FILTERS FOR STERILE AIR, STEAM AND LIQUIDS
Donaldson - Global Partner for sterile Requirements

Donaldson is a leading global manufacturer of filtration systems. The company, founded in 1915, is strongly technology-oriented and has set itself the goal of implementing the needs of global customers for filtration solutions through innovative research and development. The application-oriented know-how of Donaldson relies on the global presence of more than 10,000 employees in more than 100 offices and manufacturing facilities.

Reliable Process Solutions

Donaldson offers a complete filtration portfolio of more than 100 offices and manufacturing facilities.

Solutions for sterile Requirements

Reliable Product Quality

All filter elements are produced, packaged and shipped under strict controls in an exact manner and meet the quality and performance data that are stored in the product specification.

For indirect and direct food contact according to FDA CFR - Code of Federal Regulations, Title 21

For indirect and direct food contact in accordance with Regulation (EC) No 1935/2004

3-A Sanitary Standards for the United States

Manufactured according to DIN EN ISO 9001

Cost-effective Solutions in Industrial Quality

High-quality Stainless Steel Housings in Industrial Quality

P-EG filter housings have been developed for the purification of compressed air. Due to the optimised construction, they offer low differential pressures at high flow rates. The filter housings are suitable for operating flow rates of 60 m³/h to 19,200 m³/h.

Technical Data P-EG Housings

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity [m³/h] at 1 bar operating pressure*</th>
<th>Dimension [mm]</th>
<th>Volume [L]</th>
<th>Weight [kg]</th>
<th>Maximum operating pressure [bar]</th>
<th>Maximum operating temperature [°C]</th>
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</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B300</td>
<td>0.4</td>
<td>121 x 121</td>
<td>0.05</td>
<td>0.30</td>
<td>0.7</td>
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<tr>
<td>B600</td>
<td>1.6</td>
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<tr>
<td>B900</td>
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<td>4.6</td>
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<tr>
<td>B1260</td>
<td>19.2</td>
<td>768 x 768</td>
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<td>18.00</td>
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<td>Multi</td>
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<tr>
<td>B422</td>
<td>4520</td>
<td>1536 x 1536</td>
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Pharmaceutical

Steam Filters

Air and Gas Filter Housings

Product Portfolio

Typical Application Areas

Housings

Air and gas filters

Steam filters

Membrane filters

Sintered steel filters

Depth filters

Steel-mesh filters

Membrane filters

Liquid filters

Typical Application Areas

- Pharmaceutical
- Water & Soft Drinks
- Beverages
- Military
- Food
Economical Solutions in Sanitary Quality

High Quality Stainless Steel housings in Sanitary Quality

PG-EG stainless steel housings are used for the purification of compressed air and other technical gases. Combined with the different filter elements, they provide an optimised solution for nearly any application. The standard model series PG-EG (Single and Multiple) each consists of six different housing sizes for operating flow rates of 7.5 m³/h to 270 m³/h and for operating flow rates of 540 m³/h to 2,700 m³/h (at 1 bar absolute). Donaldson PG-EG sanitary filter housings (Single, clamp connection) are 3-A certified as standard.

PG-EG housings comply with the applicable guidelines:
Compliant according to

Manufactured according to

Innovative, sterile Aeration and Deaeration

Air and Gas Filter Housings

Technical Data PG-EG Housings

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity (m³/h) at operating pressure of 1 bar at 20°C</th>
<th>Element Connection size</th>
<th>Material</th>
<th>Connections</th>
<th>Works with</th>
<th>Filter Housings</th>
<th>Housing gasket</th>
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<tbody>
<tr>
<td>Single</td>
<td>0006</td>
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<td>ESD</td>
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<td>Single</td>
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<td>DN 30</td>
<td>Clamp</td>
<td>Available</td>
<td>Available</td>
<td>ESD</td>
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<tr>
<td>Single</td>
<td>0032</td>
<td>98</td>
<td>DN 40</td>
<td>Clamp</td>
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<td>Available</td>
<td>ESD</td>
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<tr>
<td>Single</td>
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<td>ESD</td>
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<tr>
<td>Single</td>
<td>0054</td>
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<td>DN 60</td>
<td>Clamp</td>
<td>Available</td>
<td>Available</td>
<td>ESD</td>
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</table>

Dimensions for the standard connection

Surface finish: Etched, passivated and electro-polished.

Maximum operating temperature: +125°C

Weight:

- Single:
  - 0006: 1.4301 (304) or 1.4404 (316L)
  - 0011: 1.4301 (304) or 1.4404 (316L)
  - 0022: 1.4301 (304) or 1.4404 (316L)
  - 0032: 1.4301 (304) or 1.4404 (316L)
  - 0044: 1.4301 (304) or 1.4404 (316L)
  - 0054: 1.4301 (304) or 1.4404 (316L)

Filter elements:

- Single:
  - Style 1000
- Multiple:
  - Style 3000

Filter Housings for the Aeration and Deaeration of Storage Tanks and Bulk Tanks

Filter housings for venting of product series P-BE are used to ensure 100% sterility in the storage of pharmaceutical products, containers of demineralised water, food, chemicals or the deaeration of fermenters. The user-friendly two-piece housing has a splash protection to help prevent liquids coming into contact with the filter medium.

Technical Data P-BE Housings

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity (m³/h)</th>
<th>Element Connection size</th>
<th>Material</th>
<th>Connections</th>
<th>Filter Housings</th>
<th>Housing gasket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>0192</td>
<td>10.5</td>
<td>DN 80</td>
<td>Clamp</td>
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<tr>
<td>Single</td>
<td>0144</td>
<td>10.5</td>
<td>DN 80</td>
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<td>Available</td>
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<tr>
<td>Single</td>
<td>0102</td>
<td>21.0</td>
<td>DN 100</td>
<td>Clamp</td>
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<td>Available</td>
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<tr>
<td>Single</td>
<td>0072</td>
<td>42.0</td>
<td>DN 150</td>
<td>Clamp</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Single</td>
<td>0044</td>
<td>95.0</td>
<td>DN 180</td>
<td>Clamp</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Single</td>
<td>0027</td>
<td>185.0</td>
<td>DN 200</td>
<td>Clamp</td>
<td>Available</td>
<td>Available</td>
</tr>
</tbody>
</table>

Dimensions for the standard connection

Surface finish: Etched, passivated and electro-polished.

Maximum operating pressure: 160 bar

Weight:

- Single:
  - 0192: 1.4404 (316L)
  - 0144: 1.4404 (316L)
  - 0102: 1.4404 (316L)
  - 0072: 1.4404 (316L)
  - 0044: 1.4404 (316L)
  - 0027: 1.4404 (316L)

Fasteners:

- Single:
  - Style 1000
- Multiple:
  - Style 3000

Filter Housings for the Aeration on Storage tanks

4

5
Sterile Filtration of Air and Gases

### Air and Gas Filter Elements

**Sterile Filter LifeTec™ (P)-SRF C/V/X**
The new LifeTec (P)-SRF filter in the versions C (=Compressed Air), V (=Venting), and X (=Extremel) is mainly used for safe sterile air and gas filtration. The sterile filters meet the high demands of the food and beverage industry as well as the pharmaceutical industry and works reliably even under extreme operating conditions. High filtration rates, e.g. for bacteria, viruses, and particles of down to 3 nm, increase product and process integrity. The sturdy construction of the filter with its stainless steel liners allows for a high number of steam sterilization cycles as well as for sterilization processes, using VPHP and ozone. It is ideal for fermentation applications. Temperature resistance and mechanical stability ensure a high degree of operational safety, reducing the total cost of ownership. This helps to avoid production downtimes and reduces maintenance costs.

#### Outstanding Features
- High filtration rate: LRV for bacteria and MS2 coliphage up to > 9, for nano-scaled particles up to > 10
- Suitable for sterilization, using hydrogen peroxide (VHP) and ozone
- Low differential pressure at high flow rates
- Filter elements are reverse-flow sterilizable
- For indirect food contact according to CFR Title 21 & 1935/2004/EC
- Excellent dewetting characteristics
- Mechanical stability for high operational safety

### When it has to be pure and sterile

#### Air and Gas Filter Elements

<table>
<thead>
<tr>
<th>Filter element</th>
<th>LifeTec (P)-SRF C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter media</td>
<td>Borosilicate</td>
</tr>
<tr>
<td>Retention rates [μm]</td>
<td>0.2; sterile LRV &gt; 9</td>
</tr>
<tr>
<td>Support liner</td>
<td>Silicone</td>
</tr>
<tr>
<td>End caps</td>
<td>1.4301 (304)</td>
</tr>
<tr>
<td>O-rings (others on request)</td>
<td>EPDM</td>
</tr>
<tr>
<td>Element size</td>
<td>03/10; 04/10; 04/20; 05/20; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50</td>
</tr>
<tr>
<td>Connections</td>
<td>UF, P7</td>
</tr>
<tr>
<td>Recommended housings</td>
<td>PES, PS-ES, PS-BE</td>
</tr>
<tr>
<td>Conformity</td>
<td>FDA</td>
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<tr>
<td>Operating pressure</td>
<td>Up to x = 280 °C</td>
</tr>
<tr>
<td>Maximum differential pressure</td>
<td>18 bar</td>
</tr>
<tr>
<td>Application examples</td>
<td>Sterile filtration of compressed air and gases, tank ventilation</td>
</tr>
</tbody>
</table>

### Industries

- Food
- Dairies
- Breweries
- Pharmaceutical
- Chemical

*Retention rates in air*
Steam Sterilisation Instructions for Air Filters

Work Flow: Sterilisation Instructions for Air Filter in Flow Direction

2. Open valve V1 and allow the steam condensate to drain until the steam trap below valve V3 closes.
3. Slowly open V3 allowing steam into the system: this will flow across the filters and through valve V4 and V5. This will allow the heating of the housing, the filters and associated piping without generating a significant differential pressure across the filters.
4. When ‘live’ steam flows from valve V5, close valve V5. This will direct the steam through the heated filter.
5. Observe the pressure gauges P1 and P2 and ensure the differential pressure across the filter does not exceed 0.2 to 0.3 bar g.
6. Ensure the steam pressure/temperature does not exceed the maximum allowable pressure/ temperature for the cartridge type being steamed. If reading from pressure gauges it is recommended the maximum steam pressure is 3.0 bar g in the forward direction.
7. When ‘live’ steam flows from valve V5, close valve V6. When the steam trap below valve V5 closes, the steam pressure will begin to rise.
8. Ensure the steam pressure/temperature does not exceed the maximum allowable pressure/temperature for the cartridge type being steamed. When reading from pressure gauges it is recommended the maximum steam pressure is 3.0 bar g in the forward direction.
9. Steam sterilise the cartridges for the time specified ensuring the conditions stated in steps 5 to 7 are followed.
10. Allow the system to cool for 15 minutes, then close V5 (flash-dry only).
11. Open V2 to allow compressed air into the system. The air pressure should be no more than 0.5 bar g.
12. Rapidly open V6 to flash-dry the filter (or step 9).
13. Allow the system to cool for 15 minutes then close V6 (flash-dry only).

Comments for Sterilisation Instructions for Air Filters: A double downstream valve is recommended so that under the cartridge steaming protocol the valves sealing faces of V7 can be effectively sterilised. The sealing valve faces of V8 can be similarly sterilised when the tank is steamed. When steam sterilising the tank, V7 would be closed and V6 and V8 open. Normally the tank would be steamed separately before steaming the filter. If the filter is steamed before steaming the tank it is recommended that valve V7 is closed in the post Sterilisation-In-Place settings to maintain sterility. The valve V7 must be closed during Step 9. Valve V7 should be installed horizontally and valve V6 / steam trap installed immediately downstream of V7. All drains should be fitted vertically to allow liquid removal.

See our sterilisation guide for additional information!
Housings for high Flow Rates

Steam Filter Housings

High-quality Stainless Steel Housings in Industrial Quality

Together with the (P)-GS VE and the LifeTec (P)-GSL N filter elements, the Donaldson P-EG filter housings are used in a variety of steam filtration applications.

Technical Data P-EG Housings

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity (kg/h) at 2 bar abs. at 121 °C saturated steam</th>
<th>Element Connection size</th>
<th>Connections</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>2400</td>
<td>10x30/30 DN 200</td>
<td>Available</td>
<td>Stainless steel 1.4401 (316) or 1.4404 (316L)</td>
</tr>
<tr>
<td>1536</td>
<td>1600</td>
<td>6x30/30 DN 200</td>
<td>Available</td>
<td>Stainless steel 1.4401 (316) or 1.4404 (316L)</td>
</tr>
<tr>
<td>1152</td>
<td>1460</td>
<td>540x30/30 DN 200</td>
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<td>2400</td>
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<td>Stainless steel 1.4401 (316) or 1.4404 (316L)</td>
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Element Connection Size

<table>
<thead>
<tr>
<th>Element Connection Size</th>
<th>Dimensions [mm]</th>
<th>Maximum operating pressure [bar]</th>
<th>Maximum operating temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10x30/30 DN 200</td>
<td>215x180</td>
<td>1.60</td>
<td>121</td>
</tr>
<tr>
<td>6x30/30 DN 200</td>
<td>200x180</td>
<td>1.00</td>
<td>121</td>
</tr>
<tr>
<td>5x30/30 DN 200</td>
<td>70x180</td>
<td>0.50</td>
<td>121</td>
</tr>
<tr>
<td>3x20/30 DN 100</td>
<td>54x180</td>
<td>0.30</td>
<td>121</td>
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<tr>
<td>7x30/30 DN 100</td>
<td>160x180</td>
<td>0.50</td>
<td>121</td>
</tr>
<tr>
<td>5x30/30 DN 100</td>
<td>130x180</td>
<td>0.30</td>
<td>121</td>
</tr>
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<td>3x20/30 DN 100</td>
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</tbody>
</table>

Steam Filter Housings

High Quality Stainless Steel housings in Sanitary Quality

PG-EG stainless steel housings are used for steam filtration at the highest hygienic requirements. In combination with the various Donaldson filter elements, they offer the optimal solution for each application. Donaldson PG-EG sanitary filter housings (Single, clamp connection) are 3-A certified as standard, can be equipped with a variety of connections and are available in 12 different sizes. In addition, the entire series is designed for a low differential pressure and for a high throughput.

Technical Data PG-EG Housings

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity (kg/h) at 2 bar abs. at 121 °C saturated steam</th>
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</tr>
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<td>3x20/30 DN 100</td>
<td>54x180</td>
<td>0.30</td>
<td>121</td>
</tr>
</tbody>
</table>

**Notes:**
- Dimensions are valid for the standard connection. Larger housings are available on request.
- **The 3-A certification is valid for Single-PG-EG standard housings with clamp connections.**
- Manufactured according to 3-A Sanitary Standards.
Steam Filtration with high Flow Rates

Steam Filter LifeTec™ (P)-GSL N

The LifeTec (P)-GSL N filter element removes contaminants such as particles, abrasion of valve, seatings and seals as well as rust. An improved steam quality ensures longer service life of the filters to be sterilised and therefore increases the efficiency of the entire process. In addition, the LifeTec (P)-GSL N filter element is a particularly efficient filtration product since the filter medium can be regenerated by ultrasonic bath or by back washing. This is especially important where there is a particularly high particle load. The pleated stainless steel filter media provides high particle or dirt-holding capacity and a high flow rate at low differential pressures.

Outstanding Features
- High dirt-holding capacity at a low differential pressure and a high flow rate
- Can be regenerated by back washing and ultrasonication
- Retention rate > 99.996 at 0.01 μm
- Suitable for temperatures from -20 °C up to +200 °C
- Also available as 5 μm grade for culinary steam
- Suitable for food contact use according to CFR Title 21 & 1935/2004/EC

Steam Filter LifeTec™ (P) -GSL N

Filter element | LifeTec (P)-GSL N
--- | ---
Filter media | Stainless steel fiber or stainless steel mesh 1.4301 (304)
Retention rates [μm] | 1 nominal; 5; 25; 50; 100; 250 absolute*
Support liners | 1.4301 (304)
End caps | 1.4301 (304)
O-rings (others on request) | EPDM
Element sizes | 03/10; 04/10; 04/20; 05/20; 05/25; 07/20; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50
Connections | uf, P7
Recommended housings | P-EG, PG-EG
Conformity | Operating temperature | Up to +200 °C
Maximum differential pressure | 10 bar
Application examples | Filter for liquids, gases and steam
* Retention rates in steam

Steam Filter Elements

Filter element | PS-GE VE | PI-GE N
--- | --- | ---
Filter media | Sintered stainless steel 1.4404 (316L) | Stainless steel fiber or stainless steel mesh 1.4301 (304)
Retention rates [μm] | 1; 5; 25 absolute for gases, nominal for steam | 1; 5; 25 absolute for steam and gases
Support liners | EPDM | EPDM
End caps | 1.4301 (304) | 1.4301 (304)
O-rings (others on request) | EPDM | EPDM
Element sizes | 03/10; 04/10; 04/20; 05/20; 05/30; 07/20; 07/30; 10/30; 15/30; 30/30
Connections | uf, P7 | uf, P7
Recommended housings | P-EG, P-GE | P-EG, P-GE
Conformity | Operating temperature | Up to +160 °C
Maximum differential pressure | 5 bar (irrespective of the flow direction) | 5 bar (in flow direction)
Application examples | Filter for gas and steam | Filter for gases and steam
Industries | Food | Paints/Coatings
Dairies | Environment
Pharmaceutical | Automotive
Industrial/Machinery | Chemical

High Process Safety

General Guidelines for the Design of Steam Filtration Installations

The type of the steam filter and the retention rate to be selected depends on the quality of the steam which is required for the specific application. To prevent rapid clogging of the steam filter, it is important to consider the particle load in the pipes. This may require the use of pre- and fine filters.

In addition, the flow rate of the steam in an installation should not exceed 25 m/s. In special circumstances, velocities up to 40 m/s are okay, but the resulting turbulent currents and higher differential pressures must be taken into account.

The differential pressure in a new steam filter installation should be within a range of 0.1 bar to 0.3 bar. Higher temperatures (> 150 °C) require special higher temperature O-rings.

Choice of Steam Filters

<table>
<thead>
<tr>
<th>Industries</th>
<th>Operating steam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Operating steam not for direct food contact, but for indirect heating</td>
</tr>
<tr>
<td>Dairies</td>
<td></td>
</tr>
<tr>
<td>Paints and Coatings</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td></td>
</tr>
<tr>
<td>Industrial/Machinery</td>
<td></td>
</tr>
<tr>
<td>Dairies</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td></td>
</tr>
<tr>
<td>Automotive</td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td></td>
</tr>
</tbody>
</table>

Particulate matter (PM)

Particles ≤ 1 μm

Particles ≤ 5 μm

Sintered (PI-GE VE) 1 μm
Plated (PI-GE N) 1-5 μm
Sintered (PI-GE VE) 5-25 μm
Plated (PI-GE N) 5-25 μm
Recommendations for the Design of Steam Filter Systems

(1) **Recommendations Installation**

- The flow through the membrane filter during the steam sterilisation may only occur from the upstream side (see figure on page 8).
- In a steam sterilisation, the flow through a sterile depth filter is possible from the upstream as well as in the reverse process (see figure on page 9).
- The pressure difference between the filter inlet and outlet should not exceed 0.3 bar (pressure gauge reading). The steam flow rate in the filter element must be limited to a minimum value.
- The temperature and differential pressure during sterilisation must be measured and controlled.
- A vent valve must be mounted at the top of the housing, since the system must be vented prior to sterilisation. Residual air trapped in the system causes a decrease in temperature in the filter housing, which can prevent a complete destruction of micro-organisms.

(2) **Steam Pretreatment Recommendations**

- Vapour filters protect the sterile filter efficiently against damage e.g. corrosion particles.
- Filtered boiler feed water is a prerequisite for particle-free steam.
- The pressure difference between the filter inlet and outlet must be limited to a minimum value.
- The temperature during steam sterilisation must be measured and controlled.
- The flow through the membrane filter during the SIP process must be controlled so that these do not become ‘blinded’ by the condensate (especially important for hydrophobic gas filters).

(3) **Recommendations Condensate Removal**

- Condensate traps or drains in the housing should be installed upstream and downstream on the lowest points in the overall system.
- All piping must be installed in the flow direction at a slight slope (1-2%), so that steam condensate can collect into a condensate drain/trap by gravity.
- Filters must be installed at the top of tanks if they must be sterilised simultaneously with the tank.
- After a SIP process, as much steam as possible must be drained from the system to prevent the development of large quantities of condensate.
- The cooling of the filter elements according to a SIP process must be controlled so that these do not become ‘blinded’ by the condensate.

---

**Table:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Volume [l]</th>
<th>Weight* [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>3</td>
<td>10.4</td>
</tr>
<tr>
<td>Multiple</td>
<td>8</td>
<td>17.1</td>
</tr>
</tbody>
</table>

---

**Liquid Filter Housings**

- **Stainless Steel housings for liquids**
  - PF-EG stainless steel housing (PF-EG Standard series and PF-EG Superplus series) have been developed for the filtration of liquids. In combination with various Donaldson code 7 filter cartridges all liquid filter housings can be used within different application areas. The standard series PF-EG Single consists of six different housing sizes for flow rates from 3 to 75 l/min – the series PF-EG Multiple of 17 housing sizes for flow rates of 150 to 3,000 l/min.

---

**Technical Data PF-EG Housings**

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity [l/min]</th>
<th>Element</th>
<th>Connections Materials</th>
<th>Surface finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td>Stainless steel</td>
<td>1.4404 (316L) EPDM gaskets</td>
<td>Electro-polished Ra &lt; 0.8</td>
</tr>
<tr>
<td>Multiple</td>
<td></td>
<td>Stainless steel</td>
<td>1.4404 (316L) EPDM gaskets</td>
<td>Electro-polished Ra &lt; 0.8</td>
</tr>
</tbody>
</table>

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**Economical Filtration Solutions**

- Donaldson PF-EG Superplus filter housings (Single, clamp connection) are certified 3-A as standard.

---

**Table:**

<table>
<thead>
<tr>
<th>Size</th>
<th>Capacity [l/min]</th>
<th>Element</th>
<th>Connections Materials</th>
<th>Surface finish</th>
</tr>
</thead>
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<td>Multiple</td>
<td></td>
<td>Stainless steel</td>
<td>1.4404 (316L) EPDM gaskets</td>
<td>Electro-polished Ra &lt; 0.8</td>
</tr>
</tbody>
</table>

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* Capacity based on water

** Dimensions valid for milk pipe connections

** The 3-A certification is valid for the PF-EG Superplus Single housing with clamp connection. PF-EG Multiple housings in 3-A quality are also available on request. Larger housings are available on request.
### Liquid Filter Elements

#### Pleated PTFE Filter Element

<table>
<thead>
<tr>
<th>LifeTec PT</th>
<th>LifeTec PES VP</th>
<th>LifeTec PES VN</th>
<th>LifeTec PP 100 N</th>
<th>LifeTec PP 100 CN</th>
<th>PI 15M N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter element</td>
<td>Filter element</td>
<td>Filter element</td>
<td>Filter element</td>
<td>Filter element</td>
<td>Filter element</td>
</tr>
</tbody>
</table>

#### Category
- Membrane Filters
- Absolute Filters
- Depth Filters

#### Application
- Pressure
- Maximum temperature
- Operating conditions

#### Industry Examples
- Food
- Beverages
- Water & Soft Drinks
- Dairies
- Wineries
- Breweries
- Pharmaceuticals
- Paints & Coatings
- Industrial Machinery
- Environment

#### Filter Media
- Pleated PTFE
- Pleated Polypropylene
- Pleated Polyether-sulfone
- Stainless steel mesh

#### Retention rates
- Absolute
- Nominal

#### End Caps
- O-rings (other materials on request)

#### Connections
- Standard connections

#### Conformity
- FDA
- NSF
- GMP

#### Operating temperatures
- Up to +80 °C
- Up to +100 °C

#### Maximum differential pressure
- 2 bar
- 5.5 bar

---

### Liquid Filter Elements

#### Pleated PES Filter Element

<table>
<thead>
<tr>
<th>LifeTec PES</th>
<th>LifeTec PP 100</th>
<th>PI 15M N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter element</td>
<td>Filter element</td>
<td>Filter element</td>
</tr>
</tbody>
</table>

#### Category
- Membrane Filters
- Absolute Filters
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#### Application
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#### Industry Examples
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- Water & Soft Drinks
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- Paints & Coatings
- Industrial Machinery
- Environment

#### Filter Media
- Pleated Polypropylene
- Pleated Polyether-sulfone
- Stainless steel mesh

#### Retention rates
- Absolute
- Nominal

#### End Caps
- O-rings (other materials on request)

#### Connections
- Standard connections

#### Conformity
- FDA
- NSF
- GMP

#### Operating temperatures
- Up to +80 °C
- Up to +100 °C

#### Maximum differential pressure
- 2 bar
- 5.5 bar

---

* Retention rates in water
Steam Sterilisation Instructions for Liquid Filters

(1) Open valves V4, V6, V7, V9 and V10.
(2) Drain the product from the filter system and associated piping. Opening valve V5 will aid this process.
(3) Open valve V1 and allow the steam condensate to drain until the steam trap below valve V3 closes. Close valve V9.
(4) Slowly open V3 allowing steam into the system: this will flow across the filters and through valve V4 and V5. This will allow the heating of the housing, the filters and associated piping without generating a significant differential pressure across the filters.
(5) When ‘live’ steam flows from valve V5 and T1 shows sterilisation temperature, close valve V5. This will direct the steam through the heated filter. Close valve V10.
(6) Observe the pressure gauges P1 and P2, control the steam flow rate at valve V3 and set the sterilisation steam pressure to approx. 300 mbar above the required saturated steam pressure (P1).
(7) Ensure that the differential pressure between P1 and P2 does not exceed 0.2 -0.3 bar g.
(8) When the steam trap below valve V6 closes, the steam pressure will begin to rise.
(9) Steam sterilise the cartridges for the time specified ensuring the conditions of temperature and pressure stay at a constant level.
(10) On completion of the Sterilisation-In-Place cycle, close V4, V6, V3 and V1 in that order.
(11) Slowly open V10 to release the steam pressure from the filter system and associated piping. When the pressure on P2 reads 0.1 bar g pressure close valve V10. Fully open valve V9 to release the remaining steam pressure from the filter system. When the pressure on P1 reads 0.1 bar g pressure, close valve V9.

See our sterilisation guide for additional information!
Services by Donaldson
Donaldson offers a wide range of services around the different filter elements and their installation. There are various integrity test devices available, which are characterized by a quick and easy operation and can be purchased.

Membra-Check for Membrane Filters
The Membra-Check is used for the integrity measurement of membrane filters. In addition, unknown volumes can be measured or it can be used as a calibration measuring instrument for checking pressure transducers.

Filter Test Center (FTC) for Depth Filters
The integrity of depth filter elements is checked in the area of critical particle sizes via a test aerosol with the aid of the FTC.