Filtration in Industrial Processing.
### Contents

#### Introduction
- Your Partner in the Filtration of Process Media 3
- Industries and Applications 6

#### Filter Element Technology
- Filter Materials 7
- Filter Elements 9
- Special Features of Filter Element Technology 10

#### Product Overview
- Automatic Back-flushing Filters AutoFilt® 11
- Inline and Screen Basket Filters 12
- Gas Filters 14
- System Solutions 15
- Clogging Indicators 16

#### Know-how
- Process Media 17
- Selecting the Correct Process Filter 21

#### Appendix
- Filter Specification Questionnaire 22
- ATEX Check List 23

### 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.
HYDAC – Worldwide and local

With over 7,000 employees worldwide, HYDAC is one of the leading suppliers of fluid technology, process technology, hydraulic and electronic equipment. With 45 overseas companies and more than 500 sales and service partners, HYDAC is your trusted and competent partner.

Our wide range of products, combined with our expertise in development, manufacturing, sales and service meets the vast range of requirements in the filtration of process media worldwide.

Our quality and environment certification to ISO 9001/2000 and ISO 14001 denote first class quality and responsible management of our resources.

HYDAC Process Technology GmbH

HYDAC has been a leading manufacturer of hydraulic components for well over 50 years. Within the HYDAC Group, HYDAC Process Technology GmbH is your contact for filtration solutions and element technology for the process technology, chemical and plastics processing industry.

Today, HYDAC Process Technology GmbH is in a leading market position with world-wide service and sales.

The Product Range

The product range includes components for filtering low to high viscosity as well as gaseous media:

- Automatic back-flushing filter in the AutoFilt® series
- Inline and screen basket filters in single and duplex versions
- Gas filters
- Filter elements (also customized designs)
- Filter systems and customized solutions

Neat Solutions for High-purity Media

The products which you will find in this catalogue are the culmination of numerous field tests, research in HYDAC’s own laboratory and decades of experience.

Our aim is to become your partner in the field of filtration.

Our expertise in filtration technology, high quality products and experience with filtration solutions for virtually all industries explains why we also hope to be your first point of contact.
Poor product quality

Improvement of the quality of the medium

Component wear, in extreme cases failure

No interruption to operation

Decreased cooling capacity

Consistently high quality

Reduced maintenance costs

Reduced production costs

Reduced service life

Extension of operating time

You too can benefit by installing HYDAC process filters!

HYDAC filters for process technology are high quality products which make a significant contribution to the safe function and to the extension of the service life of components, system and machines.

The HYDAC FluidCareCenter

You can count on top quality and innovation.

Development at HYDAC is characterised by designs based on test results from our research and test laboratories as well as field analyses. These designs are incorporated into application-orientated filtration systems and take the requirement profiles of users and providers into account.

In the HYDAC FluidCareCenter, in collaboration with our customers, we develop innovative projects in a wide range of industries. A skilled development team, using state-of-the-art computer-aided analysis, measuring and testing equipment and test rigs, ensures prompt implementation of the project. (see brochure on the FCC 7.128.1)
With us your Process Medium is in Good Hands …

The specialists at HYDAC have a good knowledge of the fluid you use and will gladly take care of its filtration. You will see for yourself the clear benefit of having a system that works perfectly, leaving you to concentrate fully on your area of expertise.

In deciding for a HYDAC product, you will benefit at the same time from the HYDAC network of expertise and service available worldwide:

**Inspection – Classification – Certification**

Collaboration with inspection, classification and certification bodies is part of our daily business.

Our products are developed and manufactured according to their specification, as required. Additional certification can of course be undertaken on request.

**ATEX Products**

HYDAC also has products which are suitable for use in potentially explosive atmospheres.

We will be pleased to send you our ATEX specification questionnaire.

**Customized Solutions**

- Flexible flange connections (JIS, DIN, ANSI)
- Various design pressures available
- RAL or other colour code
- Wide range of power supplies
- Digital or analogue signals to customer interfaces

The specialists at HYDAC have a good knowledge of the fluid you use and will gladly take care of its filtration. You will see for yourself the clear benefit of having a system that works perfectly, leaving you to concentrate fully on your area of expertise.

In deciding for a HYDAC product, you will benefit at the same time from the HYDAC network of expertise and service available worldwide:
Industries and Applications

Steel industry
- Filtration of the process water to protect the nozzles and pumps in high pressure descaling
- Water conditioning for cooling blast furnaces and rolling mills
- Emulsion filtration in cold rolling mills

Paper industry
- Protection of all types of nozzles on paper machines.
- Treatment of fresh water (e.g. river water) to be used for cooling
- Seal water filtration for vacuum pumps

Power plants
- Conditioning of industrial water for generator cooling
- Filtration of seal water to increase the service life of the turbine shaft rotary seals in hydropower stations
- Protection of heat exchangers in thermal power plants

Automotive industry
- Filtration of cooling lubricants and washing fluids to extend service intervals
- Treatment of cooling and process water for different applications

Machine tools
- Improving the quality of cooling lubricants
- Extension of service lifetimes
- Protection of tools, consistent quality of the manufactured parts

Mining
- Filtration of water for sprinkling the shield and cutting machines
- Treatment of cooling water for mine ventilation
- Protective filtration for water hydraulics underground
- Filters for filtering HFA fluids

Oil and gas industry
- Filtration of injection water
- Filtration of cooling and service water
- Filtration of flushing water (pipeline flushing)
- Filtration of seal gas for dry gas seals

Marine
- Pre-filtration for ballast water treatment systems

Water / waste water conditioning
- Protective filter before membrane systems
- Conditioning of service water in sewage treatment plants
- Increase in service life

Chemical industry
- Cooling water and waste water filtration
- Filtration of a wide variety of chemicals

Plastics industry
- Polymer melt filtration

Further applications
- Water pre-filtration for snow-making equipment
  ... and much more
### Filter Materials

The core of each filter is the filter element. To a large extent, they determine the efficiency. For this reason, HYDAC filters are made using only the best filter materials which meet the highest standards in respect of stability, long life and cleanability.

<table>
<thead>
<tr>
<th>Filter materials</th>
<th>Characteristics</th>
<th>Retention rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface filtration:</strong></td>
<td>Particle are separated primarily at the surface of the filter material. Once a pre-set pressure drop is achieved or according to fixed intervals, the filter materials are cleaned and the filtration process can continue continuously or intermittently.</td>
<td><strong>Nominal:</strong> The test filter must retain 90 – 95 % of all particles larger than the given filtration rating.</td>
</tr>
<tr>
<td><strong>Depth filtration:</strong></td>
<td>The operating fluid being cleaned penetrates the filter structure. The contaminating particles become trapped in the deeper layers of the filter. The flow resistance increases as the media becomes more and more clogged, which means that the filter element must be replaced.</td>
<td><strong>Absolute:</strong> The test filter must retain at least 99 % of all particles larger than the given filtration rating.</td>
</tr>
</tbody>
</table>

### Cleanable Filter Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
<th>Filtration</th>
<th>Material</th>
<th>Filtration rating in µm</th>
<th>Retention rate</th>
<th>Temperature in °C</th>
<th>Used in following HYDAC filters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicron® metal fibre</td>
<td></td>
<td>Surface</td>
<td>Stainless steel</td>
<td>1 to 100</td>
<td>Nominal</td>
<td>400</td>
<td>Inline filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td></td>
<td>0.5 to 25 for gases</td>
<td>Absolute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire mesh (Dutch weave)</td>
<td></td>
<td></td>
<td>Stainless steel</td>
<td>25 to 60</td>
<td></td>
<td>400</td>
<td>Inline filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Automatic back-flushing filters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire mesh Square mesh</td>
<td></td>
<td></td>
<td>Stainless steel</td>
<td>100 to 500</td>
<td></td>
<td>400</td>
<td>Inline filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Automatic back-flushing filters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slotted tube</td>
<td></td>
<td></td>
<td>Stainless steel</td>
<td>50 to 3,000</td>
<td></td>
<td>400</td>
<td>Inline filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Automatic back-flushing filters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perforated plate</td>
<td></td>
<td></td>
<td>Stainless steel</td>
<td>3,000 to 10,000</td>
<td></td>
<td>400</td>
<td>Screen basket filter</td>
</tr>
</tbody>
</table>
## Filter Materials

### Non-cleanable Filter Materials

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Material</th>
<th>Filtration rating in µm</th>
<th>Retention rate</th>
<th>Temperature in °C</th>
<th>Used in following HYDAC filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betamicron®</td>
<td>Glass fibre</td>
<td>3 to 20</td>
<td></td>
<td>95</td>
<td>Inline filter</td>
</tr>
<tr>
<td>Synthetic non-woven material</td>
<td>PP / PES / Nylon</td>
<td>1 to 100</td>
<td></td>
<td>95</td>
<td>Inline filter</td>
</tr>
<tr>
<td>Filter bag</td>
<td>PP / PE / Nylon</td>
<td>1 to 1,000</td>
<td></td>
<td>80</td>
<td>Inline filter</td>
</tr>
<tr>
<td>Description</td>
<td>Features</td>
<td>Type</td>
<td>Filtration rating in µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conical filter elements for HYDAC AutoFilt®</td>
<td>• Low viscosity fluids</td>
<td>Slotted tube, conical</td>
<td>50 – 3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Isokinetic filtration and back-flushing</td>
<td>SuperMesh, conical</td>
<td>25, 40, 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Residue-free cleaning</td>
<td>Slotted tube, conical, SuperFlush coating</td>
<td>50 – 3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fewer back-flushing cycles</td>
<td>SuperMesh, conical, SuperFlush coating</td>
<td>25, 40, 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lower back-flushing losses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Even flow characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inline and pressure filter elements</td>
<td>• Low to high viscosity fluids</td>
<td>Slotted tube, cylindrical</td>
<td>50 – 3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Standard and customised models</td>
<td>Chemicron®</td>
<td>3 – 20 (absolute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Excellent differential pressure stability</td>
<td>Wire mesh</td>
<td>25 – 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High porosity</td>
<td>Flexmicron®</td>
<td>1 – 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pressure filter elements up to 210 bar ∆p</td>
<td>Betamicron®</td>
<td>3 – 20 (absolute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter elements for gas filters</td>
<td>• High level of defined filtration efficiency</td>
<td>Chemicron®</td>
<td>0.5 – 25 (absolute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low pressure drop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High contamination retention capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• End caps and connection adaptors crimped – no bonding agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No electrostatic charging</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen basket filter elements</td>
<td>• Low viscosity fluids</td>
<td>Wire mesh</td>
<td>25 – 1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pre-filtration</td>
<td>Slotted tube</td>
<td>50 – 3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coarse filtration</td>
<td>Perforated plate</td>
<td>3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PELF Inline filter elements</td>
<td>• Low viscosity fluids</td>
<td>Polyester, pleated</td>
<td>1 – 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Very large filter area per element &gt;5 m²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low pressure drops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High contamination retention capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High filtration efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexmicron Inline filter elements</td>
<td>• High contamination retention capacity</td>
<td>Flexmicron Economy®</td>
<td>1 – 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Long service life</td>
<td>Flexmicron Standard®</td>
<td>1 – 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact housing with high flow rates</td>
<td>Flexmicron Premium®</td>
<td>1 – 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Betamicron® Inline filter elements</td>
<td>• High contamination retention</td>
<td>Betamicron®</td>
<td>3 – 20 (absolute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High level of particle removal over a wide differential pressure range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High resistance to fluctuations in pressure and flow rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter bag</td>
<td>• Low viscosity fluids</td>
<td>Filter bag</td>
<td>1 – 1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Continuous removal of solid particles</td>
<td>PP/PE/Nylon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flow direction from inside to outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| SuperMesh conical filter     | • Suitable for low viscosity fluids  
• Used for applications with the highest cleanliness requirements  
• Filtration ratings from 20 µm to 120 mm  
• 3 layers of sintered wire mesh  
• Element technology for HYDAC AutoFilt® automatic back-flushing filters  
• No additional support structure  
• Large open filter area  
• Highly efficient cleaning due to optimal velocity distribution in the element layers  
• No adhesion or "build-up" of particles between the element layers  
• Consistent pore structure  
• Low pressure drop  
• Very good cleaning  
• Isokinetic filtration and back-flushing | Efficiency of back-flushing                                                                                                                  |
| Special elements             | • Suitable for low to high viscosity media (polymer melts, acids, alkalis, water, superheated steam, gas)  
• Used in industrial processing, the chemical industry and the plastics processing industry  
• Filter materials: Chemicron® metal fibre, wire mesh or mesh combination  
• Sizes according to customer specification  
• Connection according to customer specification  
• Differential pressure up to 210 bar  
• High contamination retention capacity  
• High porosity up to 90 % | Cylindrical vs. conical                                                                                                                   |
| SuperFlush coating           | • Suitable for low viscosity fluids  
• Can be used in virtually all sectors of industry  
• Unique coating technology  
• Available as an option for conical filter elements  
• Standard in HYDAC ballast water applications  
• Prevents particle build-up on the filter element surface  
• Gel-like particles do not adhere to the filter element surface  
• Prevents biofouling  
• Increased service life  
• Increased efficiency |
HYDAC automatic back-flushing filters AutoFilt® are designed for continuous or intermittent filtration in all areas of industry and in water treatment. HYDAC AutoFilt® automatic back-flushing filters are self-cleaning systems for the removal of solid particles from fluids. They make a great contribution to operational reliability and reduce operating and maintenance costs.

- Temperatures up to 90 °C
- Pressures up to 350 bar
- Filtration ratings from 15 to 10,000 µm
- Flow rates up to 10,000 m³/h

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Flow Rate</th>
<th>Operating Pressure</th>
<th>Filtration Ratings</th>
<th>Filter Element Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoFilt® RF3</td>
<td>10,000 m³/h</td>
<td>100 bar</td>
<td>25 to 3,000 µm</td>
<td>Conical slotted tube, Wire mesh, SuperMesh, SuperFlush coating optional</td>
</tr>
<tr>
<td>AutoFilt® RF4</td>
<td>220 l/min</td>
<td>16 bar</td>
<td>25 to 1,000 µm</td>
<td>Conical slotted tube, Wire mesh, SuperMesh, SuperFlush coating optional</td>
</tr>
<tr>
<td>AutoFilt® RF5</td>
<td>4,200 m³/h</td>
<td>10 bar</td>
<td>200 to 3,000 µm</td>
<td>Conical slotted tube</td>
</tr>
<tr>
<td>AutoFilt® RF7</td>
<td>7,500 m³/h</td>
<td>10 bar</td>
<td>25 to 3,000 µm</td>
<td>Conical slotted tube, Wire mesh, SuperMesh, SuperFlush coating optional</td>
</tr>
<tr>
<td>AutoFilt® RF10</td>
<td>3,000 m³/h</td>
<td>6 bar</td>
<td>40 to 3,000 µm</td>
<td>Conical slotted tube, Wire mesh, SuperMesh, SuperFlush coating optional / Standard in ballast water applications</td>
</tr>
<tr>
<td>AutoFilt® ATF</td>
<td>400 m³/h</td>
<td>16 bar</td>
<td>200 to 3,000 µm</td>
<td>Conical slotted tube, SuperFlush coating optional</td>
</tr>
<tr>
<td>AutoFilt® RFH</td>
<td>800 l/min</td>
<td>350 bar</td>
<td>25 to 500 µm</td>
<td>Slotted tube, Wire mesh</td>
</tr>
</tbody>
</table>
HYDAC inline filters are designed for the toughest applications in process technology. They provide effective filtration of all types of solid contamination. Numerous designs and filter materials ensure the best fit to the filtration task and the given process conditions.

- Temperatures up to 400 °C
- Pressures up to 1,000 bar
- Filtration ratings from 1 (absolute) to 10,000 μm
- Flow rates up to 3,600 m³/h

<table>
<thead>
<tr>
<th>Flow rate Q&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Operating pressure P&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Filtration ratings</th>
<th>Filter element type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRFL / PRFLD</td>
<td></td>
<td></td>
<td>Betamicron®, Chemicron®, Wire mesh, Slotted tube</td>
</tr>
<tr>
<td>3,600 m³/h</td>
<td>64 bar</td>
<td>3 to 3,000 μm</td>
<td></td>
</tr>
<tr>
<td>PRFS / PRFSD</td>
<td></td>
<td></td>
<td>Wire mesh, Slotted tube, Perforated sheet</td>
</tr>
<tr>
<td>3,600 m³/h</td>
<td>16 bar</td>
<td>25 to 3,000 μm</td>
<td></td>
</tr>
<tr>
<td>PMRF / PMRFD</td>
<td></td>
<td></td>
<td>Flexmicron Economy®, Flexmicron Standard®, Flexmicron Premium®</td>
</tr>
<tr>
<td>1,200 m³/h</td>
<td>40 bar</td>
<td>1 to 90 μm</td>
<td></td>
</tr>
<tr>
<td>PFM / PFH / PFMD / PFHD</td>
<td></td>
<td></td>
<td>Chemicron®, Wire mesh, Slotted tube</td>
</tr>
<tr>
<td>120 l/min</td>
<td>100 bar</td>
<td>1 to 2,000 μm</td>
<td></td>
</tr>
</tbody>
</table>
## Inline and Screen Basket Filters

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Flow rate $Q_{\text{max}}$</th>
<th>Operating pressure $P_{\text{max}}$</th>
<th>Filtration ratings</th>
<th>Filter element type</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDF</td>
<td>300 l/min</td>
<td>400 bar</td>
<td>3 to 250 µm</td>
<td>Betamicron®, Chemicron®, Wire mesh</td>
</tr>
<tr>
<td>PBF</td>
<td>500 l/min</td>
<td>10 bar</td>
<td>1 to 1,000 µm</td>
<td>Filter bag</td>
</tr>
<tr>
<td>PLF1</td>
<td>1,440 l/min</td>
<td>16 bar</td>
<td>1 to 90 µm</td>
<td>PELF</td>
</tr>
</tbody>
</table>
## Gas Filters

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Operating pressure P&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Operating temperature</th>
<th>Filtration ratings</th>
<th>Filter material</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCF</td>
<td>up to 500 bar</td>
<td>-35 °C to +225 °C</td>
<td>0.5 to 25 µm</td>
<td>Chemicron®</td>
</tr>
<tr>
<td>GCF with cyclone</td>
<td>up to 500 bar</td>
<td>-35 °C to +225 °C</td>
<td>0.5 to 25 µm</td>
<td>Chemicron®</td>
</tr>
<tr>
<td>GCF Double Block &amp; Bleed</td>
<td>up to 500 bar</td>
<td>-35 °C to +225 °C</td>
<td>0.5 to 25 µm</td>
<td>Chemicron®</td>
</tr>
<tr>
<td>GPF</td>
<td>up to 500 bar</td>
<td>-35 °C to +225 °C</td>
<td>0.5 to 25 µm</td>
<td>Chemicron®</td>
</tr>
<tr>
<td>GDS</td>
<td>up to 250 bar</td>
<td>-35 °C to +225 °C</td>
<td>&gt;15 mm*</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>GCS</td>
<td>up to 250 bar</td>
<td>-35 °C to +225 °C</td>
<td>Aerosols &gt; 7 mm*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Particles &gt; 3 mm*</td>
<td></td>
</tr>
<tr>
<td>GF1</td>
<td>700 bar</td>
<td>-40 °C to +85 °C</td>
<td>1 to 25 µm</td>
<td>Chemicron®</td>
</tr>
</tbody>
</table>

* depending on the particular operating conditions
## Process Booster Block PBB

**Description:** Cooling lubricant supply for machine tools in the minimum amount of space:
- Protective filter – Automatic back-flushing filter AutoFilt® RF4-1
- Process monitoring
- Pressure control
- Pressure boost

**Technical Details:**
- Flow rate: 80 l/min for cooling lubricants
- Filtration ratings: 20 to 100 µm
- Max. operating temperature: +80 °C
- Max. operating pressure: 70 bar

## BTU Backflush Treatment Unit

**Description:** Back-flush treatment unit:
- HYDAC AutoFilt® automatic back-flushing filter for main filtration
- Process twist sieve for the treatment of the back-flushed volume
- Buffer tank with components
- Control

**Technical Details:**
- BTU 1: Add-on unit (incl. buffer tank, tank volume 150 l)
- BTU 3: Tank-top unit (for retrofitting to existing tank)
- Filtration ratings for process twist sieves: 25 to 150 µm SuperMesh mesh
- Filtration ratings for bag filters: 25 to 150 µm
- Filtration ratings for RF: 25 µm to 150 µm

## AutoFilt® TwistFlow Strainer ATF Skid

**Description:** In order to filter high flow rates, the TwistFlow Strainer AutoFilt ATF can also be supplied as a skid solution. Special models also possible with back-flushing incorporated

**Technical Details:**
- Example:
  - Flow velocity: approx. 600 m³/h
  - Filtration rating: 200 to 3,000 µm
  - Materials: stainless steel, carbon steel

---

**Individual system solutions on request and to customer specification**
HYDAC clogging indicators are designed to indicate visually and/or electrically when the filter elements must be changed or cleaned.

- Differential pressure indicators
- Visual, electrical or analogue differential pressure signal
- Wide range of pressure settings
- Optional electrical ATEX indicator

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Pmax [bar]</th>
<th>Pressure setting [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVD x B.x</td>
<td>420</td>
<td>1, 1.5, 2, 3, 5, 8</td>
</tr>
<tr>
<td>PVD x C.x</td>
<td>420</td>
<td>1, 1.5, 2, 3, 5, 8</td>
</tr>
<tr>
<td>PVD x D.x/-L</td>
<td>420</td>
<td>1, 1.5, 2, 3, 5, 8</td>
</tr>
<tr>
<td>V01 x VZ.x</td>
<td></td>
<td>160 0.8, 2.0, 4.3</td>
</tr>
<tr>
<td>DS11</td>
<td></td>
<td>25, 40 on request 0 - 1.6, 0 - 4</td>
</tr>
<tr>
<td>PVL x GW</td>
<td>25</td>
<td>0.5, 1, 1.5, 2, 3, 5</td>
</tr>
<tr>
<td>HDA 4xxx</td>
<td></td>
<td>on request -</td>
</tr>
<tr>
<td>EDS 3xxx/8xxx</td>
<td></td>
<td>on request -</td>
</tr>
</tbody>
</table>
Many industrial companies require different types of process and service water for their production and manufacturing processes. These include, for example, water for cooling purposes, washing and flushing water, seal water for rotary seals, service water to prepare chemical solutions etc. The use of drinking or mains water for such applications is too expensive as a rule and so ground or surface water is utilised for these purposes. Depending on the application and the quality of the raw water, more or less complex treatment is required for the water to obtain the required water quality.

Invariably in all water treatment processes, filtration of the solid particles suspended in the untreated water is required to guarantee operationally safe recovery of process and service water. Owing to its broad product range of automatic back-flushing filters as well as inline and screen basket filters, HYDAC can provide the correct process filter for virtually all areas of application and industries.

Ballast Water

Water is required to provide ballast depending on the load condition of the ship. Up to now, there has been the risk of sea-life being transported to areas causing damage to the ecosystem as a result of the exchange of ballast water.

For this reason, so-called ballast water treatment systems are to be installed on ships in future. By using mostly two-stage systems which consist initially of a pre-filtration stage followed secondly by disinfection (such as electrolysis, UV irradiation or ozonation systems) harmful microorganisms and viruses are killed. The automatic back-flushing filter AutoFilt® series from HYDAC is ideally suited to pre-filtration and already has a proven track-record in numerous installations.
Cooling Lubricant

Functions of cooling lubricants
Cooling lubricants are used in modern manufacturing for cutting and forming with machine tools and primarily for the following tasks.

- Lubrication
- Heat dissipation
- Transport
- Chip handling
- Flushing contamination away
- Reduced friction between tool / workpiece
tool / chip

The relative importance and emphasis of the individual criteria are dependent on the particular machining process. In addition, all cooling lubricants for metal machining are optimally tailored to numerous secondary requirements which also have positive implications for the user:

- Consistent stability for long term use due to perfect filtration
- Excellent corrosion protection
- Neutrality towards compatible elastomers, machine coatings
- Reduced outlay for machine failures and maintenance due to continuous conditioning
- Easy disposal

Range of cooling lubricants
Filtration of cooling lubricant

Even the best cooling lubricant will not function without conditioning!

In order to be able to obtain maximum usage from the cooling lubricant over a long time period, effective filtration is essential. All contamination which enters the system must also be removed from the system by filtration.

Polymer Melts

A specialist area of fluid filtration is in the production and processing of plastics. In addition to the impurities brought in from outside and caused by the manufacture of raw materials, the presence of gels and specks often causes further problems in production quality assurance.

Filtration using special filter elements in Chemicon (metal fibre), in filtration ratings of between 1 and 100 µm absolute, has proven most effective in this field. The filter elements are supplied in pleated form as standard or customised elements.

Application diagrams showing manufacture of pellets, fibre or film
Hydrogen

The European Union has committed itself to converting its transport and energy systems, by 2050, into low-carbon systems and to decoupling economic growth from resource and energy consumption. In combination with a fuel cell, hydrogen can provide a safe energy source which is flexible, decentralized and without emissions. It therefore represents a key technology to achieve these objectives.

Particularly in the automotive industry, hydrogen is gaining increasing importance as an alternative fuel. The cleanliness of the hydrogen is vitally important here for the lifetime of the fuel cell powered vehicles.

Following the launch of the PSA-H70 (HYDAC Accessories), which is a measuring cell for monitoring the H₂ cleanliness on 700 bar hydrogen fuel pumps, remarkably high levels of particle contamination could be detected irrespective of the compressor design or fuel pump manufacturer.

With the gas filter GF1, specially developed by HYDAC Process Technology for hydrogen fuel pumps up to 1,000 bar, it has been possible to draw on the knowledge and experience gained in the dry gas seal filtration sector. All filter elements consist of pleated filter materials which define the filtration rating and the contamination retention capacity and thus fulfil the requirements of hydrogen fuel pumps for the first time.

Seal Gas

HYDAC gas filters have been specially developed for use in dry gas seal systems for turbo compressors.

Dry gas seals of turbo machines are very complex systems and extremely sensitive to contamination by solid particles, aerosols and condensates. As the shaft rotates, a tiny gap of just 3 µm forms on the seal through which the seal gas flows. To protect these seals, the seal gases must be filtered appropriately to ensure the seal has as long a service life as possible.

Filter elements with a coalescing action (coalescer elements) are invariably used in all HYDAC seal gas filters. All the elements consist of pleated filter materials which define the micron rating and the contamination retention capacity, and coalescer materials which cause the fluid phase to coalesce.

The design criteria for HYDAC seal gas filters are clearly described in the API. The customer requirements take precedence, and these can be different to the API. HYDAC has developed special design software for sizing and matching the filter to the particular application.
**The Nature of the Medium being Filtered**

Unlike hydraulic media the solid contamination of process media is not classified according to ISO. No two applications requiring process media filtration are alike. Nevertheless, various parameters can be identified from which it is possible to make the best selection to match the filter to the particular process.

In addition to having an exact description of the application, one of the first steps in selecting the correct filter is the classification and analysis of the intended medium.

**Selecting the Filter Material and Filtration Rating**

The selection of the filter material and the filtration rating is determined by the existing system and the components requiring protection. In some cases coarse filtration is sufficient, in others, however, very fine filtration must be provided; complete cascade solutions are also possible. Therefore, it is important to follow the principle: fine enough, rather than as fine as possible!

Put your trust in a professional partner with more than 40 years experience in filtration.

**Sizing Process Filters**

Although there are no standards for selecting the appropriate process filter, there are nevertheless some helpful calculation principles which should be followed. We will be pleased to send you our filtration specification questionnaire and devise with you a filtration solution which is specially tailored to your requirements. HYDAC also offers products which are suitable for use in potentially explosive areas.
Filter Specification Questionnaire

Company: ___________________________ Telephone: ___________________________
Name: ______________________________ Fax: ________________________________
Address: ___________________________ Mobile: ________________________________
E-mail: _____________________________

Description of application (if necessary, enclose sketches):

__________________________________________________________________________

Medium:

Medium
Type of contamination
Fluid group (PED 97/23/EC)
Safety data sheet / CAS No.:__________________________

Viscosity ___________________________ cSt.
Contamination load ___________________________ mg/l

Group 1 (hazardous) Group 2 (non-hazardous)

(only if applicable)

Operating data:

P1: Operating pressure / Pressure at inlet
P2: Pressure at outlet***
P3: Back-flushing line pressure***
Operating temperature* ___________________________ °C

Flow velocity ___________________________ m³/h

Design data:

Design pressure ___________________________ bar
Flow velocity ___________________________ m³/h
Connection inlet/outlet
Required filter type
Filter material
Clogging indicator**
Type of control***
Compressed air***
Power supply voltage***

Design temperature ___________________________ °C
Filtration rating ___________________________ µm
Materials
Required filter type
Filter material
Clogging indicator**
Type of control***
Compressed air***
Power supply voltage***

Quantity

________________________________________________________________________

________________________________________________________________________

* If the maximum operating temperature of the fluid exceeds its boiling point, please contact Head Office
** Not required when using an automatic back-flushing filter
*** This information is only required when using an automatic back-flushing filter
Customer:  
Project:  
Which product is to be used?

**Equipment Groups According to EC Directive 94 / 9 / EC, Annex I**

<table>
<thead>
<tr>
<th>Group I (Mines, methane and / or combustible dust)</th>
<th>Group II (Potentially explosive atmosphere of gas / air or dust/air mixtures, vapours or mists)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category M</td>
<td>Category 1</td>
</tr>
<tr>
<td>1</td>
<td>G (Gas) (Zone 0)</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Please tick Group / Category

- **Group I**
  - Category M
  - Category 1
  - Category 2
  - Category 3

- **Group II**
  - Category M
  - Category 1
  - Category 2
  - Category 3

- **Equipment designed to ensure a very high level of safety.**
  - Operation guaranteed even in the event of a rare malfunction.

- **Equipment designed to ensure a high level of safety.**
  - Intended to be de-energized in event of explosive atmosphere.
  - Designed for environments where a potentially explosive atmosphere is to be expected frequently or for long periods.

- **Equipment designed to ensure a normal level of safety.**
  - Designed for environments where a potentially explosive atmosphere is rarely expected and then only for a short time.

<table>
<thead>
<tr>
<th>Medium</th>
<th>Explosion group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>II A</td>
</tr>
<tr>
<td>Safety data sheet</td>
<td>II B</td>
</tr>
<tr>
<td>Flash point</td>
<td>II C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Max. surface temperature in °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>450</td>
</tr>
<tr>
<td>T2</td>
<td>300</td>
</tr>
<tr>
<td>T3</td>
<td>200</td>
</tr>
<tr>
<td>T4</td>
<td>135</td>
</tr>
<tr>
<td>T5</td>
<td>100</td>
</tr>
<tr>
<td>T6</td>
<td>85</td>
</tr>
</tbody>
</table>

**Types of ignition protection (only for electrical units)**

- p: Without ignition protection
- c: Pressurisation
- d: Constructional safety
- d: Flameproof enclosure
- k: Liquid immersion
- ...