Versatile Filtration Solutions for Compressed Air Applications

Compressed air next to electricity, is the most widely used energy source in the industry section. Hence, the following aspects have to be considered in high quality compressed air purification:

- Economic filtration
- Validated performance data according to ISO 12500-1 (oil aerosols), 12500-2 (oil vapours) and 12500-3 (particles)
- Reliable achievement of the compressed air quality to suit the application according to ISO 8573-1

Unrivalled high Performance

The Ultra-Filter was developed on the basis of world-wide experiences and innovative designs for highly efficient and economic filtration technology.

- A flow-optimised filter design guarantees minimum pressure loss
- The innovative filtration technology ensures high separation efficiency
- An intelligent overall concept for unrivalled efficiency

Compressed air quality according to ISO 8573-1

<table>
<thead>
<tr>
<th>Compressed air quality class</th>
<th>Dirt (solid particles)</th>
<th>Water</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum particle number per m³ particle size, d in μm</td>
<td>Pressure dew point °C</td>
<td>Concentration mg/m³</td>
</tr>
<tr>
<td>0</td>
<td>Specified according to application and better than Class 1</td>
<td>≤ -70</td>
<td>≤ 0.01</td>
</tr>
<tr>
<td>1</td>
<td>20,000</td>
<td>10</td>
<td>≤ -70</td>
</tr>
<tr>
<td>2</td>
<td>400,000</td>
<td>100</td>
<td>≤ 0.1</td>
</tr>
<tr>
<td>3</td>
<td>90,000</td>
<td>1,000</td>
<td>≤ 1</td>
</tr>
<tr>
<td>4</td>
<td>n.s.</td>
<td>10,000</td>
<td>≤ +3</td>
</tr>
<tr>
<td>5</td>
<td>n.s.</td>
<td>100,000</td>
<td>≤ +7</td>
</tr>
</tbody>
</table>

Flow-optimised air flow through the Ultra-Filter

Computer-aided simulation was the basis for the turbulence-free design with optimised air flow through the filter housing and into the element. This ensures low pressure losses.
The innovative UltraPleat®
Filtration Technology
With the new filtration technology UltraPleat it has succeeded, to reduce the differential pressure, which arises while filtering compressed air, up to 50% compared to the former range – and this with consistently high filtration performance.

The UltraPleat filtration technology uses a new structure of coated high-tech fibres that are processed into a pleated filter medium with a high separation efficiency of liquid particles and a huge adsorption capacity for solid particles. The multilayer structure of the new filter medium was designed so that optimal aerodynamic conditions are achieved, simultaneously providing a filter surface that is over 400% larger by comparison with wrapped filter media. For the separation of oil aerosols, an efficiency of up to ≥ 99.9% is achieved.

Unrivalled Efficiency
The outstanding low differential pressure of the UltraPleat technology has great influence on the energy consumption and turns filter elements including the new filtration technology into real energy saving filters. For the compressed air users energy savings are increasing, therefore a contribution to the conservation of resources will be made – a completely clean business!

Success Factors of the UltraPleat Technology

1. New filter media
2. Improved pleat (form and structure)
3. Improved filter media coating
4. Outer stainless steel support sleeve

Energy Cost Savings through Reduction of Differential Pressure

The economic efficiency is clearly indicated by a simple calculation showing the reduction in differential pressure:

Just a 300 mbar lower differential pressure over 8,000 operating hours saves 2,100 Euro per year. (7 bar operating pressure, 110 kW installed power, 8 Eurocent/kWh).

This practical example shows that the investment in optimizing the compressed air system rapidly pays for itself.
The Economizer for an economical Filter Exchange
Further energy cost savings are achieved by the timely replacement of used filter elements. The most economic time for this action is determined by the Economizer. This continuously measures the differential pressure. The integrated micro-processor evaluates the measurement data and compares the higher energy costs caused by pressure loss with the costs of a new filter element. The most cost-effective replacement time for the filter element is calculated and LED’s then signal that “Filter exchange” is necessary.

Excellence with the Rating “Unrivalled”
With nine sizes, the Ultra-Filter covers the performance range from 35 to 1,100 m³/h flow rate and therefore conventional compressor capacities between 2 and 110 kW.

Three versions are available:
- Standard: Econometer with float drain
- Plus: Economizer with float drain
- Superplus: Economizer with level-controlled condensate drain UFM-D

Economic efficiency also means: The right filter element for each application. Every required compressed air quality can be achieved with the least possible pressure loss. The Ultra-Filter offers, with its six different grades, all levels from prefilter via sub micro filter to active carbon filter and therefore everything that an efficient compressed air purification needs.

Unrivalled Compactness
The Ultra-Filter is space-saving in every respect:
- The space requirement: up to 30 % less installation height, a few centimetres of ground clearance enables filter exchange
- The differential pressure display: integrated in filter head
- The filter combination: fits into the smallest spaces due to an intelligent adapter solution
- The wall mounting: adjustable
Unrivalled ease of Use

The Ultra-Filter is unrivalled in its ease of use. This is evident both during installation and when the filter element is replaced. The filter bowl is rotated slightly via a bayonet lock and can be removed together with the filter element. The new element is just as easily inserted. The integrated condensate drain does not have to be disconnected from power and condensate feeds. The cover with integrated differential pressure display can be rotated – so that the display stays visible from the selected side.

Unrivalled Flexibility

All filters can be either used as coalescence filters (flow through element from the inside to the outside) or as particulate filters (outside to inside). The essential clue: if requirements change, the filter head does not even have to be rotated. Changing the coding clip inside the filter bowl allows the filter element to be rotated and so change the flow direction. The coalescence filter becomes a particulate filter in seconds – and vice versa. Wall supports available on request enable flexible wall mounting. The telescopic design of the support provides stageless adjustability. The combination of filter grades installed in series is provided through connection adapters. Easy to mount and space-saving to even fit into the smallest spaces.

Unrivalled Safety

Operating safety is paramount:
- High operating safety through a bayonet lock: The filter cannot be opened while it is under pressure.
- No inflation of coalescence drainage layer: It is completely fixed in place by the outer support sleeve. This ensures a constant flow cross-section between element and housing at all times.
- High quality corrosion protection: All filter housings are immersion-lacquered on the in and outside. This ensures long-term protection, particularly against aggressive condensates.

Possible installation in series with connection adapters

Wall supports enable flexible wall mounting
Unrivalled Efficient
Based on the proven Ultra-Filter series the innovative three-stage filter DF-T was developed. It will be used for the purification of compressed air or gases when limited space is required. By combining of several purification stages in only one filter housing the DF-T is a very compact solution. It can be used as terminal filter, where the highest quality of compressed air is necessary and only small place for installation is available.

The “All-in-One”-Filter:

- Coalescence filter for the removal of oil aerosols and particles
- Activated carbon adsorber (packed bed) for the removal of oil vapours and other hydrocarbons
- High performance particle filter
- Achievement of the quality class 1 for oil aerosols and particles according to ISO 8573-1

The use of the new DF-T filters is as interesting for point of use filtration in sensitive applications, such as the food production, the pharmaceutical industry, in laser cutting machines, as well as environmental technology as in the central compressed air treatment for performances up to 110 m³/h. The filter can be used especially advantageously as a compact treatment unit for small compressors, in order to generate pure compressed air in a simple way, for example in paint applications.

The three-stage filter thereby enables the optimum adjustment of the compressed air quality to the consumer profile as requested by the users.

Features

- Combination of sub micro filter, activated carbon adsorber and high performance particle filter (compressed air quality class 1 for oil aerosols and particles)
- Three purification stages in one filter (space savings up to 60 % to traditional solutions)
- Reliable monitoring of the service lifetime of the filter element as well as the differential pressure
- Flow-optimised design
- Perfectly meets the requirements for the use as a terminal filter: Size range, filtration grades, integrated monitoring functions and a reliable working pneumatic condensate drain
- Low pressure losses, thereby saving of energy costs
- Filter cannot be opened under pressure due to bayonet lock

Cross-section of an Ultra-Filter with DF-T element

Up to 60% installation space can be reduced in comparison to a three filter combination

Previous solution with three filters

Innovative solution with three-stage filter DF-T
The DF-T – compact and save

Unrivalled Space Savings
The Economizer integrated in the filter housing supervises the service lifetime of the filter element and signals the necessary exchange at expiration of the specified time of use. Optional the Economizer supervises the differential pressure of the filter and signals with reaching the adjusted limit that an exchange of the filter element is rational. As the Economizer signals alarm at oil breakthrough it is an ideal solution to protect downstream equipment.

With three sizes the three-stage filter covers the performance range up to 110 m³/h flow rate at an operating pressure of 7 bar.

Technical Data DF-T

<table>
<thead>
<tr>
<th>Size</th>
<th>Flow rate*</th>
<th>Weight**</th>
<th>Housing type</th>
<th>Dimensions housing</th>
<th>Dimensions element</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF-T</td>
<td>m³/h</td>
<td>kg</td>
<td>DF</td>
<td>A mm</td>
<td>B mm</td>
</tr>
<tr>
<td>0050</td>
<td>50</td>
<td>1.0</td>
<td>0120</td>
<td>341</td>
<td>103</td>
</tr>
<tr>
<td>0080</td>
<td>80</td>
<td>2.0</td>
<td>0210</td>
<td>382</td>
<td>139</td>
</tr>
<tr>
<td>0110</td>
<td>110</td>
<td>2.2</td>
<td>0320</td>
<td>442</td>
<td>139</td>
</tr>
</tbody>
</table>

*Nominal flow at 7 bar g. m³/h related to 1 bar abs. and 20 °C    **without filter element
### Unrivalled Variability

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Capacity*</th>
<th>Connection</th>
<th>Filter Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Filter</td>
<td>nominal m³/h</td>
<td>G</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td>0.035</td>
<td>35</td>
<td>¹⁄₄“</td>
</tr>
<tr>
<td></td>
<td>0.070</td>
<td>70</td>
<td>³⁄₄“</td>
</tr>
<tr>
<td></td>
<td>0.120</td>
<td>120</td>
<td>¹“</td>
</tr>
<tr>
<td></td>
<td>0.210</td>
<td>210</td>
<td>³⁄₄“</td>
</tr>
<tr>
<td></td>
<td>0.320</td>
<td>320</td>
<td>1“</td>
</tr>
<tr>
<td></td>
<td>0.450</td>
<td>450</td>
<td>1 ¹⁄₄“</td>
</tr>
<tr>
<td></td>
<td>0.600</td>
<td>600</td>
<td>1 ¹⁄₆“</td>
</tr>
<tr>
<td></td>
<td>0.750</td>
<td>750</td>
<td>2“</td>
</tr>
<tr>
<td></td>
<td>1.100</td>
<td>1100</td>
<td>2“</td>
</tr>
</tbody>
</table>

*related to the intake compressor +20 °C, 1 bar abs., at 7 bar g operating pressure

---

### Technical Data

- **P-filter**
  - Particle filter
  - Differential pressure: 0.15 bar
  - Efficiency: 100 % related to 25 μm

- **B-filter**
  - Particle filter
  - Differential pressure: 0.12 bar
  - Efficiency: 100 % related to 25 μm

- **A-filter**
  - Activated carbon filter
  - Differential pressure: 0.13 bar
  - Residual oil content: 0.002 mg/m³

- **V-filter**
  - Coalescence filter
  - Differential pressure: 0.11 bar
  - Residual oil content: < 0.2 mg/m³

- **UltraPleat M-filter**
  - Coalescence filter
  - Differential pressure: 0.08 bar
  - Residual oil content: < 0.02 mg/m³

- **UltraPleat S-filter**
  - Coalescence filter
  - Differential pressure: 0.10 bar
  - Residual oil content: < 0.01 mg/m³

- **Ultra-filter version**
  - "Superplus" shown here

---

### Total Filtration Management

Donaldson offers a wide variety of solutions to reduce your energy costs, improve your productivity, guarantee production quality and help protect the environment.

### Total Filtration Service

A comprehensive range of services especially designed to keep your production at peak performance and at the lowest total cost of ownership.

---

Please contact us:
Donaldson Europe B.V.B.A.
Research Park Building No. 1303 - Interleuvenlaan 1
B-3001 Leuven - Belgium Phone +32(0)16 38 38 11 - Fax +32(0)16 40 00 77
CAP-europe@donaldson.com · www.donaldson.com

---

Technical alterations reserved (04/2014)

---

*A related to nominal performance at 7 bar, dry condition
*B related to nominal performance at 7 bar, wet filter
*C when upstream connected an M- or S-filter
*D related to an inlet concentration of 3 mg/m³