side

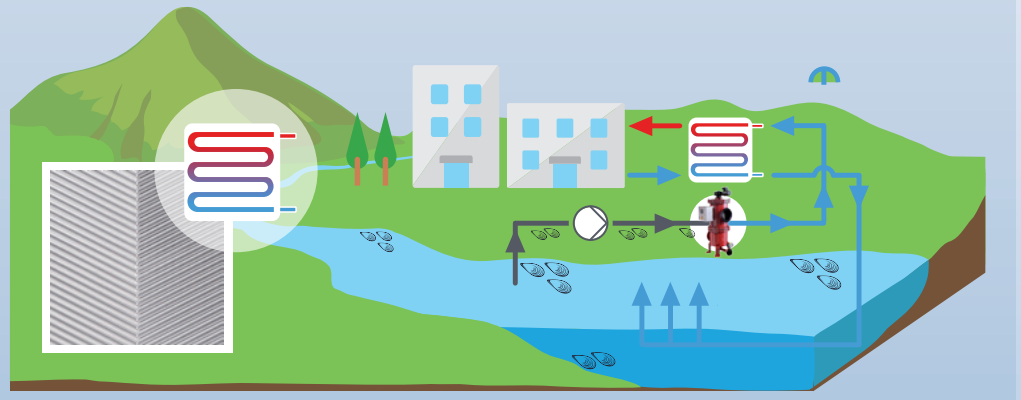
→ This results in expensive maintenance and repair work as well as downtimes

→ Relatively large pre-filter pump systems are required when using conventional automatic filters

Long-term protection against mussels – thanks to proactive filtration



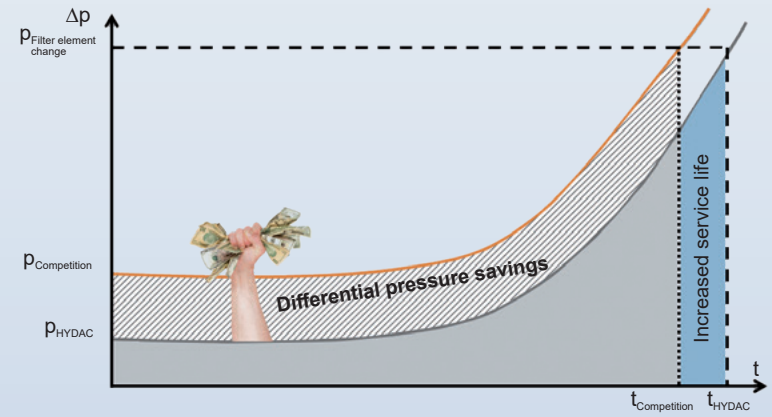
Without the appropriate pre-filtration, mussel larvae can spread in the system unhindered and block downstream components such as heat exchangers.



The solution

- AutoFilt® RF3: coarse protection against large accumulations of mussels with a filtration rating of 50 µm
- AutoFilt® RF14: basket-based protection against mussel larvae (up to 95%) thanks to a finer filtration rating of down to 20 µm
- Combination solution: filtration plus UV disinfection.
  Microbes are destroyed in fractions of a second if the dose is sufficiently high.
  Avoiding the use of chemicals also pays off in the long term.

Ultrafine filtration – PLF1 and PLF2 process inline filters ensure reduced differential pressures and increased service lives

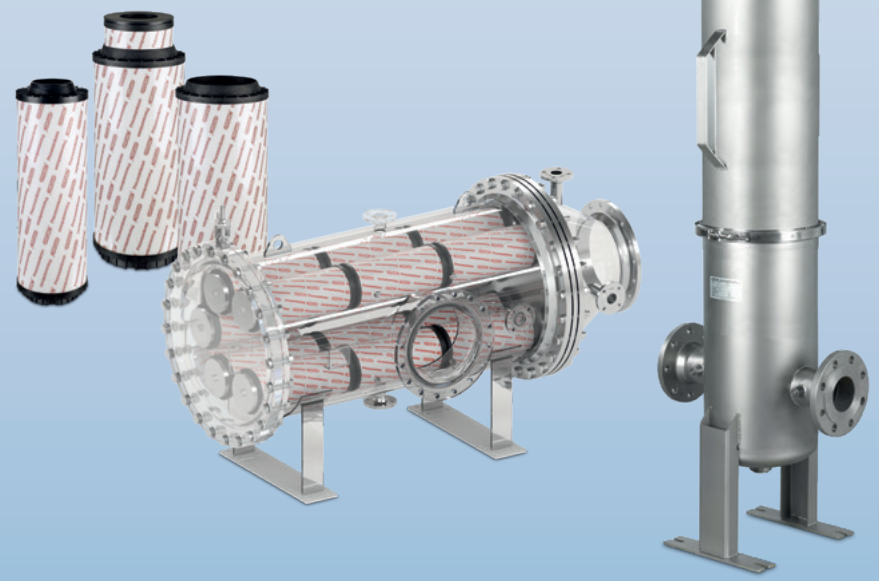


Increased service life

Thanks to our high-quality filter elements, you can take advantage of optimum filtration performance and a longer filter element service life.

Save energy costs

With our filter elements, you can take advantage of very low differential pressures. Depending on the flow rate, with a differential pressure saving of 0.49 bar alone you can save up to 42 thousand euros in energy costs.



Cost-effectiveness and energy efficiency

HYDAC water filtration – application areas and filtration ratings

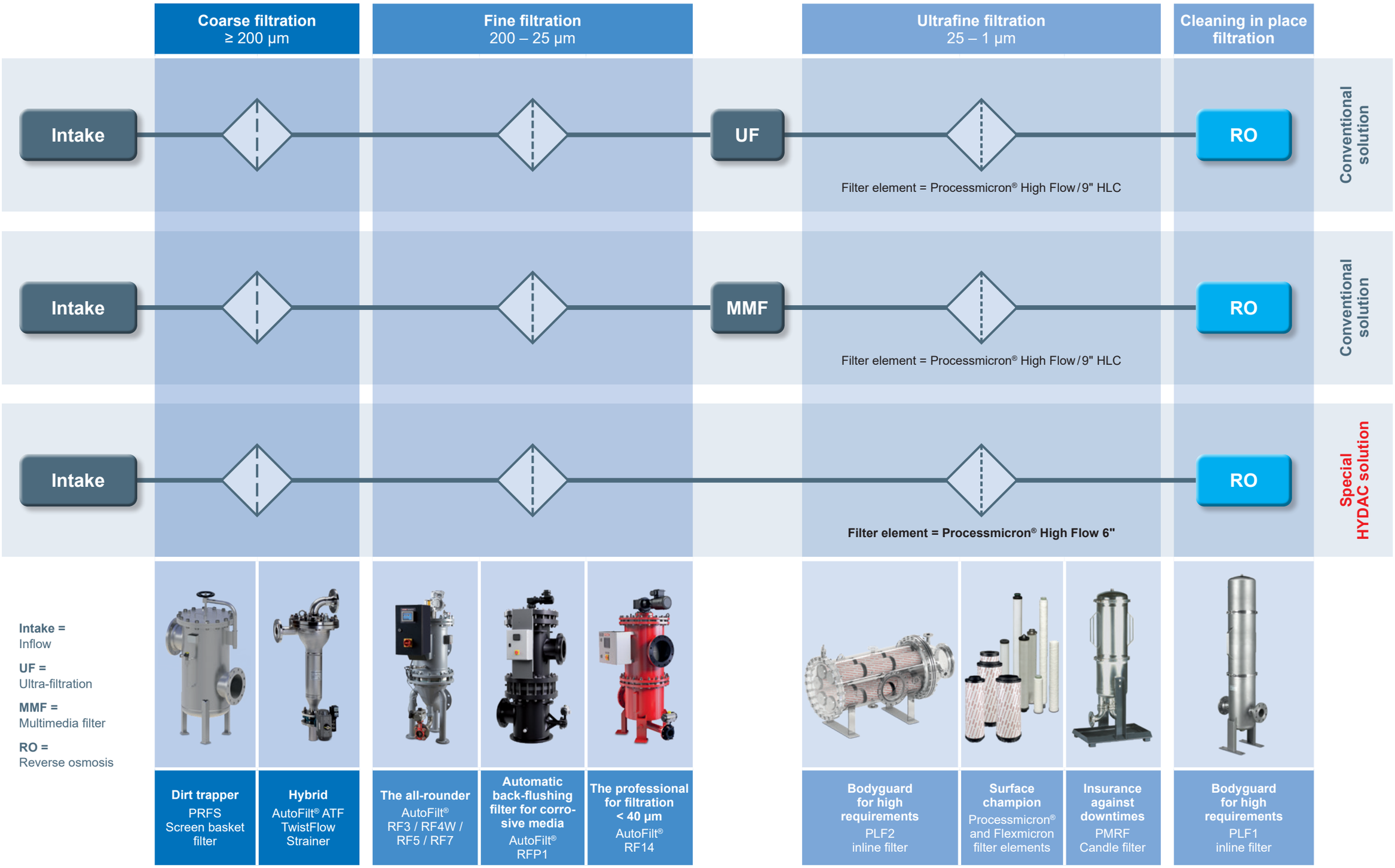
Challenges in water treatment...

A reverse osmosis system, which operates on the basis of semi-permeable membranes, is generally located at the end of the water treatment chain. A high-pressure pump is used to push the pre-filtered, untreated water through the membrane to separate it into clean water and waste water.

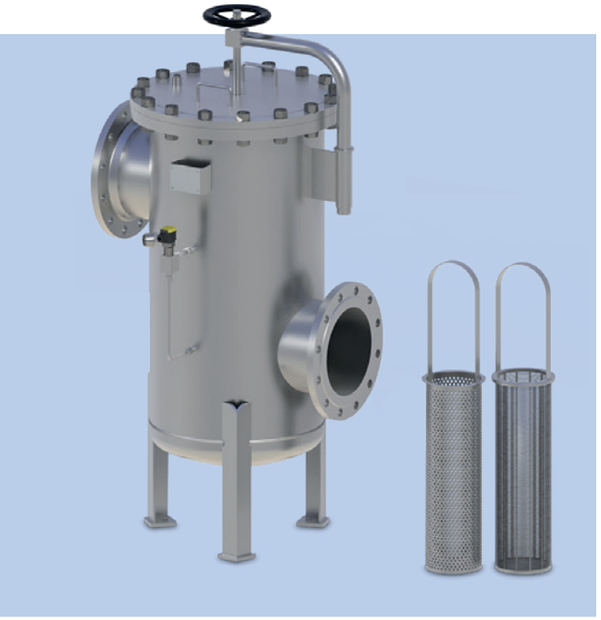
This illustrates why the quality of the untreated water is exceptionally important for **reverse osmosis (RO)**: contaminated or damaged membranes can result in pressure losses and, ultimately, downtimes or damage to the entire system.

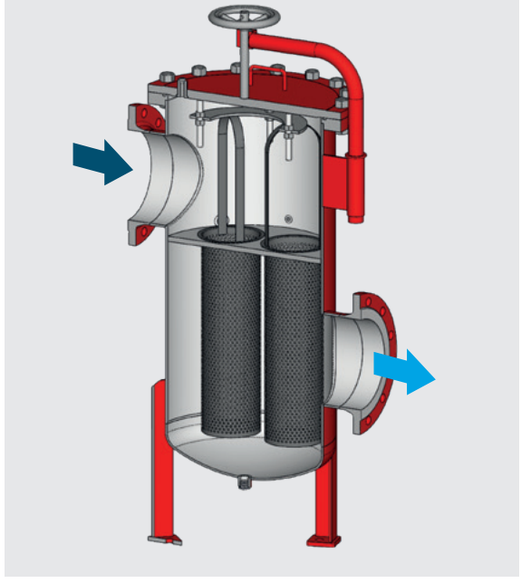
...and the HYDAC solutions

HYDAC's filter solutions can be used in pre-filtration both as a **protective filter** and as a **working filter**. As a protective filter, they would be responsible for pre-treatment of the medium to protect **ultra-filtration systems (UF)** or **multi-media filters (MMF)**; as working filters, they can even assume the tasks of ultra-filtration systems (UF) or multi-media filters (MMF) and provide full water pre-treatment before reverse osmosis.



The dirt trapper: Process screen basket filter PRFS/PRFSD





PRFS sectional drawing

Product description

- Screen basket filter – also available as a double filter
- Can be used as a coarse filter, bypass filter or pre-separator

Screen basket technology

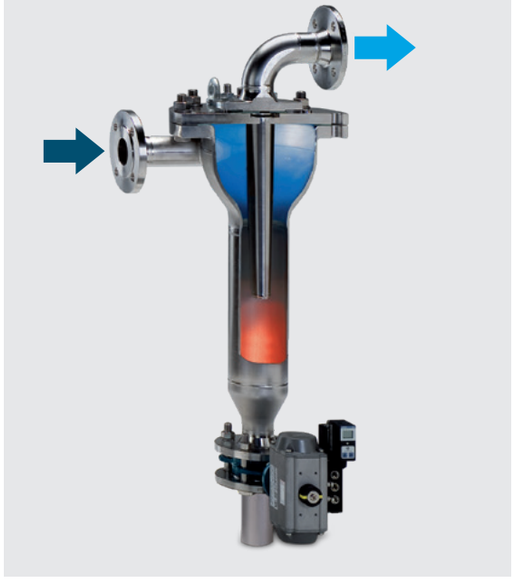
- Screen basket insert with bracket
- Chemicron® wire mesh: 25 to 1000 µm
- Chemicron® wedge wire: 50 to 3000 µm
- Chemicron® perforated plate: 3000 to 10000 µm

Product advantages

- High filtration performance
- Easy to operate
- Robust filter materials – perfect for long-term operation
- Cleanable filter materials
- Low operating costs
- Particles cannot reach the clean side when changing the basket
- Also available as a change-over double filter

Specifications	PRFS/PRFSD screen basket filter
Nominal size	■ DN 50 – DN 700
Flow rate Q_{max}	■ 3600 m³/h
Operating pressure p_{max}	■ 16 bar
Filtration ratings	■ 25 µm to 10000 µm

The hybrid: Automatic filter AutoFilt® TwistFlow Strainer ATF



AutoFilt® ATF sectional drawing

Product description

- Coarse separation due to centrifugal force with guaranteed filtration ratings
- 2-stage functional principle:
  1. Centrifugal separation → tackles high contamination loads
  2. Conical filter element → guarantees the filtration rating

Filter element technology

- Depending on the specific weight, even particles < 100 µm can be separated effectively
- Chemicron® wedge wire or Chemicron® SuperMesh wire mesh 200 to 3000 µm
- Optional SuperFlush non-stick coating

Product advantages

- No transfer of contamination to the clean side
- Suitable for strong fluctuations in untreated water quality
- Consistent filtration quality
- Also available as a skid solution for high flow rates

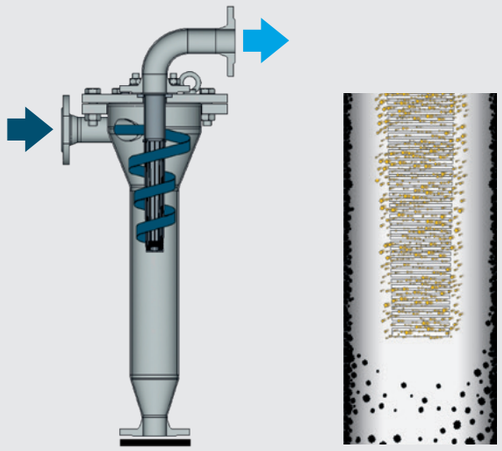
Skid solution

Specifications	AutoFilt® TwistFlow Strainer ATF
Nominal size	■ G 1" – DN 200
Flow rate Q_{max}	■ 400 m³/h, higher flow rates possible with skid solution
Operating pressure p_{max}	■ 16 bar
Filtration ratings	■ Depends on the particle properties and operating conditions

How it works

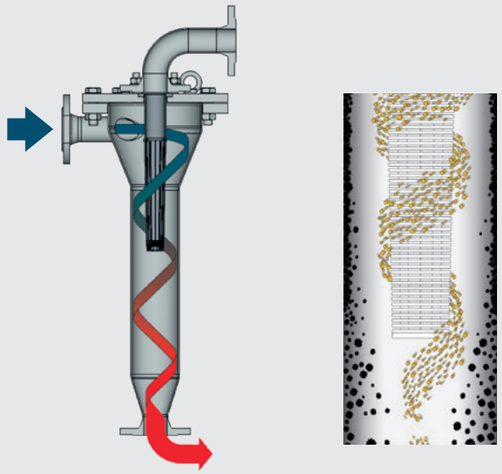
Filtration

- Fluid enters the housing tangentially
- As a result of the tangential inflow and the conical housing cross section, the fluid flows down in a spiral shape
- High-density particles are pushed against the housing wall by the centrifugal forces and sediment in the lower section
- Low-density particles that are not separated downwards are separated by the conical wedge wire filter element with a defined filtration rating



Cleaning

- Sedimented particles that are separated at the conical wedge wire filter elements accumulate in the lower section and are periodically ejected
- Cleaning is accomplished via flushing with unfiltered fluid
- Filtration is continuous as only part of the flow is used for flushing



The AutoFilt® TwistFlow Strainer ATF can achieve ratings finer than 200 µm

Depending on the specific weight, even particles < 100 µm can be separated effectively.
Whereas conventional hydrocyclones pose the risk of transferring contamination to the clean side when operating conditions are changed, the conical wedge wire with a defined filtration rating in the AutoFilt® ATF assumes a protective function (police filter), thereby preventing the transfer of contamination to the clean side.

Effectiveness/particle size	Specific weight 7.5 g/cm³	Specific weight 2.6 g/cm³	Specific weight 1.7 g/cm³
>100 µm	99 %	98 %	77 %
100 – 75 µm	92 %	84 %	35 %
75 – 50 µm	87 %	78 %	21 %

The all-rounder: Automatic filter AutoFilt® RF3/RF5/RF7

Product description

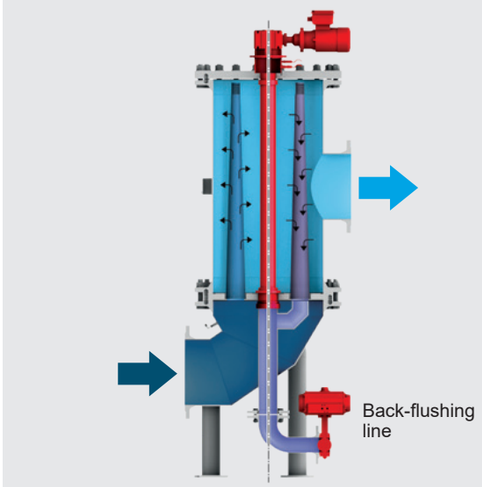
- Self-cleaning automatic filter in
  - **vertical version**: AutoFilt® RF3 / RF5
  - **horizontal version,** space-saving: AutoFilt® RF7
  - **Economy version** with vertical inlet, up to 200 µm: AutoFilt® RF5

Filter element technology

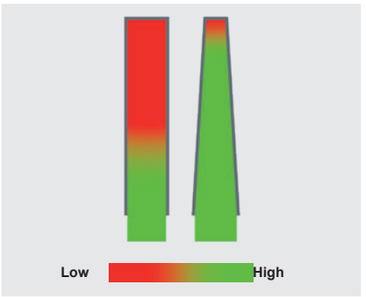
- Conical filter elements
- Chemicron® wedge wire: 50 to 3000 µm
- Chemicron® SuperMesh wire mesh: 25 to 60 µm

Product advantages

- Automatic back-flushing reduces operating costs
- Isokinetic filtration and back-flushing ensure greater efficiency
- Variable flange positions
- Numerous material and control variants
- No interruption of the filtrate flow during back-flushing
- Proved its worth over a thousand times



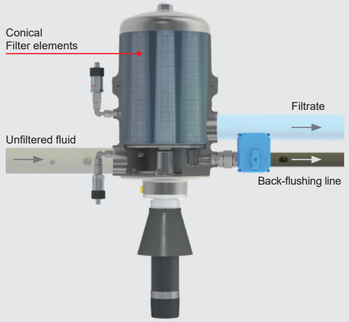
AutoFilt® RF3 sectional drawing



Back-flushing efficiency in conical filter elements compared to conventional cylindrical filter elements

Specifications	AutoFilt® RF3 / RF5 / RF7
Nominal size	■ G 1" – DN 900
Flow rate Q_{max}	■ 7500 m³/h
Operating pressure p_{max}	■ 100 bar
Filtration ratings	■ 25 µm to 3000 µm

The all-rounder: Automatic filter AutoFilt® RF4W



AutoFilt® RF4W sectional drawing

Product description

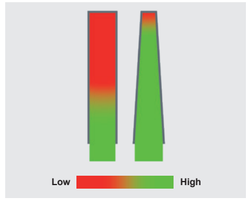
- Self-cleaning, automatic stainless steel back-flushing filter specifically for water applications
- Separation of particles from low viscosity fluids

Filter element technology

- Conical filter elements
  - Chemicron® wedge wire (50 µm – 1000 µm)
  - Chemicron® SuperMesh wire mesh, 3-layer, sintered (25 µm, 40 µm, 60 µm)
  - Optional SuperFlush non-stick technology

Product advantages

- Ready-to-use unit
- Compact design with innovative sealing concept and quick opening
- Fully automatic operation
- No interruption of the filtration during back-flushing
- Full filtration performance following back-flushing
- Maximum utilisation of the filter area
- Low operating costs
- Low maintenance



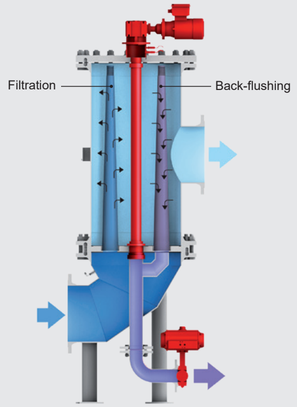
Back-flushing efficiency in conical filter elements compared to conventional cylindrical filter elements

Specifications	AutoFilt® RF4W
Nominal size	■ G 2"
Flow rate Q_{max}	■ 27 m³/h
Operating pressure p_{max}	■ 16 bar
Filtration ratings	■ 25 µm to 1000 µm

Variants

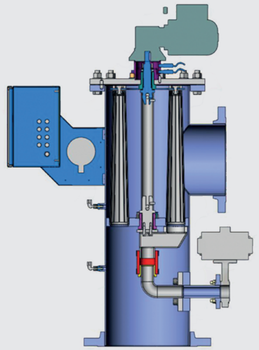
AutoFilt® RF3/RFP1

The all-rounder – proved its worth over a thousand times



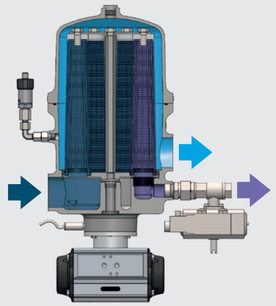
AutoFilt® RF5

Economy with vertical inlet, up to 200 µm



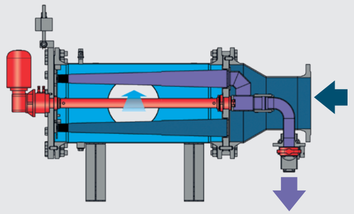
AutoFilt® RF4W

Compact for low flow rates



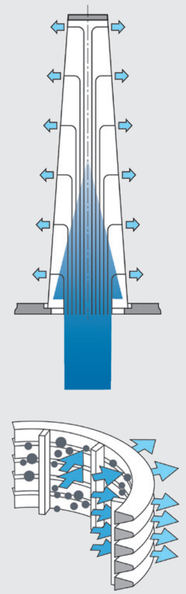
AutoFilt® RF7

Horizontal design saves space



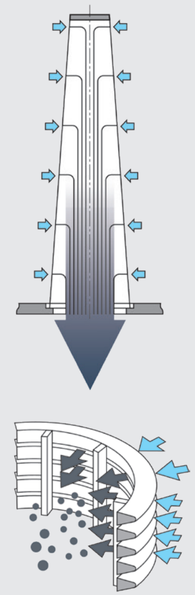
How it works

Filtration



- The medium being filtered flows through the filter elements from the inside to the outside.
- In this process, the particles are deposited on the smooth inside surface of the filter elements.
- As the level of contamination increases, the differential pressure between the contaminated and clean sides of the filter increases. When the pressure loss reaches the differential pressure trigger point, back-flushing starts automatically.

Back-flushing



- AutoFilt® RF3 / RF5 / RF7: The gear motor rotates the flushing arm under the filter elements that need cleaning
- AutoFilt® RF4W: The pneumatic drive rotates the filter element plate including the filter element into position, so that a contamination filter element sits above the flushing opening
- The back-flushing valve is opened
- The pressure drop between the filtrate side and the back-flushing line flushes a small amount of the filtrate back through the contaminated filter elements
- The contamination particles deposited on the inside of the filter elements are loosened and flushed into the back-flushing line via the flushing arm

Automatic back-flushing filter for corrosive media – Automatic filter AutoFilt® RFP1

AutoFilt® RFP1
Resistance meets Efficiency

Product description

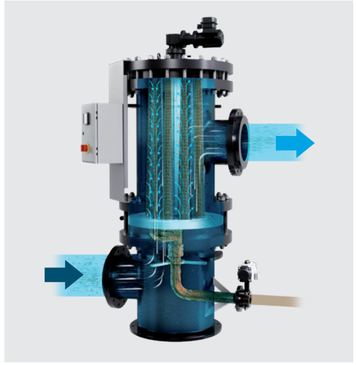
- Self-cleaning automatic filter
- For media that require high resistance e.g., seawater
- Applications in which using a sacrificial anode would not be acceptable

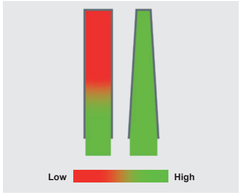
Filter element technology

- Conical filter elements
- Chemicron® wedge wire: 50 to 3000 µm
- Chemicron® SuperMesh wire mesh: 25 to 60 µm

Product advantages

- Inexpensive alternatives to versions with a duplex and super-duplex housing / internal parts
- Reduction in the number of internal components due to the advantageous sliding properties of plastic
- High cleaning efficiency thanks to tried-and-tested conical filter elements made of Chemicron® wedge wire and SuperMesh

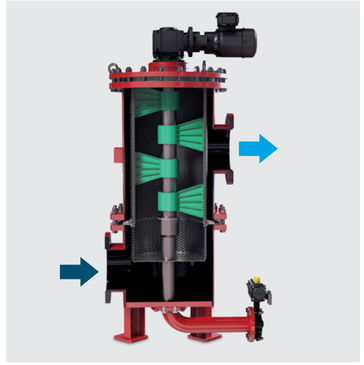




Efficient back-flushing in conical filter elements compared to conventional cylindrical filter elements

Specifications	AutoFilt® RFP1
Nominal size	■ DN 100 – DN 300
Flow rate Q_{max}	■ 810 m³/h
Operating pressure p_{max}	■ 6 bar
Filtration ratings	■ 25 µm to 3000 µm

The professional for filtration < 40 µm – Automatic filter AutoFilt® RF14



Sectional drawing of AutoFilt® RF14

Product description

- Basket-based back-flushing filter system
- Self-cleaning automatic fine filter
- Separation of suspended solid particles from low viscosity fluids
- HySuction – optimised back-flushing technology

Filter element technology

- Plain screen basket for demanding contamination types and Δ mesh baskets for maximum performance density
- Innovative mesh structures for maximum service life
- Fine stainless steel mesh as standard with filtration ratings from 20 to 80 µm

Product advantages

- Fully automatic back-flushing reduces operating costs
- Uninterrupted filtration operation
- Flow-optimised filter design
- High process reliability thanks to HySuction back-flushing
- Optimum filter basket cleaning for a wide range of contamination types and filtration ratings
- Axial gap technology offers maximum process reliability
- Switching between basket technologies is possible for an existing filter, even at a later date
- Exceptionally easy to maintain filter design
- Cover lifting device also available

Specifications	AutoFilt® RF14
Nominal size	■ DN 50 – DN 700
Flow rate Q_{max}	■ 4460 m³/h
Operating pressure p_{max}	■ 6 bar *
Filtration ratings	■ 20 µm to 80 µm

*Higher pressure ratings on request

How it works

Filtration

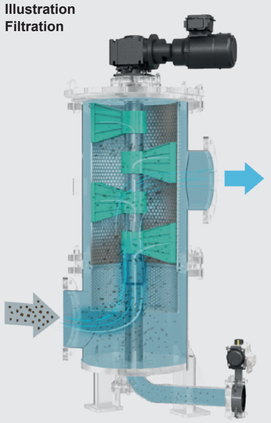
- The fluid to be filtered flows through the back-flushing filter's filter basket, passing from the inside to the outside
- Particles then collect on the inside of the filter basket
- As the level of filter contamination increases, the differential pressure between the contaminated side and the clean side increases
- When the pressure loss reaches the pre-set differential pressure trigger point, back-flushing of the filter basket starts automatically
- The axially arranged cleaning device is rotated by the gear motor. The cleaning nozzles slide over the entire inside of the filter basket in a radial direction, back-flushing the filter mesh.
- No interruption of the filtrate flow during back-flushing

Initiating automatic back-flushing

You can choose how the back-flushing is initiated:

- When the pre-set differential pressure trigger point is exceeded
- Via a pre-set timer function
- By pressing the "TEST" button

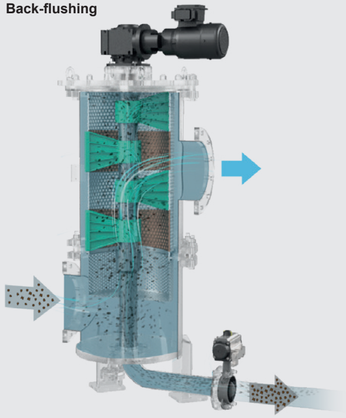
Illustration Filtration



Automatic back-flushing sequence – back-flushing cycle

- When the back-flushing is initiated, the gear motor starts and rotates the axially arranged cleaning device and its individual cleaning nozzles
- The back-flushing valve in the back-flushing line is opened
- Due to the differential pressure arising between the filtrate line and back-flushing line, a partial reversal of flow occurs in the area surrounding the cleaning nozzles
- Part of the filtrate flows from the outside to the inside through the filter basket into the openings of the cleaning nozzles, while the contamination adhering to the inside of the filter basket is carried along by the flow that develops
- While the gear motor continues to rotate, the cleaning nozzles slide along the entire inside of the filter basket radially
- This results in complete cleaning of the filter basket
- Once the back-flushing cycle is complete, the back-flushing valve in the back-flushing line closes and the rotation of the motor stops

Illustration Back-flushing



Bodyguard for high requirements – Inline filter PLF1 up to 200 m³/h

Product description

- Continuous separation of solid particles from low viscosity fluids
- Single-stage filter housing for up to two filter elements
- Flow rates up to 200 m³/h

Filter element technology

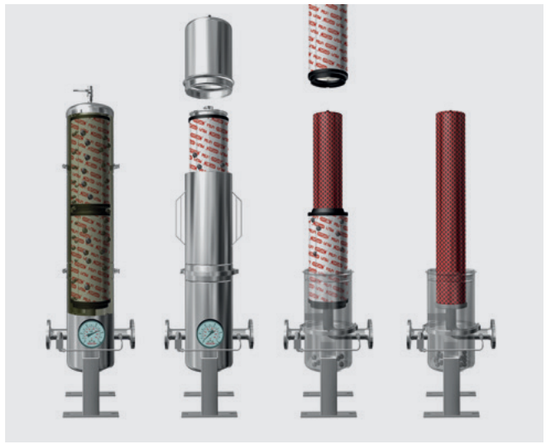
- High-quality filter elements made of polyester or polypropylene
- Multi-layer filter mat construction
- Graduated depth filtration
- Protects the clean side

Processmicron® filter elements in three versions:

1) Working filtration:
Greater upstream flow area for high contamination loads
→ HighFlow 6"

2) Comprehensive working filtration:
Double security, even in the case of contamination surges, thanks to the cascade effect
→ HighLoadCascade 9"

3) Protective filtration:
High flow rates
→ HighFlow 9"



Sectional drawing and functional drawing PLF1

Product advantages

- Excellent separation rates
- Low pressure drops due to large cross sections and filter areas
- Very large filter area per filter element
- Compact design with high flow rates
- Flow-optimised structure
- Protects the clean side during element change
- High contamination retention capacity
- Modular design gives optimal flexibility in catering for every application

Specifications	PLF1 inline filter
Nominal size	■ DN 40 – DN 150
Flow rate Q_{max}	■ 200 m³/h
Operating pressure p_{max}	■ 16 bar
Filtration ratings	■ 1 µm to 90 µm

Bodyguard for high requirements – Inline filter PLF2 up to 3000 m³/h

Product description

- Continuous separation of solid particles from low viscosity fluids
- Multi-station filter housing for up to 21 filter elements
- Flow rates up to 3000 m3/h

Filter element technology

- High-quality filter elements made of polyester or polypropylene
- Multi-layer filter mat construction
- Graduated depth filtration
- Protects the clean side

Processmicron® filter elements in three versions:

1) Working filtration:
Greater upstream flow area for high contamination loads
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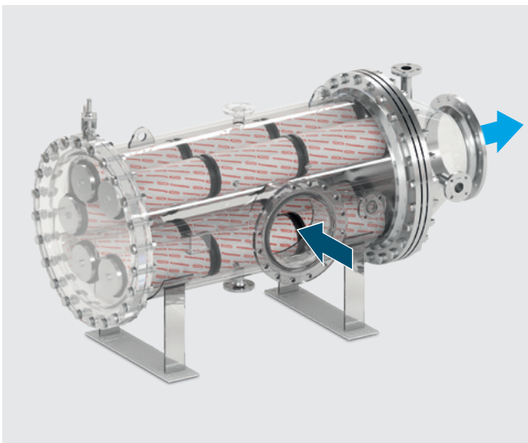
Double security, even in the case of contamination surges, thanks to the cascade effect
→ HighLoadCascade 9"

3) Protective filtration:
High flow rates
→ HighFlow 9"



PLF2 sectional drawing

Product advantages

- Excellent separation rates
- Low pressure drops due to large cross sections and filter areas
- Very large filter area per filter element
- Compact design with high flow rates
- Space-saving horizontal filter design
- Flow-optimised structure
- Protects the clean side during element change
- High contamination retention capacity
- Modular design gives optimal flexibility in catering for every application

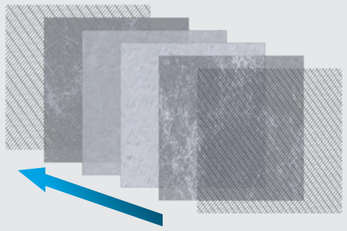
Specifications	PLF2 inline filter
Nominal size	■ DN 200 – DN 600
Flow rate Q_{max}	■ 3000 m³/h
Operating pressure p_{max}	■ 16 bar
Filtration ratings	■ 1 µm to 90 µm

Processmicron® filter elements for the PLF1 and PLF2 series

Technical data

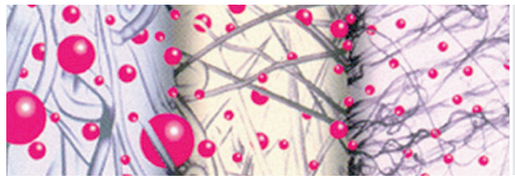
- Filtration ratings: 1 µm to 90 µm
- Length: 20", outer diameter: 6" or 9"
- Filter element type: pleated or spun spray
- Filter material: polyester or polypropylene

Structure of Processmicron® filter elements



Multi-layer filter mat construction

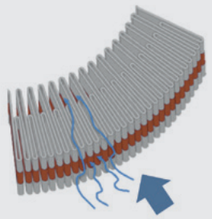
- Robust and high-quality layer structure
  → no crumpling of the filter layers
- High contamination retention
- Low pressure loss



Graduated depth filtration

- High level of cleanliness with a single pass
- Thick filter medium layer
  → High storage volumes for contamination

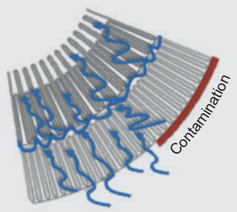
The optimum filter element for every requirement



HighFlow 6"

Working filtration:

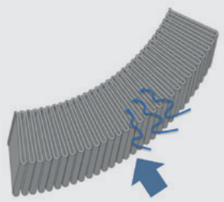
- M-fold
- Optimised, increased upstream flow area for high contamination loads



HighLoadCascade 9"

Comprehensive working filtration:

- Combination of parallel folds (outside) and M-folds (inside)
- Double security, even in the case of contamination surges, thanks to the cascade effect
- Filter layer selection precisely tailored to the filtration task at hand (outer and inner layer)

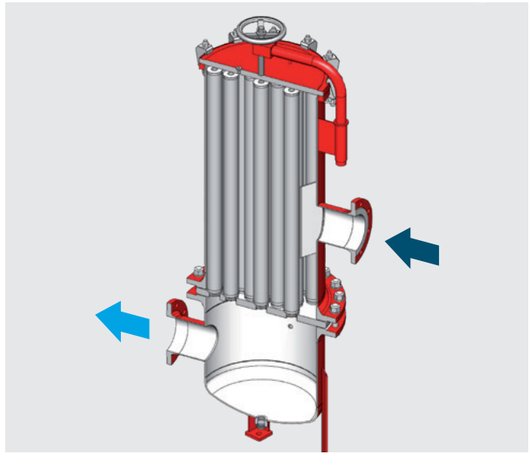


HighFlow 9"

Protective filtration:

- Pleated filter element structure (parallel fold)
- High flow rates
- Extreme fold stability thanks to an innovative parallel fold on a large area of the filter

Insurance against downtimes – PMRF candle filter



PMRF sectional drawing

Product description

- Separation of solid particles from low viscosity fluids
- Suitable for applications with the highest cleanliness requirements
- Tried-and-tested candle filter technology for the finest filtration
- Also available as a change-over double filter

Filter element technology

- Filtration ratings: 1 µm to 90 µm
- **Flexmicron Premium:** durable, pleated filter elements (pleat technology) with a low layer thickness made of melt blown or high-quality glass fibres for graduated depth filtration
  → Long service lives, even with fluids that are difficult to filter
- **Flexmicron Standard:** Spun Spray depth filter elements (melt blown) for graduated depth filtration: High level of cleanliness with a single pass, thick filter medium layer
  → High storage volumes for contamination
- **FlexMicron Economy:** Spun Spray depth filter elements (melt blown) suitable for applications with medium requirements for fluid cleanliness and fluid type purity
  → Low-cost solution

Product advantages

- Economic operation thanks to high quality standards, defined filtration rates and high separation values
- Compact housing with high flow rates
- Easy to service when changing the filter element
- Efficient system and component protection
- Environmentally friendly disposal as it is incinerable

Specifications	PMRF candle filter
Nominal size	■ G 1" – DN 250
Flow rate Q_{max}	■ 1200 m^3/h
Operating pressure p_{max}	■ 40 bar
Filtration ratings	■ 1 µm to 90 µm

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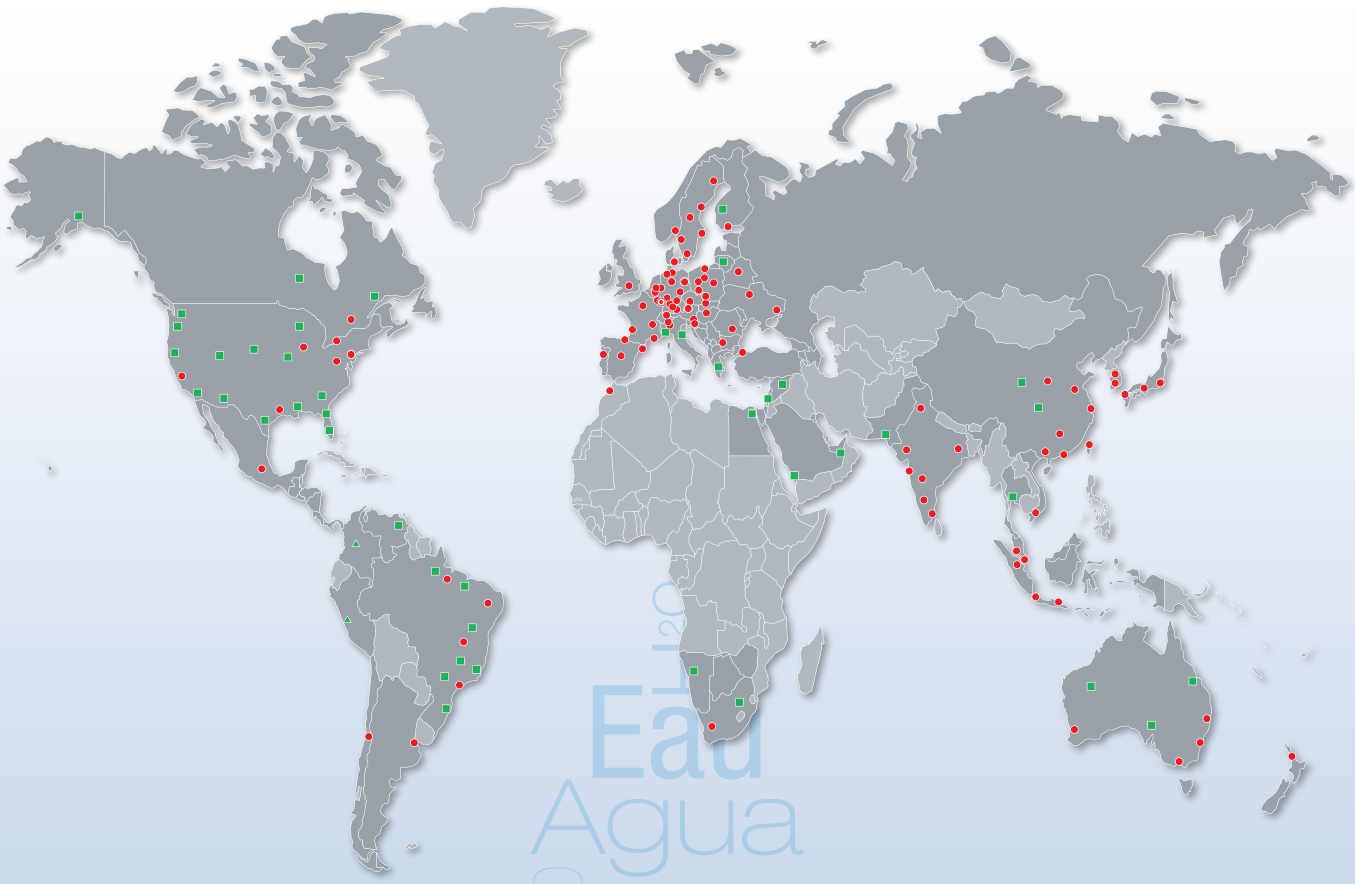

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Note

The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

EN 7.807.4/08.24