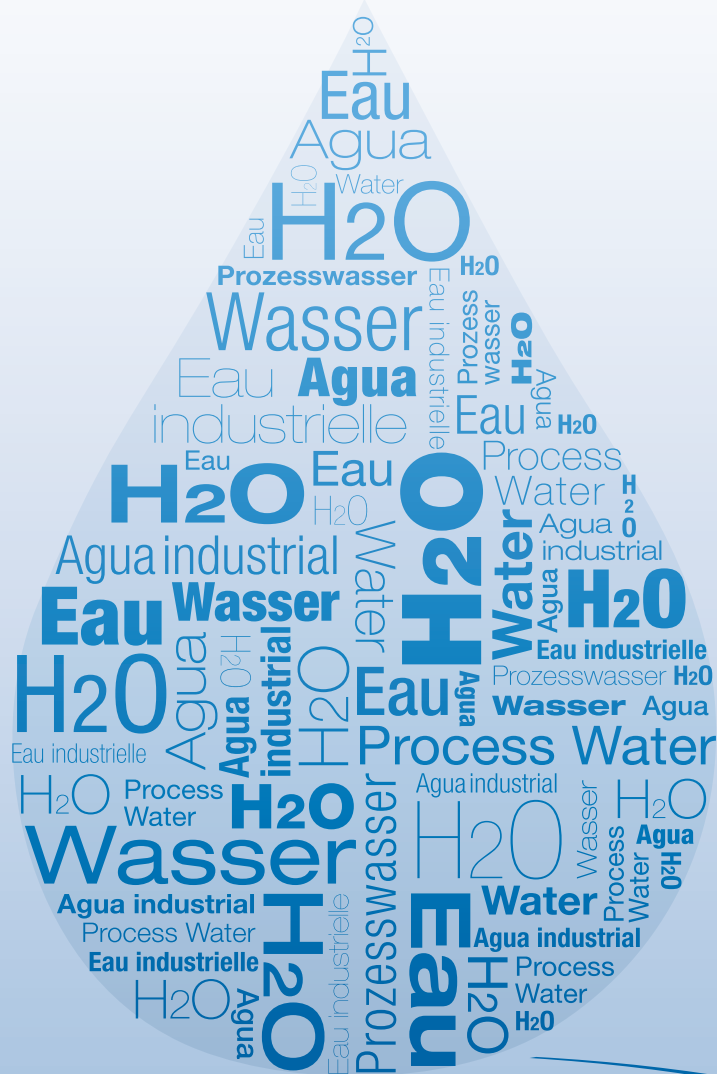
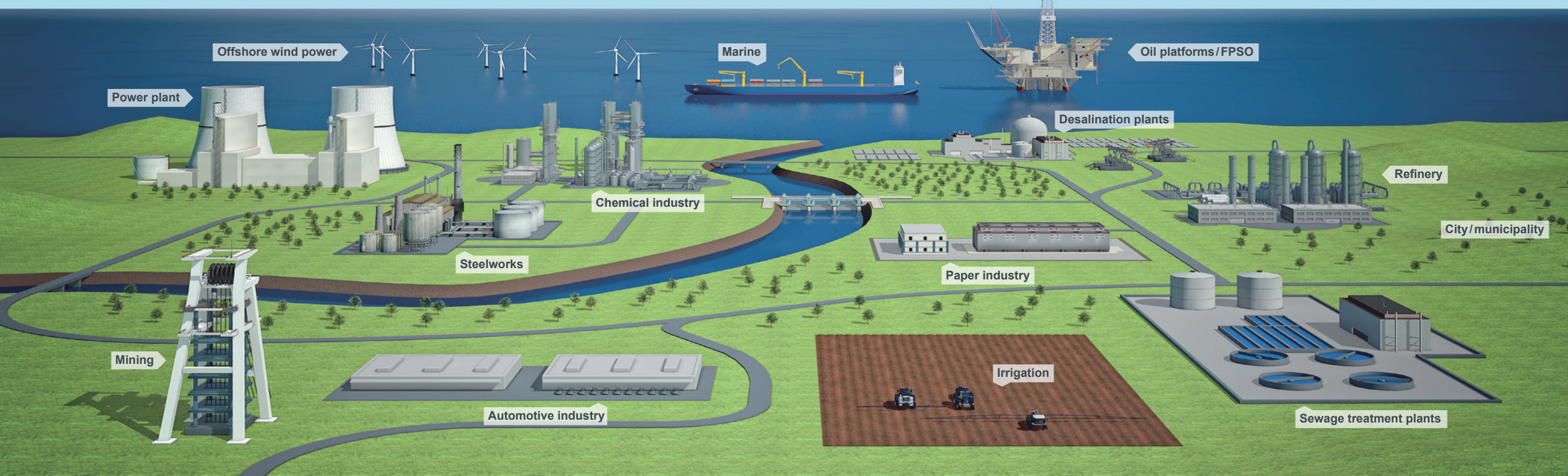


HYDAC Process Technology Water Filtration Product Overview





Every drop counts...

Our "blue planet" will only carry its name as long as its life sustaining water resources do not dry up.

The use of modern filter technologies allows for the more efficient use and reprocessing of water resources and thus contributes sustainably to the conservation of the earth's water resources.

Certified environmental management

DIN EN ISO 9001
DIN EN ISO 14001



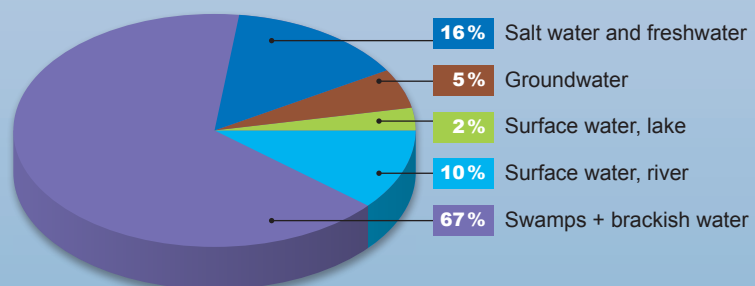
Filtration seen as a sustainable resource



HYDAC process filters for the efficient filtration of...

- Process water
- Membrane feed water
- Scrubber water
- Cooling water
- Service water
- Sealing water
- Injection water
- Ballast water
- Water spray
- and many more

The earth's water resources



Reduce Operating Costs with HYDAC Filter Solutions

Membrane filtration

- In the area of water treatment, various pressure-driven membrane processes are employed:
 - Micro filtration
 - Ultra filtration
 - Nano-filtration
 - Reverse osmosis
- In so doing, the smallest particles (retentate) are retained and removed by a membrane.

“Poor pre-filtration can cause damage and prove expensive...”

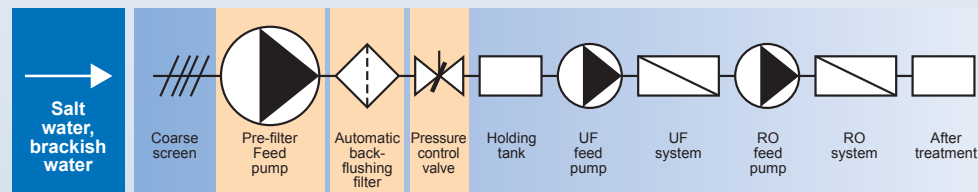
Challenge

- Particulate contaminants can cause damage to membrane filters:
- Damaged membranes increase the risk of contamination reaching the clean water side
- Results in expensive maintenance and repair work as well as downtimes
- When using conventional automatic filters a relatively large pre-filter pump system is required

Automatic pre-filtration – AutoFilt® RF10 with innovative filter technology reduces the costs of pump system pre-filters

Conventional back-flushing filter

Required operating pressure min. 2 bar, back-flushing pressure min. 1.5 bar

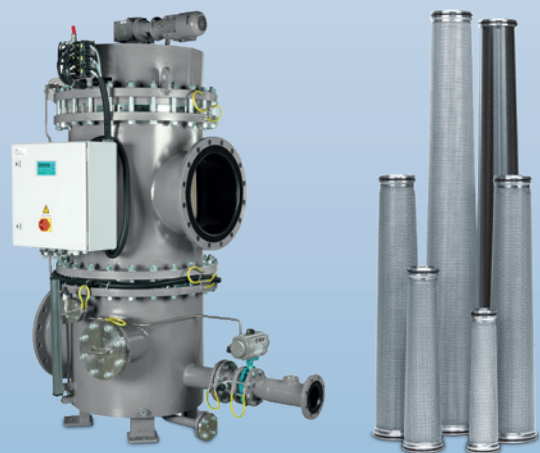
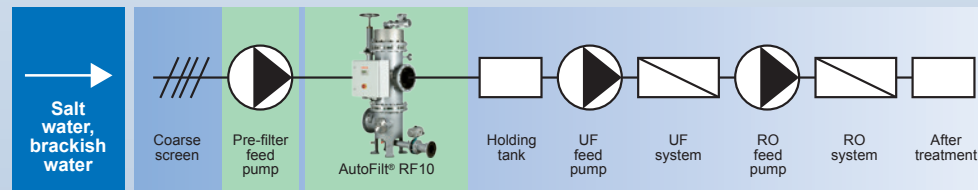


Cost driver:

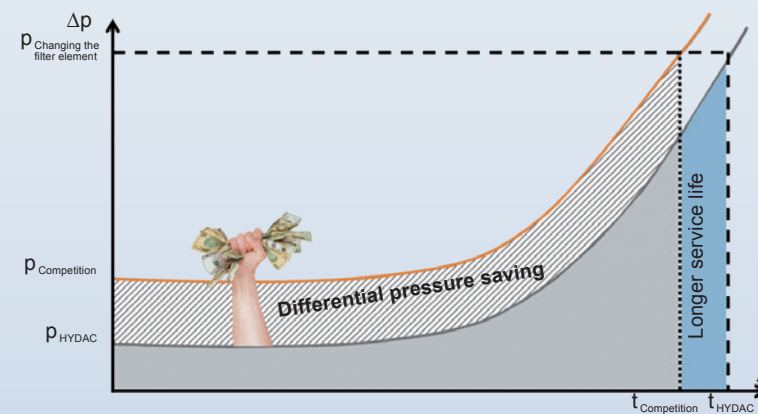
- Pre-filter pump installations must have large enough dimensions
- Additional control devices for setting the required filtrate pressure of 1.5 bar

→ HYDAC solution: HYDAC AutoFilt® RF10

Highly efficient back-flushing under low pressure conditions and with long back-flushing line



Finest filtration – the process line filters PLF1 and PLF2 ensure a reduced differential pressure and longer service life



Longer service life

Thanks to our high-quality filter elements you benefit from optimal filtration and a longer filter element service life.



Save energy costs

With our filter elements, you can benefit from a very low differential pressure. Even a differential pressure saving of 0.49 bar can produce energy savings of up to €42k, depending on the flow rate.



HYDAC Water Filtration – Work Areas and Fineness

Challenges in water treatment...

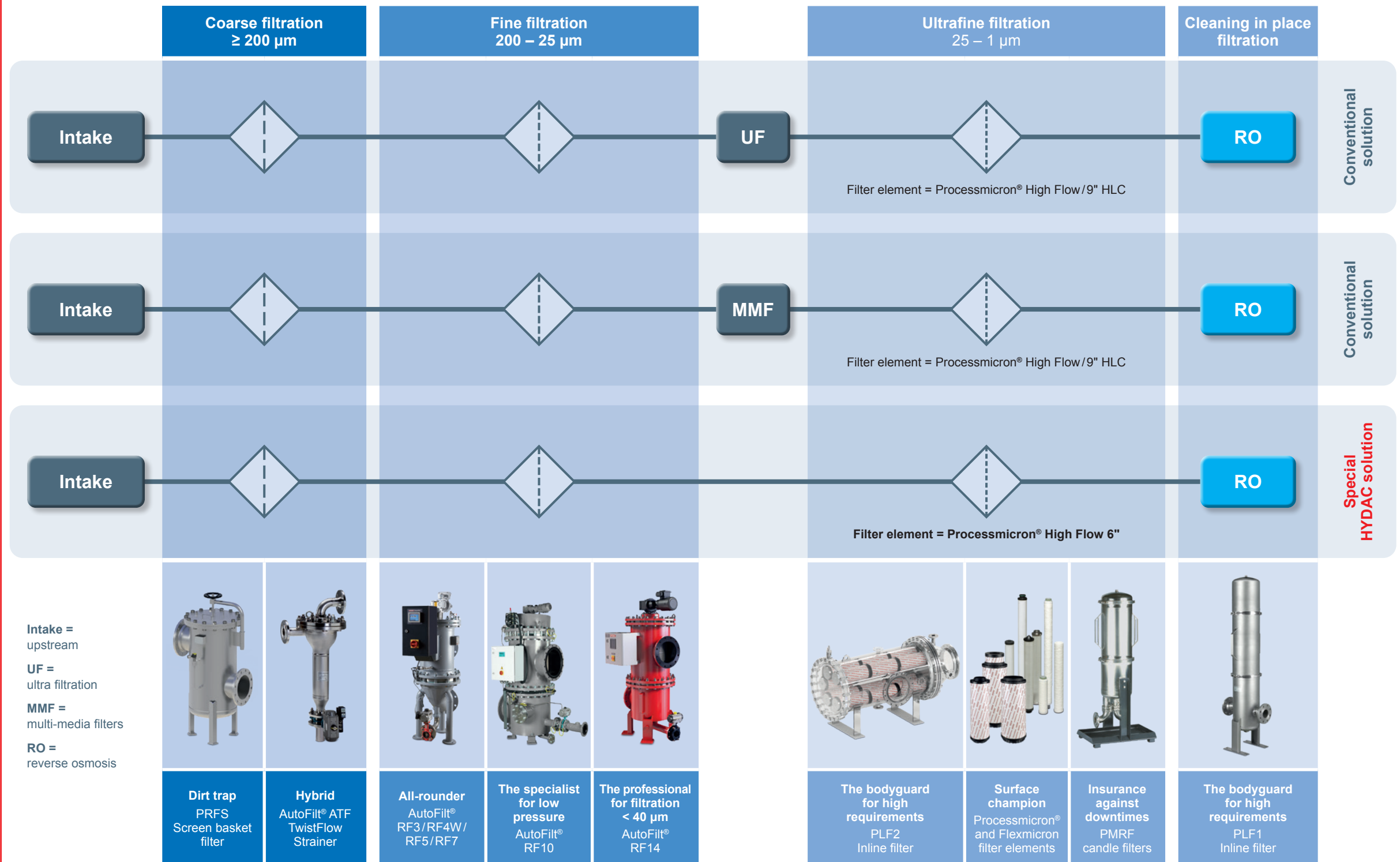
A reverse osmosis plant based on semi-permeable membranes is usually at the end of the water processing chain. The pre-filtered untreated water is pumped back through the membrane with a high pressure pump in order to separate it into pure water and waste water.

It becomes clear why the condition of the untreated water is of particular importance for the **reverse osmosis (RO)**: contaminated or damaged membranes result in pressure losses and eventually in downtimes or damages to the entire system.

...and the solution from HYDAC

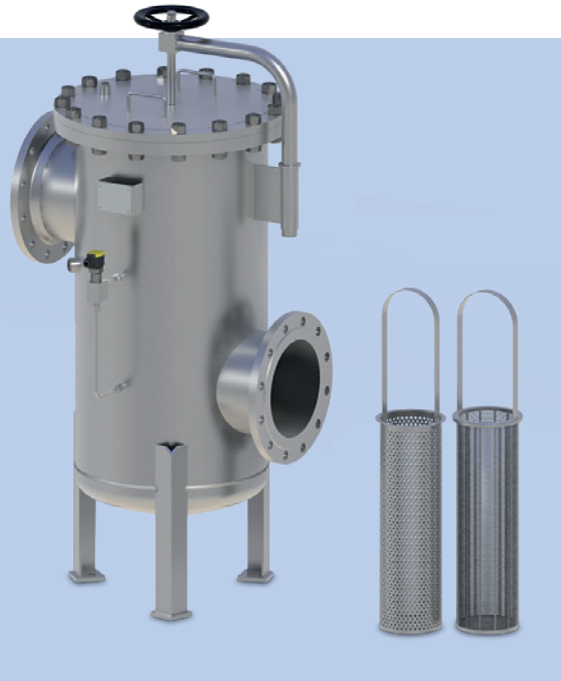
Filter solutions from HYDAC can be used both as **protective filters** and **work filters**.

As protective filters they would be used for the pre-treatment of the media for the protection of **ultra filtration systems (UF)** or **multi-media filters (MMF)**, and as work filters they can even take over the functions of ultra-filtration systems (UF) or multi-media filters (MMF) and perform the entire pre-treatment of the water prior to the reverse osmosis.



Intake =
upstream
UF =
ultra filtration
MMF =
multi-media filters
RO =
reverse osmosis

The Dirt Trapper: Process Screen Basket Filter PRFS/PRFSD



Product description

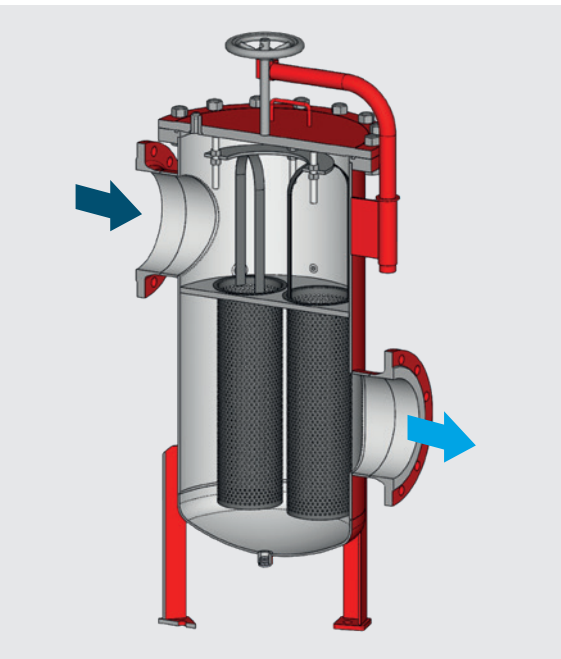
- Screen basket filter – also available as double filter
- Used as coarse filter, bypass filter or pre-separator

Screen basket technology

- Screen basket insert with bracket
- Wire mesh 25 to 1000 µm
- Wedge wire: 50 to 3000 µm
- Perforated plate 3000 to 10000 µm

Product advantages

- High filtration efficiency
- Simple handling
- Robust filter materials – ideal for long-term operation
- Cleanable filter materials
- Low operating costs
- Particles cannot enter the clean side when changing the basket
- Also available as a switchable double filter



Sectional view PRFS

| Specifications | PRFS/PRFSD screen basket filter |
|------------------------------|---------------------------------|
| Nominal size | ● DN 50 – DN 700 |
| Volume flow Q_{max} | ● 3600 m ³ /h |
| Operating pressure p_{max} | ● 16 bar |
| Filtration ratings | ● 25 µm to 10000 µm |

The Hybrid: Automatic Filter AutoFilt® ATF TwistFlow Strainer



Product description

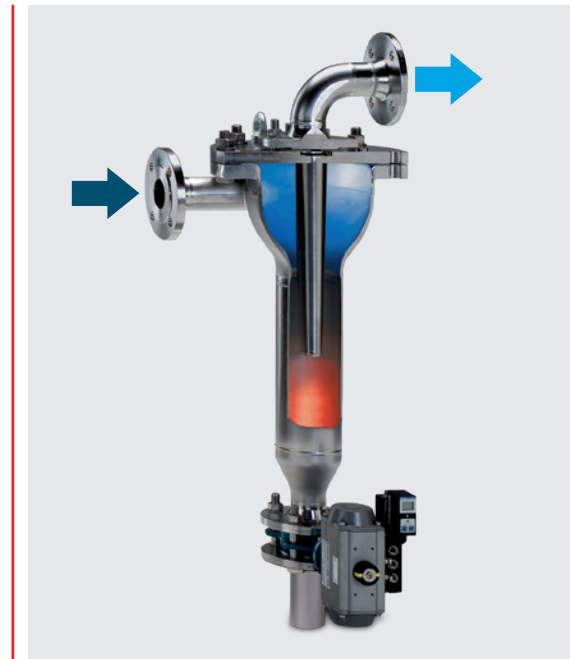
- Coarse separation by centrifugal force with guaranteed filtration ratings
- 2-stage operating principle:
 1. Centrifugal separation tackles → High contamination loads
 2. Conical filter element → Guarantees the filtration rating

Filter element technology

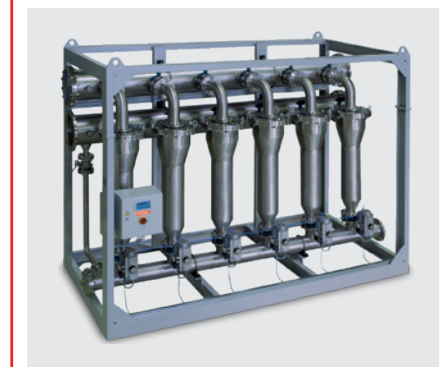
- Depending on the specific weight, even particles < 100 µm are separated effectively
- Wedge wire or SuperMesh wire mesh 200 to 3000 µm
- Optional: SuperFlush non-stick coating

Product advantages

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



Sectional drawing for AutoFilt® ATF



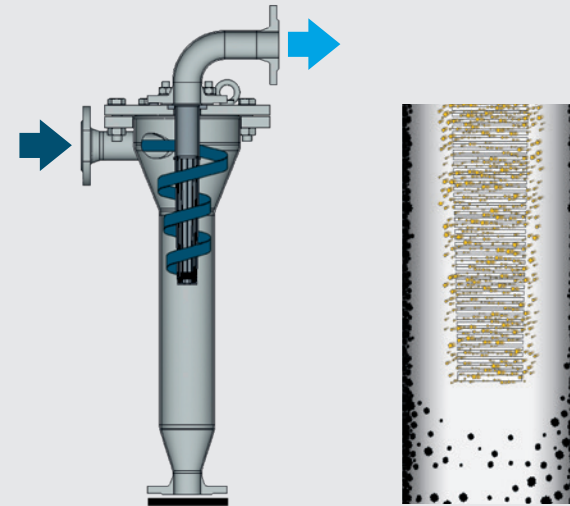
Skid solution

| Specifications | AutoFilt® TwistFlow Strainer ATF |
|------------------------------|--|
| Nominal size | ● G 1" – DN 200 |
| Volume flow Q_{max} | ● 400 m ³ /h, higher volume flows with skid solution possible |
| Operating pressure p_{max} | ● 16 bar |
| Filtration ratings | ● Dependent on particle nature and operating conditions |

Mode of operation

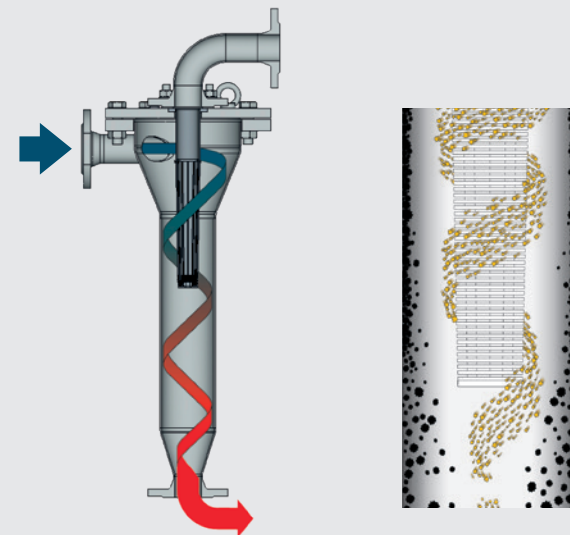
Filtration

- 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
- Particles with a high density are pressed against the housing wall by the centrifugal forces, and are deposited in the lower section of the housing
- Particles with a low density, which are not deposited below, are separated out by the conical slotted tube filter element with a defined filtration rating



Cleaning

- Deposited particles and those separated by the conical slotted tube filter element collect in the lower section and are removed periodically
- Cleaning is performed by flushing with unfiltered fluid
- Filtration is continuous as only partial 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 are separated effectively. Whereas with conventional hydrocyclones under changed operating conditions there is the risk of contamination reaching the clean side, the conical wedge wire in the AutoFilt® ATF performs a protective function (safety filter) with defined filtration ratings and thus prevents contamination reaching the clean side.

| Efficiency / particle size | Specific weight 7.5 g/cm ³ | Specific weight 2.6 g/cm ³ | Specific weight 1.7 g/cm ³ |
|----------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| > 100 µm | 99 % | 98 % | 77 % |
| 100 – 75 µm | 92 % | 84 % | 35 % |
| 75 – 50 µm | 87 % | 78 % | 21 % |

The All-rounder: Automatic Filters AutoFilt® RF4W



Product description

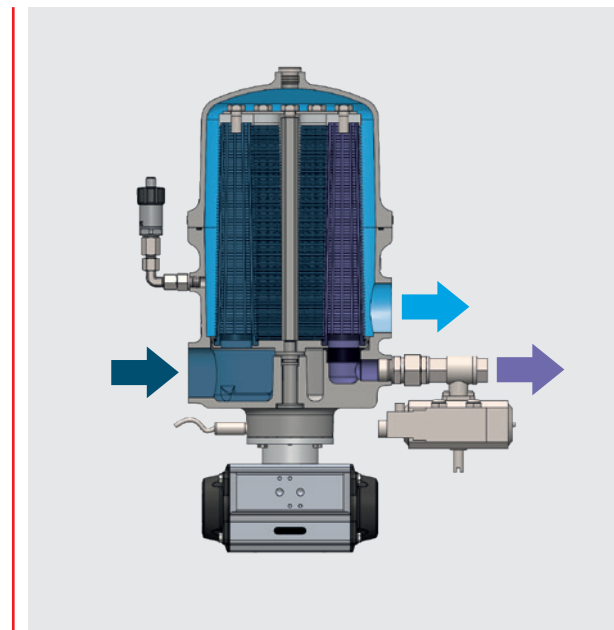
- Self-cleaning automatic stainless steel back-flushing filter for water applications
- Separation of solid particles from low viscosity fluids

Filter element technology

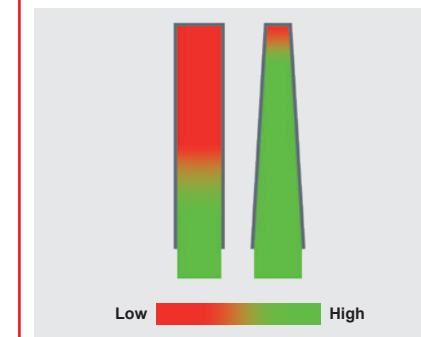
- Conical filter elements
 - Wedge wire (50 µm – 1000 µm)
 - SuperMesh wire mesh, 3-layer, sintered (25 µm, 40 µm, 60 µm)
 - Optional SuperFlush non-stick technology

Product advantages

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



Sectional drawing for AutoFilt® RF4W



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

| Specifications | AutoFilt® RF4W |
|-------------------------------------|------------------------|
| Nominal size | ● G 2" |
| Volume flow Q _{max} | ● 27 m ³ /h |
| Operating pressure p _{max} | ● 16 bar |
| Filtration ratings | ● 25 µm to 1000 µm |

The All-rounder: Automatic Filters AutoFilt® RF3/RF5/RF7



Product description

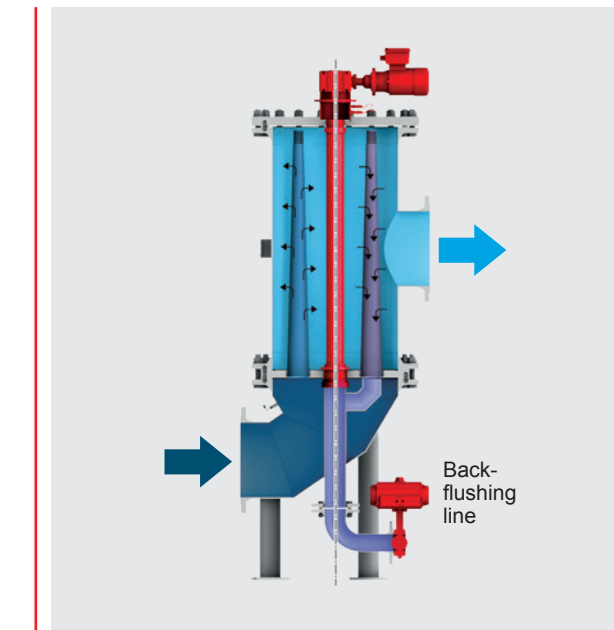
- Self-cleaning automatic filter in
 - vertical design: AutoFilt® RF3/RF5
 - horizontal design, space-saving: AutoFilt® RF7
 - economy design with vertical inlet, up to 200 µm: AutoFilt® RF5

Filter element technology

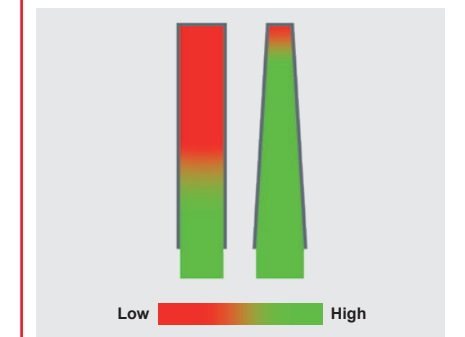
- Conical filter elements
- Wedge wire: 50 to 3000 µm
- SuperMesh wire mesh: 25 to 60 µm

Product advantages

- Automatic back-flushing reduces operating costs
- Isokinetic filtration and back-flushing provides 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



Sectional drawing for AutoFilt® RF3



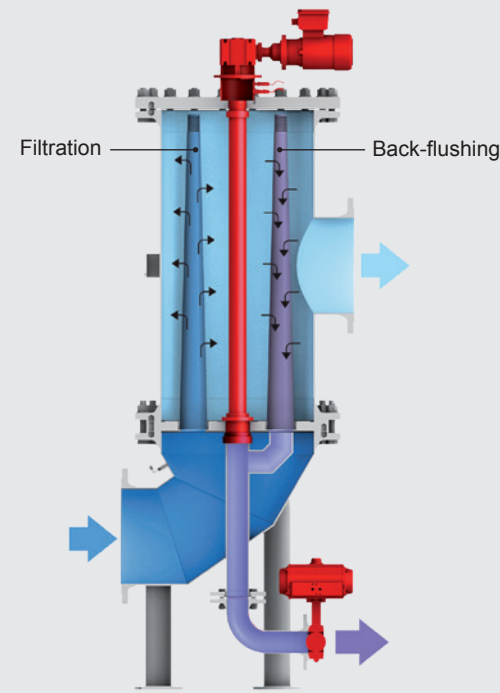
Back-flushing efficiency in conical filter elements compared to conventional cylinder filter elements

| Specifications | AutoFilt® RF3/RF5/RF7 |
|-------------------------------------|--------------------------|
| Nominal size | ● G 1" – DN 900 |
| Volume flow Q _{max} | ● 7500 m ³ /h |
| Operating pressure p _{max} | ● 100 bar |
| Filtration ratings | ● 25 µm to 3000 µm |

Versions

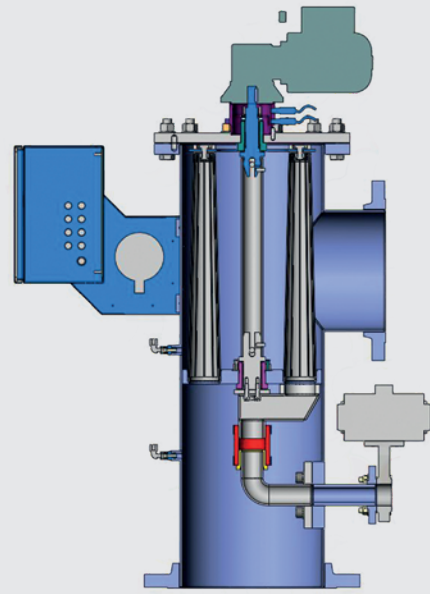
AutoFilt® RF3

The allrounder – proved its worth over a thousand times



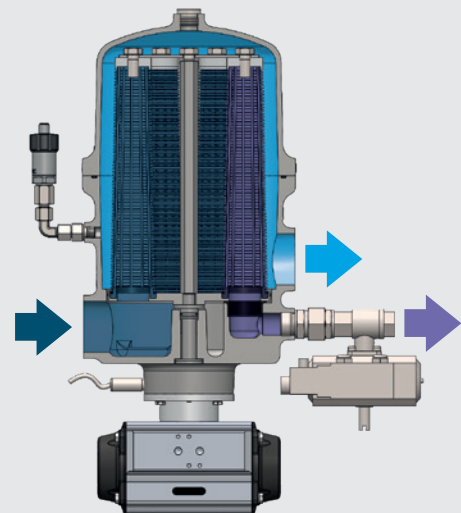
AutoFilt® RF5

Economy with vertical inlet up to 200 µm



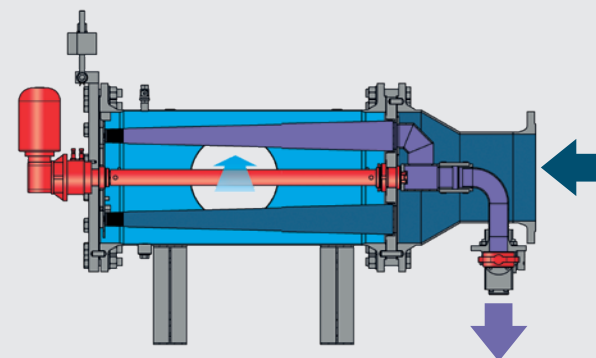
AutoFilt® RF4W

Compact for low flow rates



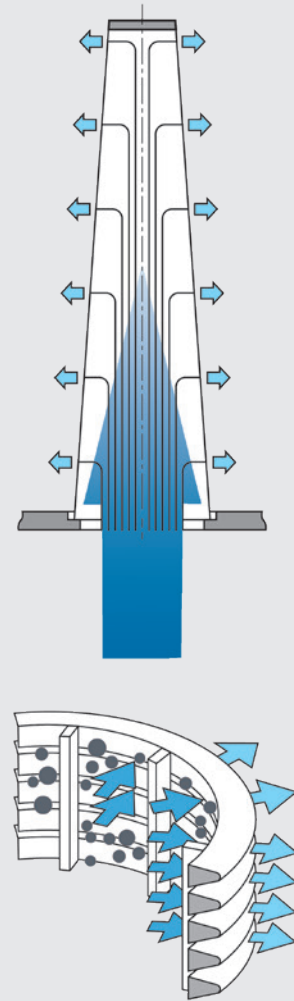
AutoFilt® RF7

Horizontal design saves space



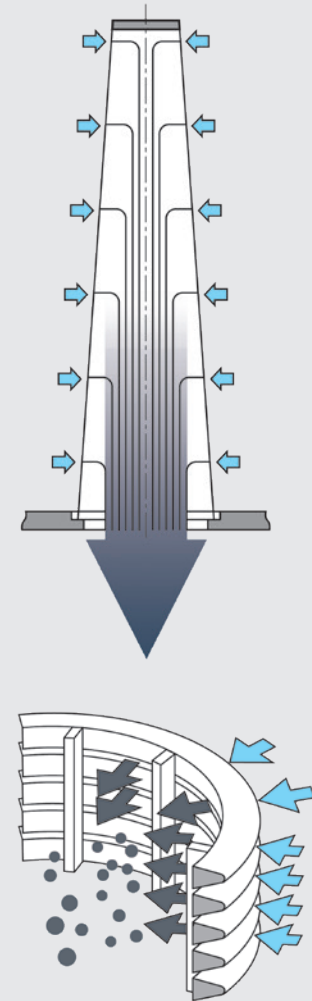
Mode of operation

Filtration



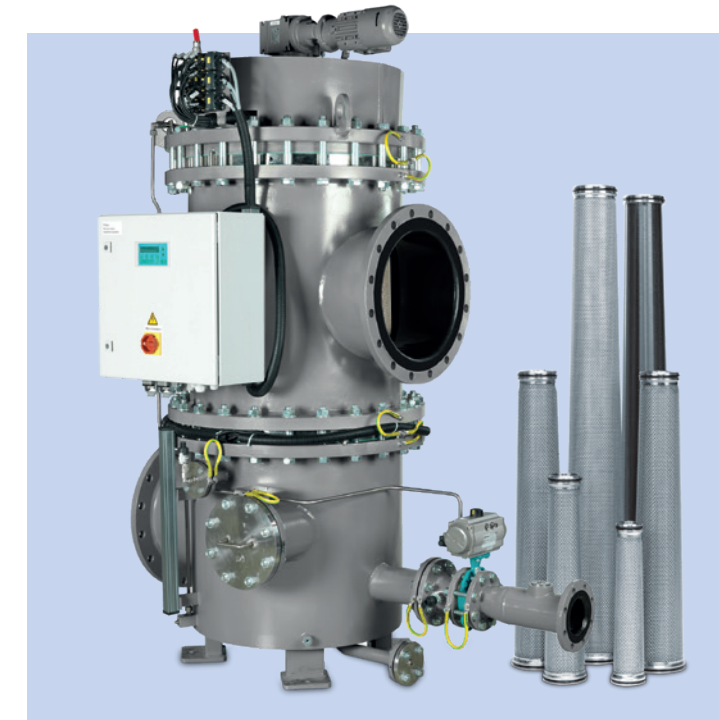
- The medium being filtered flows through the filter elements from the inside to the outside
- Contamination particles then collect on the smooth inside of the filter elements
- As the level of contamination increases, the differential pressure between the contaminated and clean sides of the filter increases. If 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: During automatic back-flushing, the pneumatic drive rotates the filter element plate, including the filter elements, into the correct position, so that a contaminated filter element sits over the flushing opening
- The back-flush valve is opened
- The pressure drop between filtrate side and back-flush line flushes a small amount of the filtrate back through the contaminated filter elements
- The contaminant particles deposited on the inside of the filter elements are loosened and flushed into the back-flush line via the flushing arm

The Specialist for Low Pressure – Automatic Filter AutoFilt® RF10



Product description

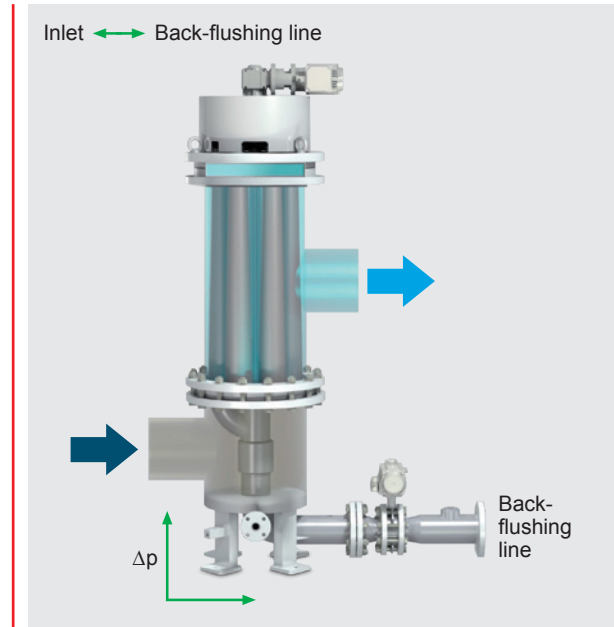
- Self-cleaning automatic filter
- Hydrodynamic suction effect
- Conical JetFlush technology

Filter element technology

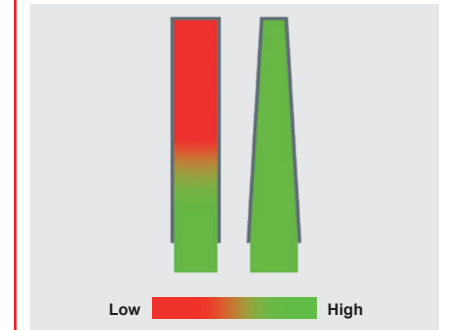
- Conical filter elements
- Wedge wire: 50 to 3000 µm
- SuperMesh wire mesh: 25 to 60 µm

Product advantages

- Back-flushing independent of pressure on clean side of filter
- Dependent only on the inlet pressure
- Highly efficient back-flushing with low pressure conditions and long back-flush lines
- Suitable for high contamination loads and contamination peaks



Back-flushing independent of pressure on clean side of filter



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

Specifications

| | |
|------------------------------|--------------------------|
| Nominal size | • DN 100 – DN 600 |
| Volume flow Q_{max} | • 3500 m ³ /h |
| Operating pressure p_{max} | • 6 bar |
| Filtration ratings | • 25 µm to 3000 µm |

AutoFilt® RF10

| | |
|------------------------------|--------------------------|
| Nominal size | • DN 100 – DN 600 |
| Volume flow Q_{max} | • 3500 m ³ /h |
| Operating pressure p_{max} | • 6 bar |
| Filtration ratings | • 25 µm to 3000 µm |

The Professional for Filtration < 40 µm – Automatic Filter AutoFilt® RF14



Product description

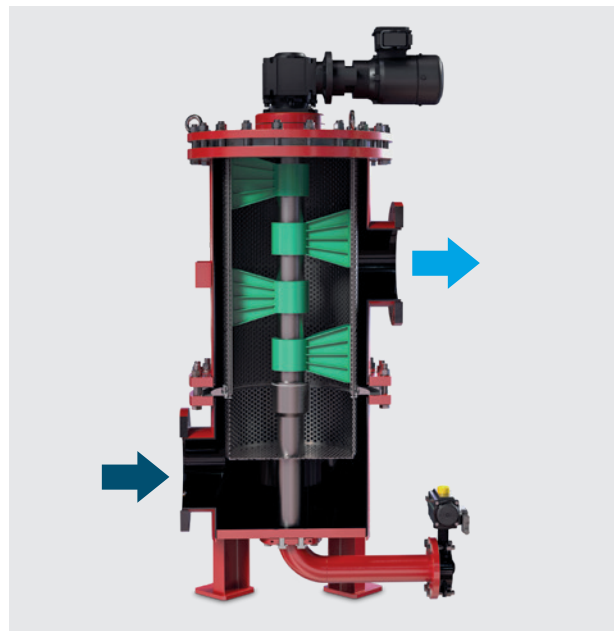
- Basket-based back-flushing filter system
- Self-cleaning automatic fine filter
- Separation of suspended solid particles from low viscosity fluids
- HySuction – optimised back-flushing technology

Filter element technology

- Plain screen baskets for challenging types of dirt and Δ-mesh baskets for maximum power density
- Innovative mesh structures for maximum service life
- Fine stainless steel mesh in standard with filtration ratings of 20 to 80 µm

Product advantages

- Fully automatic back-flushing reduces the operating costs
- Uninterrupted filtration
- Flow-optimised filter design
- High process reliability thanks to HySuction back-flushing
- Optimum regeneration of the filter baskets for wide range of dirt types and filtration ratings
- Axial gap technology offers maximum process reliability
- Basket technologies can be changed even for existing filters
- Filter design particularly maintenancefriendly
- Davit available as an option



Sectional drawing for AutoFilt® RF14

| Specifications | AutoFilt® RF14 |
|-------------------------------------|--------------------------|
| Nominal size | ● DN 50 – DN 700 |
| Volume flow Q _{max} | ● 4460 m ³ /h |
| Operating pressure p _{max} | ● 6 bar* |
| Filtration ratings | ● 20 µm to 80 µm |

Function

Filtration

- The fluid to be filtered flows through the filter basket of the back-flushing filter, 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 and the clean side increases
- When the differential pressure reaches the pre-set 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 the radial direction, back-flushing the filter mesh
- No interruption of the filtrate flow during back-flushing

Initiation of automatic back-flushing

You can choose how the back-flushing is initiated:

- When the pre-set triggering differential pressure is exceeded
- By means of set time override
- By pressing the “TEST” button

Procedure for automatic back-flushing – back-flush cycle

- When the back-flushing is initiated, the gear motor starts and rotates the axially arranged cleaning device with individual cleaning nozzles
- The back-flush valve in the back-flush line is opened
- Due to the differential pressure arising between filtrate line and back-flush line, a partial reversal of flow occurs in the area surrounding the cleaning nozzles
- Part of the filtrate flows from outside to 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 the filter basket being entirely cleaned
- Once the back-flush cycle is complete, the back-flush valve in the back-flush line closes and the rotation of the motor stops

Illustration of the filtration

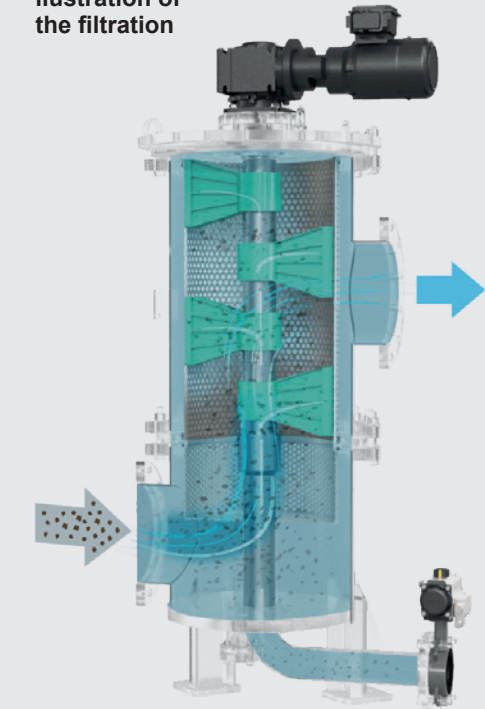
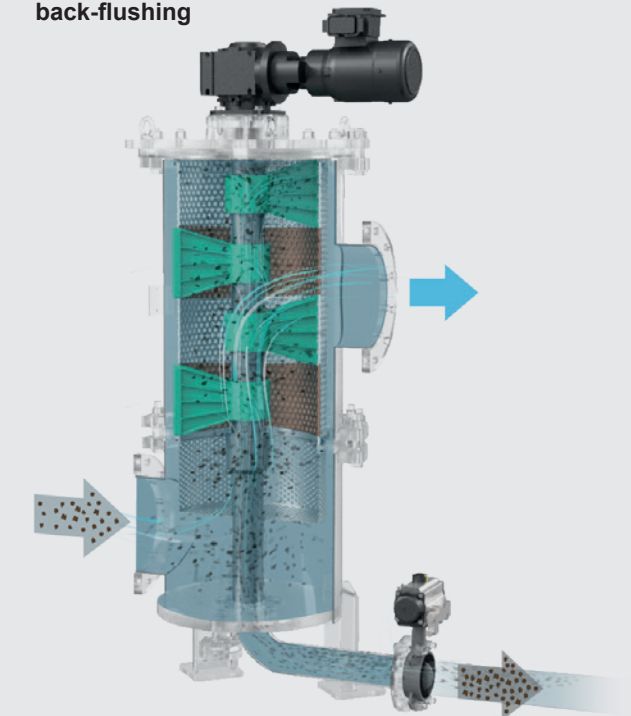


Illustration of back-flushing



Bodyguard for High Requirements – Inline Filter PLF1 up to 200 m³/h






Product description

- Continuous separation of solids from low viscosity fluids
- One-step filter housing for up to two filter elements
- Flow rates up to 200 m³/h

Filter element technology

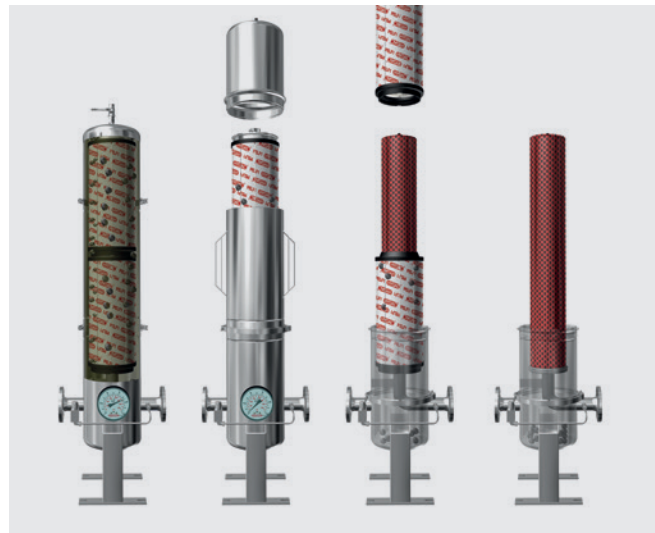
- High quality filter elements made from polyester or polypropylene
- Multi-layer filter mat construction
- Staged (graduated) depth filtration
- Protection for the clean side

Processmicron® filter elements in 3 versions:

-  **1) Work filtration:**
Larger flow surface for higher contamination loads
→ HighFlow 6"
-  **2) Comprehensive work filtration:**
Double the safety, even for contamination peaks due to cascade effects
→ HighLoadCascade 9"
-  **3) Protective filtration:**
High volumetric flows
→ HighFlow 9"

Product advantages

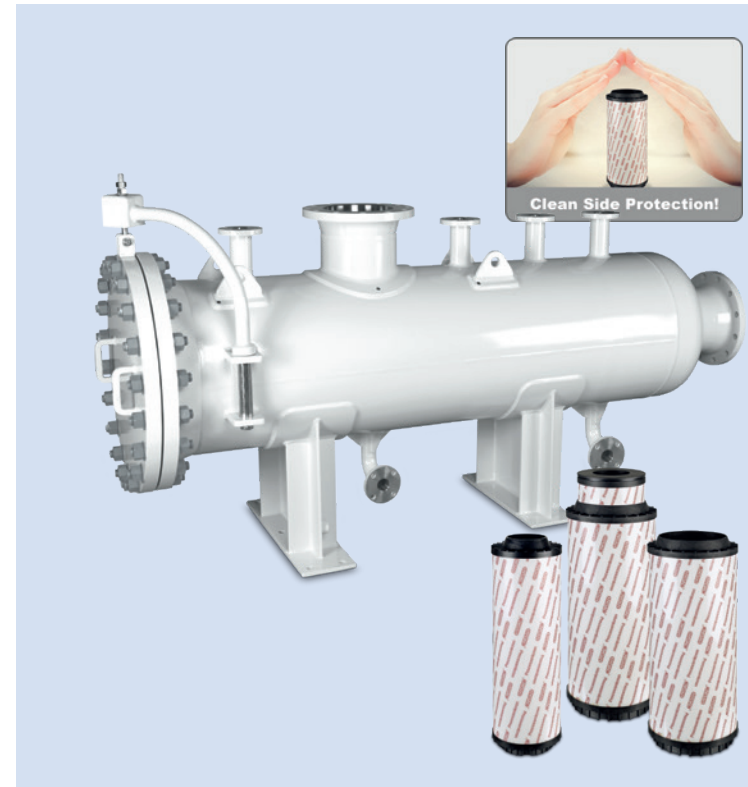
- Excellent deposition rates
- Low pressure drops due to large cross sections and filter areas
- Very large filter area per filter element
- Compact design with high flow rates
- Flow-optimised design
- Protection of the clean side during element change
- High contamination retention capacity
- Modular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



Sectional and functional drawing for PLF1

| Specifications | PLF1 Inline Filters |
|-------------------------------------|-------------------------|
| Nominal size | ● DN 40 – DN 150 |
| Volume flow Q _{max} | ● 200 m ³ /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 solids from low viscosity fluids
- One-step filter housing for up to 21 filter elements
- Flow rates up to 3000 m³/h

Filter element technology

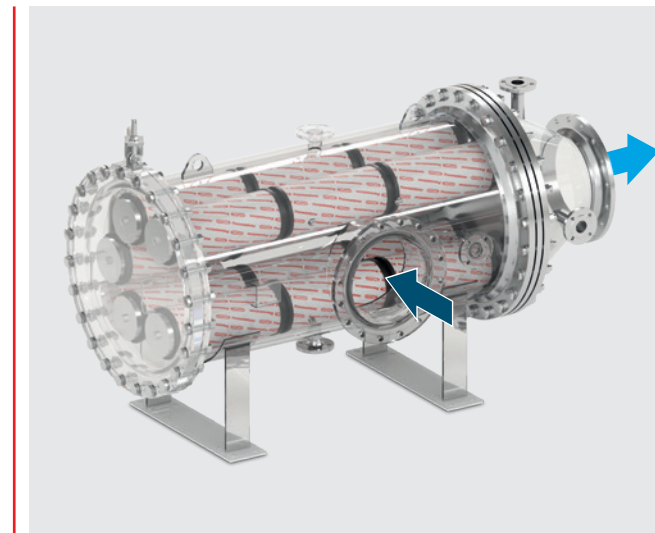
- High quality filter elements made from polyester or polypropylene
- Multi-layer filter mat construction
- Staged (graduated) depth filtration
- Protection for the clean side

Processmicron® filter elements in 3 versions:

-  **1) Work filtration:**
Larger flow surface for higher contamination loads
→ HighFlow 6"
-  **2) Comprehensive work filtration:**
Double the safety, even for contamination peaks due to cascade effects
→ HighLoadCascade 9"
-  **3) Protective filtration:**
High volumetric flows
→ HighFlow 9"

Product advantages

- Excellent deposition 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 design
- Protection of the clean side during element change
- High contamination retention capacity
- Modular design gives optimal flexibility in catering for every application



Sectional view PLF2

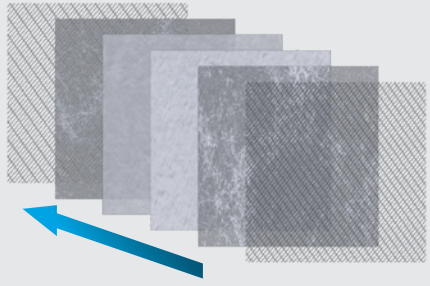
| Specifications | PLF2 Inline Filters |
|-------------------------------------|--------------------------|
| Nominal size | ● DN 200 – DN 600 |
| Volume flow Q _{max} | ● 3000 m ³ /h |
| Operating pressure p _{max} | ● 16 bar |
| Filtration ratings | ● 1 µm to 90 µm |

Processmicron® Filter Elements for Series PLF1 and PLF2

Technical data

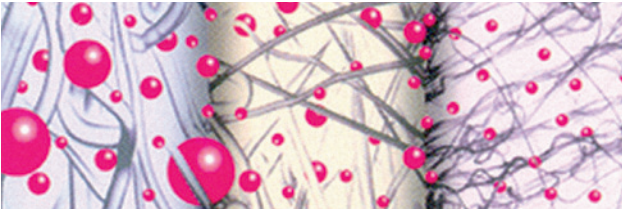
- Filtration ratings: 1 µm to 90 µm
- Length: 20", outer diameter 6" or 9"
- Type of filter element pleated or Spun Spray
- Filter material: polyester or polypropylene

Design of Processmicron® Filter Elements



Multi-layer filter mat construction


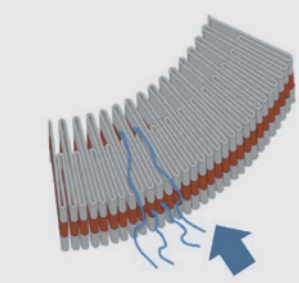


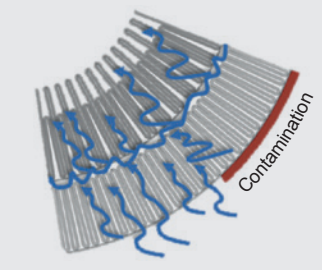


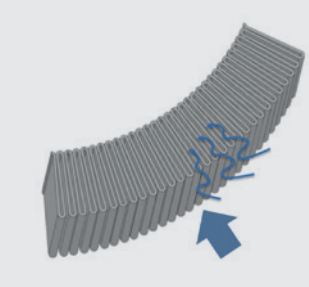

- Robust and high-quality layer structure
→ No skewing of the filter layers
- High contamination retention
- Low pressure loss



Staged (graduated) depth filtration

- High purity in single passage
- High layer thickness of the filter medium
→ High storage volume for contamination

The right filter element for optimal particle filtration

| | | |
|---|---|---|
|  |  | <div style="text-align: center;">  <h3>HighFlow 6"</h3> </div> <p>Working filtration:</p> <ul style="list-style-type: none"> ● M-pleat ● Optimised, enlarged upstream area for high polluting loads |
|  |  | <div style="text-align: center;">  <h3>HighLoadCascade 9"</h3> </div> <p>Comprehensive working filtration:</p> <ul style="list-style-type: none"> ● Combination of parallel folds (outside) and M-folds (inside) ● Double security, even with contamination surges, thanks to cascading effect ● Selection of filter layers precisely tailored to the filtration task at hand (outer and inner layers) |
|  |  | <div style="text-align: center;">  <h3>HighFlow 9"</h3> </div> <p>Protective filtration:</p> <ul style="list-style-type: none"> ● Pleated filter element construction (parallel folding) ● High flow rates ● Extreme fold stability through parallel folding at large filter element circumference |

Insurance against Downtimes – Candle Filters PMRF



Product description

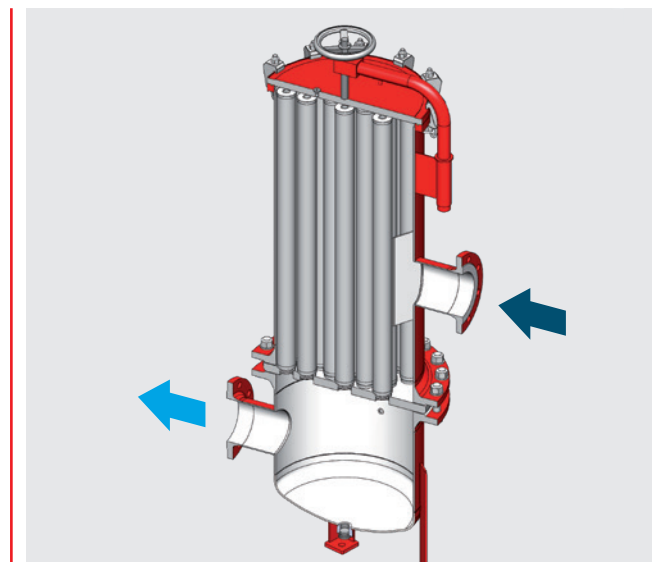
- Separation of solid particles from low viscosity fluids
- Suitable for applications with the highest cleanliness requirements
- Tried-and-tested candle filter technology for finest filtration
- Also available as a switchable double filter

Filter element technology

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

Product advantages

- Economic operation through high quality standards, defined filtration rates and high separation values
- Compact housing with high flow rates
- Service-friendly for filter element change
- Efficient system and component protection
- Environmentally safe disposal, as incinerable



Sectional view PMRF

| Specifications | PMRF Candle Filters |
|------------------------------|---------------------|
| Nominal size | ● G 1" – DN 250 |
| Volume flow Q_{max} | ● 1200 m³/h |
| Operating pressure p_{max} | ● 40 bar |
| Filtration ratings | ● 1 µm to 90 µm |



Accumulator Technology 30,000



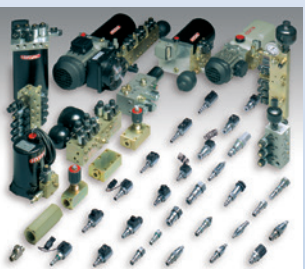
Filter Technology 70,000



Process Technology 77,000



Filter Systems 79,000



Compact Hydraulics 53,000



Accessories 61,000

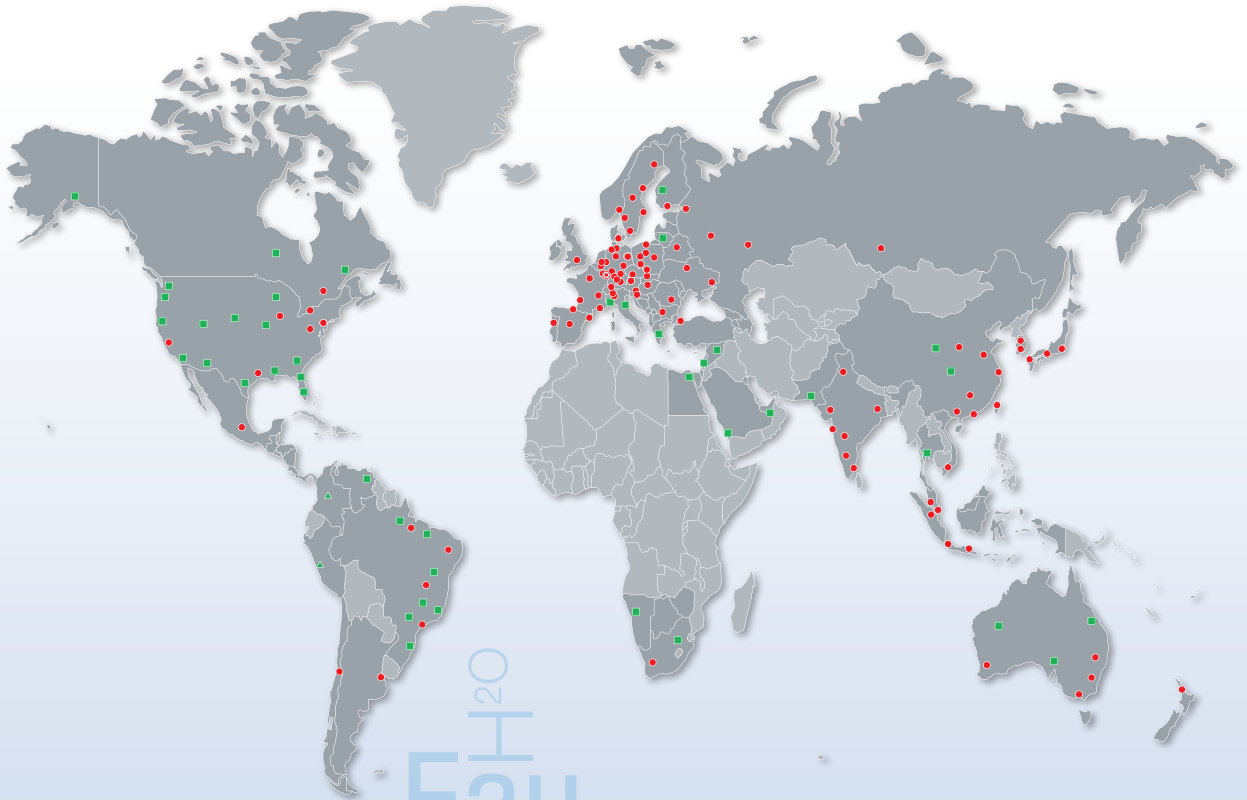


Electronics 180,000



Cooling Systems 57,000

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