Donaldson
FILTRATION SOLUTIONS

FILTERS FOR STERILE AIR, STEAM AND LIQUIDS

Solutions for Sterile Requirements

Donaldson - Global Partner for Sterile Requirements

High-quality filter housings

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 and the knowledge of more than 10,000 employees in more than 100 offices and manufacturing facilities.

Reliable Process Solutions

Donaldson offers a complete filtration portfolio of innovative solutions for air & gas, steam and liquids. All products are designed to reach maximum purity standards and fulfil highest quality 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	FDA
For indirect and direct food contact in accordance with Regulation (EC) No 1935/2004	
3-A Sanitary Standards for the United States	3-A®
Manufactured according to DIN EN ISO 9001	Quality Management DQS ISO 9001:2008
Manufactured according to the specifications of the Pressure Equipment Directive 97/23/EC	CE

Product Portfolio

Air and gas filters	Steam filters	Liquid filters
Housings	Housings	Housings
Membrane filters	Sintered steel filters	Membrane filters
Depth filters	Steel-mesh filters	Depth filters

The illustrated colour scheme displays the various applications for a quick and easy overview on the following pages.

Typical Application Areas

Dairies

Soft Drinks

Water

Wine

Breweries

Food Industry

Cost-effective Solutions in Industrial Quality

Air and Gas Filter Housings

High-quality Stainless Steel Housings in Industrial Quality

P-EG housing

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 m^3/h to 19,200 m^3/h.

P-EG housings comply with the applicable guidelines:	
Compliant according to	FDA
Manufactured by	CE

Technical Data P-EG Housings

Size	Capacity [m^3/h] at 7 bar operating pressure*	Element	Connection size	Connections			Materials	
				BSP standard thread	Flange	Welded ends	Filter housings	Housing gasket
Single								
0006	60	03/10	G 1/4"	Standard	Available	Available	Stainless steel 1.4301 (304) or 1.4404 (316L)	EPDM
0009	90	04/10	G 3/8"					
0012	120	04/20	G 1/2"					
0018	180	05/20	G 3/4"					
0027	270	05/25	G 1"					
0036	360	07/25	G 1 1/4"					
0048	480	07/30	G 1 1/2"					
0072	720	10/30	G 2"					
0108	1080	15/30	G 2"					
0144	1440	20/30	G 2 1/2"					
0192	1920	30/30	G 3"					
0288	2880	30/50	G 3"					
Multiple								
0432	4320	3x20/30	DN 100	–	Standard	Available	Stainless steel 1.4301 (304) or 1.4404 (316L)	Blue Gard Style 3000
0576	5760	3x30/30	DN 100					
0768	7680	4x30/30	DN 150					
1152	11520	6x30/30	DN 150					
1536	15360	8x30/30	DN 200					
1920	19200	10x30/30	DN 200					

Size	Surface finish		Dimensions** [mm]		Volume [L]	Weight** [kg]	Maximum operating pressure [bar]	Maximum operating temperature [°C]
	Inside	Outside	Height	Width				
Single								
0006	Etched and passivated Ra < 1.6	Etched, passivated and polished Ra < 1.6	215	108	0.55	1.70	16	-25/+150
0009			245	108	0.65	1.90		
0012			245	108	0.65	1.90		
0018			270	125	0.75	2.00		
0027			300	125	1.00	2.60		
0036			350	140	1.25	3.00		
0048			380	170	2.30	4.30		
0072			455	170	3.30	4.80		
0108			580	170	4.30	5.30		
0144			762	216	8.00	9.00		
0192			1015	216	11.10	10.80		
0288			1035	240	16.50	16.20	12	
Multiple								
0432	Etched and passivated Ra < 1.6	Etched and passivated Ra < 1.6	1090	410	36.00	43.00	10	-25/+150
0576			1350	410	45.00	44.00		
0768			1410	480	77.00	70.00		
1152			1460	540	110.00	80.00		
1536			1600	660	190.00	135.00		
1920			1600	660	190.00	135.00		

Operating pressure (bar)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Conversion factor	0.25	0.36	0.50	0.60	0.75	0.90	1.00	1.10	1.20	1.40	1.50	1.60	1.75	1.90	2.00	2.10

* [m^3/h] at 1 bar at 20 °C, for other operating pressures see table of conversion factors ** Dimensions are valid for the standard connection
Larger housings are available on request

Economical Solutions in Sanitary Quality

Air and Gas Filter Housings

High Quality Stainless Steel Housings in Sanitary Quality

PG-EG housing

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 m^3/h to 270 m^3/h and for operating flow rates of 540 m^3/h to 2,700 m^3/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	FDA, 3-A ***
Manufactured according to	ISO 9001:2008, CE

Technical Data PG-EG Housings

Size	Capacity [m^3/h] at operating pressure of 1 bar at 20 °C*	Element	Connection size	Connections			Materials	
				Clamp	Flange	Welded ends	Filter housings	Housing gasket
Single								
0006	7,5	03/10	DN 10	Standard	Available	Available	Stainless steel 1.4404 (316L)	EPDM
0018	22,5	05/20	DN 10					
0032	45	05/30	DN 25					
0072	90	10/30	DN 40					
0144	180	20/30	DN 50					
0192	270	30/30	DN 65					
Multiple								
0432	540	3x20/30	DN 100	–	Standard	Available	Stainless steel 1.4301 (304)	Blue Gard Style 3000
0576	810	3x30/30	DN 100					
0768	1080	4x30/30	DN 150					
1152	1620	6x30/30	DN 150					
1536	2160	8x30/30	DN 200					
1920	2700	10x30/30	DN 200					

Size	Surface finish	Dimensions** [mm]		Volume [L]	Weight** [kg]	Maximum operating pressure [bar]	Maximum operating temperature [°C]
		Height	Width				
Single							
0006	Etched, passivated and electro-polished, Ra < 0.8 inside and outside	267	120	0.60	1.50	16	-25/+150
0018		319	120	0.80	1.70		
0032		379	162	1.80	2.10		
0072		506	162	3.20	2.90		
0144		789	206	5.40	4.50		
0192		1043	206	7.40	5.70		
Multiple							
0432	Etched, passivated and electro-polished, Ra < 0.8 inside and outside	1155	410	36.00	43.00	10	-25/+150
0576		1410	410	45.00	44.00		
0768		1475	480	77.00	70.00		
1152		1530	540	110.00	80.00		
1536		1665	660	190.00	135.00		
1920		1665	660	190.00	135.00		

Operating pressure (bar)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Conversion factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

*Please use the conversion factor for other operating pressures
** Dimensions are valid for the standard connection
*** The 3-A certification is valid for single-PG-EG standard housings with clamp connection
Larger housings are available on request

Innovative, Sterile Aeration and Deaeration

Air and Gas Filter Housings

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

P-BE housing

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 in to contact with the filter medium.

P-BE housings comply with the applicable guidelines:	
Compliant according to	FDA
Manufactured according to	Quality Management ISO 9001:2008

Filter housings for the aeration on storage tanks

Technical Data P-BE Housings

Size	Capacity [m³/h]*		Element	Connection size	Connections			Materials	
	△p = 20 mbar	△p = 40 mbar			Milk pipe DIN 11851	Flange	Clamp	Filter housings	Fasteners
Single									
0006	4.5	9	03/10	DN 32	Standard	Available	Available	Stainless steel 1.4301 (304) or 1.4404 (316L) on request	Stainless steel 1.4301 (304) or 1.4404 (316L) on request
0027	12	24	05/25	DN 40					
0032	17	35	05/30	DN 50					
0072	35	70	10/30	DN 50					
0144	70	140	20/30	DN 80					
0192	105	210	30/30	DN 80					
Multiple									
0432	210	420	3x20/30	DN 100	Available	Standard	Available	Stainless steel 1.4301 (304) or 1.4404 (316L) on request	Stainless steel 1.4301 (304) or 1.4404 (316L) on request
0576	315	630	3x30/30	DN 100					
0768	420	840	4x30/30	DN 150					
1152	630	1260	6x30/30	DN 150					
1536	840	1680	8x30/30	DN 200					
1920	1050	2010	10x30/30	DN 200					

Size	Dimensions [mm]**		Weight [kg]**	Maximum operating temperature [°C]
	Height	Diameter		
Single				
0006	110	85.00	1.50	+200
0027	168	104.00	2.20	
0032	186	114.30	2.40	
0072	312	114.30	3.30	
0144	550	154.00	9.20	
0192	805	154.00	11.60	
Multiple				
0432	670	219.10	14.50	+200
0576	925	219.10	17.50	
0768	950	273.00	30.00	
1152	950	323.90	30.00	
1536	960	406.40	43.00	
1920	960	406.40	43.00	

*[m³/h] relative to 1 bar at 20 °C
** Dimensions are valid for the standard connection

Sterile Filtration of Air and Gases

Air and Gas Filter Elements

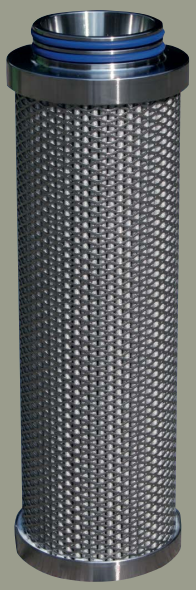
Suitable for temperatures up to +200 °C

Sterile Filter (P)-SRF N

The (P)-SRF N filter element is used for a safe sterile filtration of compressed air and other process gases. All elements fulfil the high requirements in the food and beverage as well as the pharmaceutical industries and work reliably under extreme operating conditions. The (P)-SRF N filter element is a pleated depth filter with stainless steel end caps, inner support core and outer support liner. Due to its glass fiber optic medium, this filter has a high temperature resistance and long service life. The very high retention rate for viruses and phages (LRV > 9-10/cm²) makes it the ideal filter for fermentation applications.

Outstanding Features

- Excellent dewetting characteristic
- Suitable for sterilisation with hydrogen peroxide (VPHP)
- Low differential pressure at high flow rates
- LRV of MS2 Coliphagen > 9-10/cm²
- Can be sterilised in reverse direction
- For food contact use according to CFR Title 21 & 1935/2004/EC

Filter element	(P)-SRF N 
Filter media	Borosilicate
Retention rates [µm]	0.2 µm; sterile LRV > 7/cm²
Support liner	1.4301 (304)
End caps	1.4301 (304)
O-rings (others on request)	Silicone
Element size	03/10; 04/10; 04/20; 05/20; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30
Connections	uf, P7
Recommended housings	PG-EG, P-EG, P-BE
Conformity	FDA
Operating temperature	Up to + 200 °C (> 150 °C for dry heat only)
Maximum differential pressure	5 bar (in flow direction)
Application examples	Sterile filtration of compressed air and gases, tank ventilation


Food Industry


Dairies


Fermentation


Pharmaceutical Industry


Chemical Industry

When it has to be pure and sterile

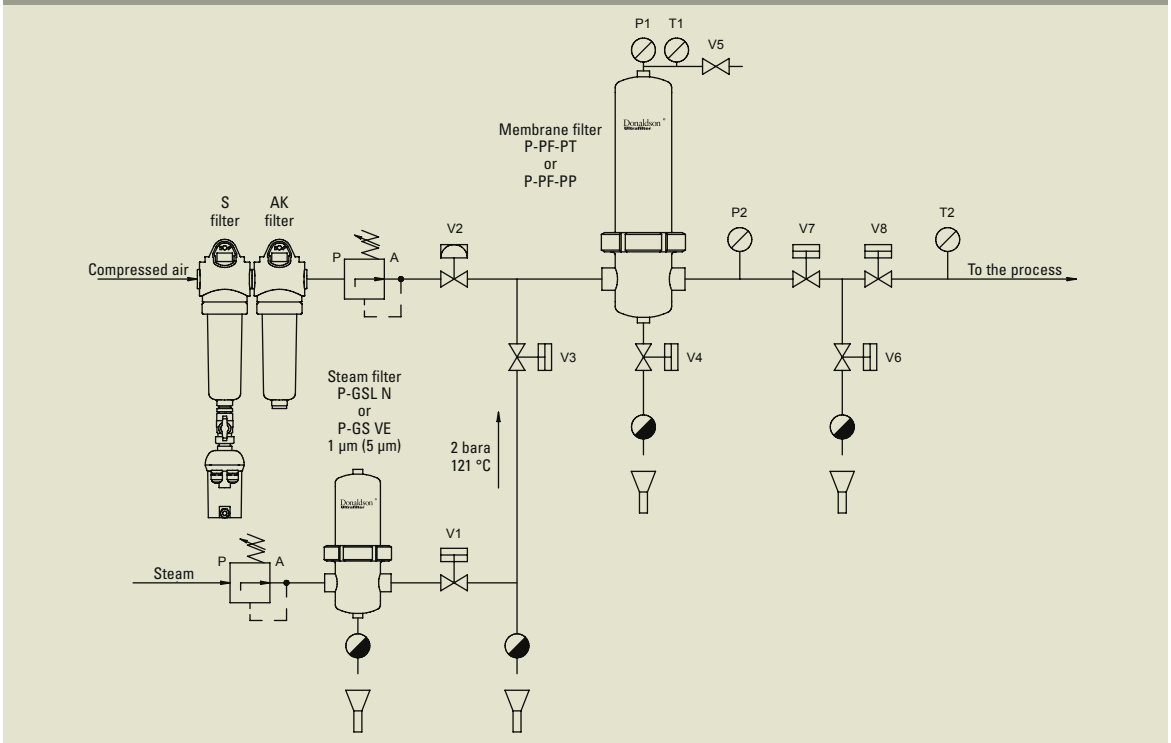
Air and Gas Filter Elements

Filter element	(P)-GSL N	(P)-SRF	(P)-BE	(P)-PF-PT	(P)-PF-PP
					
Filter media	Stainless steel fiber or stainless steel mesh 1.4301 (304)	Borosilicate	Borosilicate	Pleated PTFE membranes	Pleated polypropylene membranes
Retention rates [µm]	1; 5; 25; 50; 100; 250 absolute*	0.2; sterile LRV > 7/cm²	0.2 LRV > 5/cm²	0.2; sterile LRV > 7/cm²	0.2; sterile LRV > 7/cm²
Support liner	1.4301 (304)	1.4301 (304)	1.4301 (304)	Polypropylene	Polypropylene
End caps	1.4301 (304)	1.4301 (304)	1.4301 (304)	Polypropylene	Polypropylene
O-rings (others on request)	EPDM	Silicone	Silicone	EPDM	EPDM
Element sizes	03/10; 04/10; 04/20; 05/20; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50	03/10; 04/10; 04/20; 05/20; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50	03/10; 04/10; 04/20; 05/20; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50	05/30; 10/30; 20/30; 30/30	05/30; 10/30; 20/30; 30/30
Connections	uf, P7	uf, P7	uf, P7	uf, P7, P9	uf, P7, P9
Recommended housings	P-EG, PG-EG	PG-EG, P-EG	PG-EG, P-EG, P-BE	PG-EG, P-EG, P-BE	PG-EG, P-EG, P-BE
Conformity	FDA	FDA	FDA	FDA	FDA
Operating temperature	Up to +200 °C	Up to +200 °C (>+150 °C for dry heat only)	Up to +200 °C (>+150 °C for dry heat only)	Up to +92 °C	Up to +92 °C
Maximum differential pressure	10 bar	5 bar (regardless of the flow direction)	5 bar (regardless of the flow direction)	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction
Application examples	Pre-filter for compressed air and gases, tank ventilation	Sterile filtration of compressed air and gases	Ventilation of tanks	Sterile filtration of compressed air and gases	Sterile filtration of compressed air and gases
Industries	 Food/Beverages  Paints/Coatings  Environment  Pharmacy  Chemistry	 Food  Dairies  Breweries  Pharmacy  Chemistry	 Food  Dairies  Fermentation  Health Care  Biotechnology	 Food  Dairies  Fermentation  Pharmacy  Chemistry	 Food  Petrochemistry  Environment  Pharmacy  Chemistry

* Retention rates in air

Steam Sterilisation Instructions for Air Filters

Work Flow: Sterilisation Instructions for Air Filter in Flow Direction



(1) Open valves V4, V5, V6, and V7.

(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, 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).

(6) Ensure the differential pressure across the filter does not exceed 0.2 to 0.3 bar g.

(7) When the steam trap below valve V6 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. If 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) On completion of the Sterilisation-In-Place (SIP) cycle, close V4, V6, V3 and V1 in that order.

(11) Fully open V5 to flash-dry the filter (or step 12).

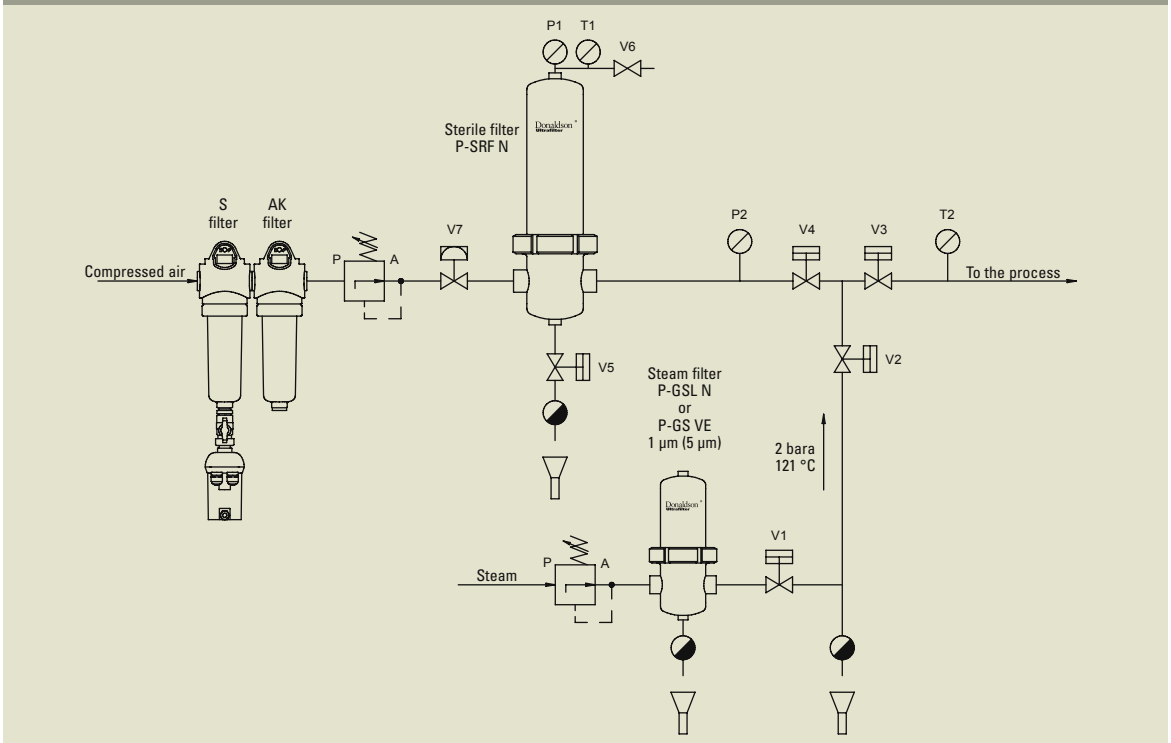
(12) Open V2 to allow compressed air into the system. The air pressure should be no more than 0.5 bar g above the steam pressure.

(13) Allow the system to cool for 15 minutes, then close V5 (flash-dry only).

See our sterilisation guide for additional information!

Steam Sterilisation Instructions for Air Filters

Work Flow: Sterilisation Instructions for Air Filters in Reverse Direction



(1) Open valves V4, V5 and V6.

(2) Open valve V1 and allow the steam condensate to drain until the steam trap below valve V2 closes.

(3) Slowly open V2 allowing steam into the system.

(4) Observe the pressure gauges P1 and P2 and control the steam flow rate at valve V2 to ensure the differential pressure across the filter does not exceed 0.1 bar g*. If it exceeds 100 mbar stop the sterilisation procedure and rectify the cause of the differential pressure before proceeding with the sterilisation routine.

(5) When 'live' steam flows from valve V6, close valve V6. When the steam trap below valve V5 closes, the steam pressure will begin to rise.

(6) Ensure steam pressure/temperature does not exceed the maximum allowable pressure/ temperature for the cartridge type being steamed. Continue to monitor the differential pressure using gauges P1 and P2. If it exceeds 100 mbar stop the sterilisation procedure.

(7) On completion of the sterilisation cycle time, close V4, V2, V1 in that order.

(8) Rapidly open V6 to flash dry the filter (or step 9).

(9) Open V7 slowly to allow air into the system. The pressure of the air should be no more than 0.5 bar g above the steam pressure.

(10) 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 sterilizing 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.

*Pressure gauge display
See our sterilisation guide for additional information!

Steam Filter Housings

High-quality Stainless Steel Housings in Industrial Quality

P-EG housing

Together with the (P)-GS VE and the (P)-GSL N filter elements, the Donaldson P-EG filter housings are used in a variety of steam filtration applications. Equipped with a variety of connections, the P-EG housings are designed for low differential pressures and high flow rates.

P-EG housings comply with the applicable guidelines:	
Compliant according to	FDA
Manufactured according to	CE

Technical Data P-EG Housings

Size	Capacity [kg/h] at 2 bar abs. at 121 °C saturated steam	Element	Connection size	Connections			Materials	
				BSP standard thread	Flange	Welded ends	Filter housing	Housing gasket
Single								
0006	7.5	03/10	G 1/4"	Standard	Available	Available	Stainless steel 1.4301 (304) or 1.4404 (316L)	EPDM
0009	11.25	04/10	G 3/8"					
0012	15.0	04/20	G 1/2"					
0018	22.5	05/20	G 3/4"					
0027	33.75	05/25	G 1"					
0036	45	07/25	G 1 1/4"					
0048	60	07/30	G 1 1/2"					
0072	90	10/30	G 2"					
0108	135	15/30	G 2"					
0144	180	20/30	G 2 1/2"					
0192	240	30/30	G 3"					
0288	360	30/50	G 3"					
Multiple								
0432	540	3x20/30	DN 100	–	Standard	Available	Stainless steel 1.4301 (304) or 1.4404 (316L)	Blue Gard Style 3000
0576	720	3x30/30	DN 100					
0768	960	4x30/30	DN 150					
1152	1440	6x30/30	DN 150					
1536	1920	8x30/30	DN 200					
1920	2400	10x30/30	DN 200					

Size	Surface finish		Dimensions* [mm]		Volume [L]	Weight* [kg]	Maximum operating pressure [bar]	Maximum operating temperature [°C]
	Inside	Outside	Height	Width				
Single								
0006	Etched and passivated Ra < 1.6	Etched, passivated and polished Ra < 1.6	215	108	0.55	1.70	16	-25/+150
0009			245	108	0.65	1.90		
0012			245	108	0.65	1.90		
0018			270	125	0.75	2.00		
0027			300	125	1.00	2.60		
0036			350	140	1.25	3.00		
0048			380	170	2.30	4.30		
0072			455	170	3.30	4.80		
0108			580	170	4.30	5.30		
0144			762	216	8.00	9.00		
0192			1015	216	11.10	10.80		
0288			1035	240	16.50	16.20	12	
Multiple								
0432	Etched and passivated Ra < 1.6	Etched and passivated Ra < 1.6	1090	410	36.00	43.00	10	-25 /+150
0576			1350	410	45.00	44.00		
0768			1410	480	77.00	70.00		
1152			1460	540	110.00	80.00		
1536			1600	660	190.00	135.00		
1920			1600	660	190.00	135.00		

* Dimensions are valid for the standard connection
Larger housings are available on request

and for Low Differential Pressures

Steam Filter Housings

High Quality Stainless Steel Housings in Industrial Quality

P-EGS housing

P-EGS housings were developed for the purification of steam in different ranges of applications. Due to the optimized construction they offer a very low differential pressure at high flow rates. Combined with the different Donaldson filter elements P-GSL N they provide an optimised solution for nearly all applications.

The P-EGS series is available in 4 different housing sizes with steam mass flows up to 600 kg/h (at 2 bar abs.). The Donaldson plug connection guarantees that the element remains safely fixed at all times. The housings are available with BSP threads, flange or with hygienic welded end connection according to DIN 11850.

P-EGS housings comply with the applicable guidelines:	
Compliant according to	FDA
Manufactured according to	CE

Technical Data P-EGS Housings

Size	Capaciity [kg/h] at 2 bar abs. at 121 °C saturated steam	Connection size	Connections			Materials		*
			BSP standard thread	Flange	Welded ends	Filter housing	Housing gasket	
0005	27	G ½"	Standard	Available	Available	Stainless steel 1.4404 (316L)	EPDM	
0010	84	G 1"						
0020	240	G 2"						
0030	575	G 3"						

Size	Surface finish		Dimensions* [mm]		Volume [L]	Weight* [kg]	Maximum operating pressure [bar]	Maximum operating temperature [°C]
	Inside	Outside	Height	Width				
0005	Etched and passivated Ra < 1.6	Etched, passivated and polished Ra < 1.6	235	108	0.60	1.90	16	-25/+150
0010			285	125	1.00	2.60		
0020			379	170	2.70	4.80		
0030			509	240	8.80	11.20		

* Dimensions are valid for the standard BSP connection
* Optional FLUORAZ for temperatures > 180°C

SIZING RECOMMENDATION

Optimal Steam Flows on combination with P-GSL N 1µm elements							
	Flow [kg/h]						
	@ 2 bar abs.	@ 3 bar abs.	@ 4 bar abs.	@ 5 bar abs.	@ 6 bar abs.	@ 7 bar abs.	@ 8 bar abs.
P-EGS 0005	⟶ 27	⟶ 39	⟶ 51	⟶ 62	⟶ 73	⟶ 84	⟶ 97
P-EGS 0010	⟶ 84	⟶ 120	⟶ 160	⟶ 194	⟶ 215	⟶ 235	⟶ 255
P-EGS 0020	⟶ 240	⟶ 310	⟶ 370	⟶ 420	⟶ 470	⟶ 510	⟶ 550
P-EGS 0030	⟶ 575	⟶ 750	⟶ 890	⟶ 1010	⟶ 1130	⟶ 1250	⟶ 1350

Steam Filtration with High Flow Rates

Steam Filter Elements

Retention rate down to 0.01 µm in saturated steam

Steam Filter (P)-GSL N

The (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 (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

Filter element	(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 liner	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; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50
Connections	uf, P7
Recommended housings	P-EG, PG-EG
Conformity	FDA
Operating temperature	Up to +200 °C
Maximum differential pressure	10 bar
Application examples	Filter for liquids, gases and steam

*Retention rates in steam


Food Industry


Dairies

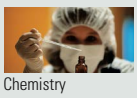
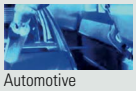
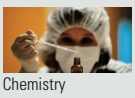

Paints and Coatings


Pharmaceutical Industry


Fermentation

High Process Safety

Steam Filter Elements

Filter element	(P)-GS VE	(P)-GS N
		
Filter media	Sintered stainless steel 1.4404 (316L)	Stainless steel fibre 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	–	1.4301 (304)
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; 05/25; 07/25; 05/30; 07/30; 10/30; 15/30; 30/30; 30/50	03/10; 04/20; 05/20; 05/30; 07/30; 10/30; 15/30; 30/30
Connections	uf, P7	uf, P7
Recommended housings	P-EG, PG-EG	P-EG, PG-EG
Conformity	FDA	–
Operating temperature	Up to +200 °C	Up to +160 °C
Maximum differential pressure	5 bar (regardless of the flow direction)	5 bar (in flow direction)
Application examples	Filter for gases and steam	Filter for gases and steam
Industries	 Food Industry  Dairies  Fermentation  Pharmacy  Chemistry	 Paints/Coating  Environment  Mechanical Engineering  Automotive  Chemistry

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

Culinary steam	Operating steam
Filters for culinary steam should retain > 95% of 2 µm particles (3-A standard 609-01)	Operating steam not for direct food contact, but for indirect heating

Particles ≤ 1 µm		Particles ≥ 5 µm	
Sintered (P)-GS VE 1 µm	Pleated (P)-GSL N 1-5 µm	Sintered (P)-GS VE 5-25 µm	Pleated (P)-GSL N 5–250 µm (P)-GS N 5-25 µm

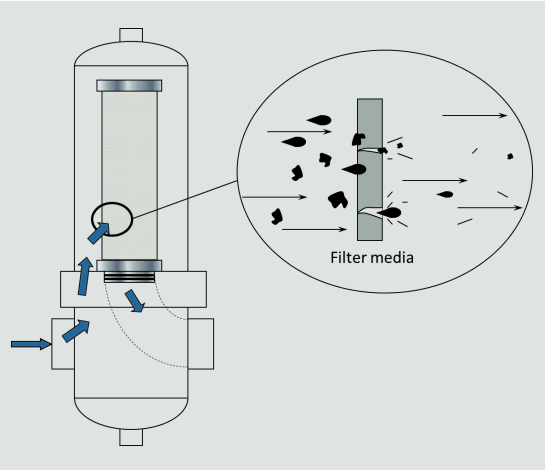
Recommendations for the Design of Steam Filter Systems

(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 g (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

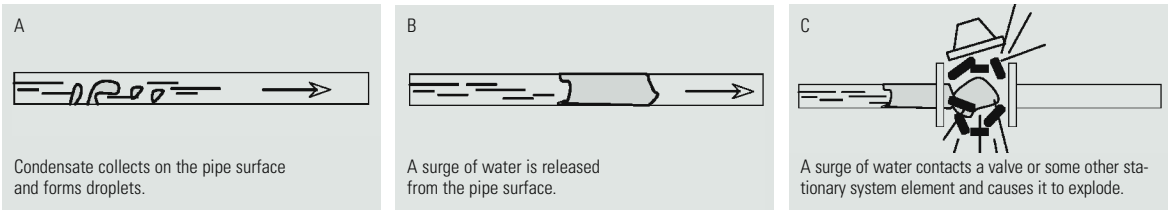
- Vapour filters protect the sterile filter efficiently against damage e.g. corrosion particles.
- Filtered boiler feed water is a prerequisite for particle-free steam.
- The steam generator must be serviced regularly. The systems (pipelines, etc.) should preferably made of stainless steel.



At a vapour velocity of 20 m/sec in the pipe, particle or particles (e.g. corrosion particles) impact the sterile filter medium at a speed of 72 km/h. (30 m/sec correspond to a speed of 108 km/h).

(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.
- Filter housings must be installed vertically (with the housing opening facing down) so that the condensate cannot accumulate inside the housing/filter element.
- 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 (especially important for hydrophobic gas filters).



Condensate must be prevented in the entire system and removed immediately to prevent the risk of exploding valves.

See our sterilisation guide for additional information!

Economical Filtration Solutions

Liquid Filter Housings

Stainless Steel Housings for Liquids

PF-EG housing

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 seven housing sizes for flow rates of 75 to 600 l/min. Donaldson PF-EG Superplus filter housings (Single, clamp connection) are certified 3-A as standard.

PF-EG housings comply with the applicable guidelines:	
Compliant according to	FDA, 3-A ***
Manufactured according to	DQS ISO 9001:2008, CE

Technical Data PF-EG Housings

Size	Capacity [l/min.]* 5 µm	Element	Connection size	Dimensions** [mm]		Volume [L]	Weight** [kg]	Maximum operating pressure [bar]		Maximum operating temperature [°C]
				Height	Width			For fluids of 50 °C	For saturated steam of 150 °C	
Single										
0003	3	03/10	DN 10	280	140	0.30	1.20	10	3.7	-25/+150
0008	8	05/20	DN 10	333	140	0.40	1.40			
0012	12	5/3 Code 7	DN 25	406	250	1.50	4.40			
0025	25	10/3 Code 7	DN 25	541	250	2.50	5.10			
0050	50	20/3 Code 7	DN 25	795	250	4.50	6.70			
0075	75	30/3 Code 7	DN 25	1049	250	6.60	7.70			
Multiple										
0080	75	3x10/3 Code 7	DN 40	690	330	8.10	13.60	10	3.7	-25/+150
0150	150	3x20/3 Code 7	DN 40	935	330	12.90	16.10			
0225	225	3x30/3 Code 7	DN 40	1205	330	18.60	18.60			
0250	250	5x20/3 Code 7	DN 50	965	400	23.30	21.80			
0375	375	5x30/3 Code 7	DN 50	1215	400	32.50	24.90			
0400	400	8x20/3 Code 7	DN 65	985	500	46.50	33.60	7.5		
0600	600	8x30/3 Code 7	DN 65	1235	500	64.20	37.90		3.0 (+144 °C)	

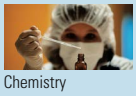
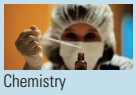
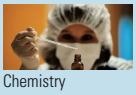
Connections		Materials		Surface finish	
Standard	Superplus	Filter housing	Housing gasket	Standard	Superplus
Single					
Milk pipe	Clamp	Stainless steel 1.4404 (316L)	EPDM gaskets (other gaskets on request)	Interior and exterior stained & passivated	Interior and exterior electro-polished Ra < 0.8
Multiple					
Milk pipe	Milk pipe	Stainless steel 1.4404 (316L)	EPDM gaskets (other gaskets on request)	Interior and exterior stained & passivated	Interior and exterior electro-polished Ra < 0.8

* Capacity based on water
** Dimensions valid for Superplus housing
*** The 3-A certification is valid for the PF-EG Superplus Single housing with clamp connection, PF-EG Multiple housing quality in 3-A quality are also available on request
Larger housings are available on request

Best Quality for your Process

Liquid Filter Elements: Sterile Membrane Filters

Absolute Membrane Filters

Filter element	(P)-PF-PT	(P)-PF-PP	(P)-PF-PES „W“	PF-PES „B“	PF-PES „X“
					
Filter media	Pleated PTFE membrane	Pleated polypropylene membrane	Pleated polyethersulfone membrane	Pleated polyethersulfone membrane	Pleated polyethersulfone membrane
Retention rates [µm]	0.2; steril LRV > 7/cm²	0.2; steril LRV > 7/cm²	0.2 steril; 0.45; 0.6 LRV > 7/cm²	0.2; 0.45 absolut	0.45 absolut
Support liner	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene
End caps	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene
O-rings (others on request)	EPDM	EPDM	EPDM	EPDM	EPDM
Element sizes	10"; 20"; 30"	10"; 20"; 30"	10"; 20"; 30"	10"; 20"; 30"	10"; 20"; 30"
Connections	uf, P7, P9	uf, P7, P9	uf, P7, P9	P7, P9	P7, P9
Recommended housings	PF-EG	PF-EG	PF-EG	PF-EG	PF-EG
Conformity	FDA	FDA	FDA	FDA	FDA
Operating temperature	Up to +92 °C	Up to +92 °C	Up to +92 °C	Up to +92 °C	Up to +92 °C
Maximum differential pressure	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction
Application examples	Sterile filtration of liquids	Sterile filtration of liquids	Sterile filter for water and soft drinks	Final filter for beer and wine	Final filter for beer and wine
Industries	 Food  Dairies  Fermentation  Pharmacy  Chemistry	 Food  Petrochemistry  Environment  Pharmacy  Chemistry	 Food  Biotechnology  Water  Soft Drinks  Chemistry	 Wine  Breweries  Water  Soft Drinks	 Wine  Breweries  Water  Soft Drinks

Hygiene at the Highest Level

Liquid Filter Elements: Absolute Depth Filters

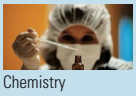
Nominal

Filterelement	(P)-SM N	PP-FC100	(P)-PP100	PP100 „C“	(P)-GSL N
					
Filter media	Stainless steel fiber or stainless steel mesh 1.4301 (304)	Polypropylene	Pleated polypropylene	Pleated polypropylene	Stainless steel fiber or stainless steel mesh 1.4301 (304)
Retention rates [µm]	1; 5; 25; 50; 100; 250 absolute	0.5; 1; 3; 5; 10; 20; absolute 30; 50; 75; 100; 150; 180 nominal	0.8; 1.2; 2.4; 5; 10 absolute	1 absolute	1 nominal; 5; 25; 50; 100; 250 absolute*
Support liner	1.4301 (304)	Polypropylene	Polypropylene	Polypropylene	1.4301 (304)
End caps	1.4301 (304)	Polypropylene	Polypropylene	Polypropylene	1.4301 (304)
O-rings (others on request)	EPDM	EPDM	EPDM	EPDM	EPDM
Element sizes	10"; 20"; 30"	10"; 20"; 30"; 40"	10"; 20"; 30"	10"; 20"; 30"	10"; 20"; 30"
Connections	uf, P7	P7, no end caps	uf, P7, P9	P7, P9	uf, P7
Recommended housings	PF-EG	PF-EG, P-KG	PF-EG, P-KG	PF-EG	PF-EG
Conformity	FDA	FDA	FDA	FDA	FDA
Operating temperature	Up to +150 °C	Up to +92 °C	Up to +92 °C	Up to +92 °C	Up to +200 °C
Maximum differential pressure	5 bar (in flow direction)	2 bar	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	10 bar
Application examples	Pre-filters and fine filters for liquids	Pre-filters and fine filters for liquids	Pre-filters and fine filters for liquids	Pre-filters and final filters for fluids	Filters for liquids
Industries	 Food/Beverages  Paints/Coatings  Environment  Pharmacy  Chemistry	 Food/Beverages  Mechanical Engineering  Environment  Industrial water  Chemistry	 Wine  Breweries  Environment  Water/Soft Drinks  Chemistry	 Wine  Breweries  Environment  Water  Dairies	 Food/Beverages  Paints/Coatings  Environment  Pharmacy  Chemistry

*Retention rates in water

Efficient Cleaning

Depth Filters

Filter element	PP-FC	PP-TF	(P)-PP
			
Filter media	Polypropylene	Pleated polypropylene	Pleated polypropylene
Retention rates [µm]	1; 5; 10; 20; 30; 50; 75; 100; 150 nominal	1; 3; 5; 10; 15; 25; 50 nominal	0.4; 1; 3; 5; 10; 30 nominal
Support liner	Polypropylene	Polypropylene	Polypropylene
End caps	Polypropylene	Polypropylene	Polypropylene
O-rings (others on request)	EPDM	EPDM	EPDM
Element sizes	10"; 20"; 30"; 40"	10"; 20"; 30"; 40"	10"; 20"; 30"
Connections	P7, no end caps	DOE	uf, P7, P9
Recommended housings	PF-EG, P-KG	P-KG	PF-EG
Conformity	FDA	FDA	FDA
Operating temperature	Up to +92 °C	Up to +92 °C	Up to +92 °C
Maximum differential pressure	2 bar	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction	5.5 bar (<+35 °C), 2 bar (<+80 °C) in flow direction
Application examples	Coarse and pre-filter for liquids	Pre-filter for fluids	Pre-filter and fine filter for liquids
Industries	 Food/Beverages  Mechanical engineering  Environment  Industrial water  Chemistry	 Food/Beverages  Water  Environment  Industrial water  Chemistry	 Food/Beverages  Biotechnology  Environment  Pharmazy  Chemistry

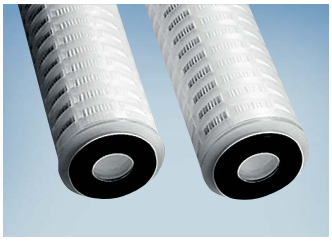
Connections

Donaldson also supplies elements with different types of adapters that fit into the housings of other manufacturers.

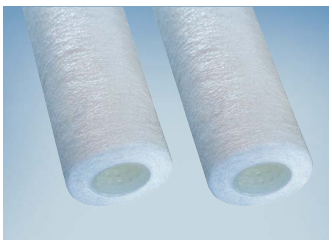
uf 2" O-rings 226

P7 O-rings 226, 2 locking tabs, locating fin

P9 O-rings 222, bayonet 3 locking tabs, locating fin



DOE Double open end

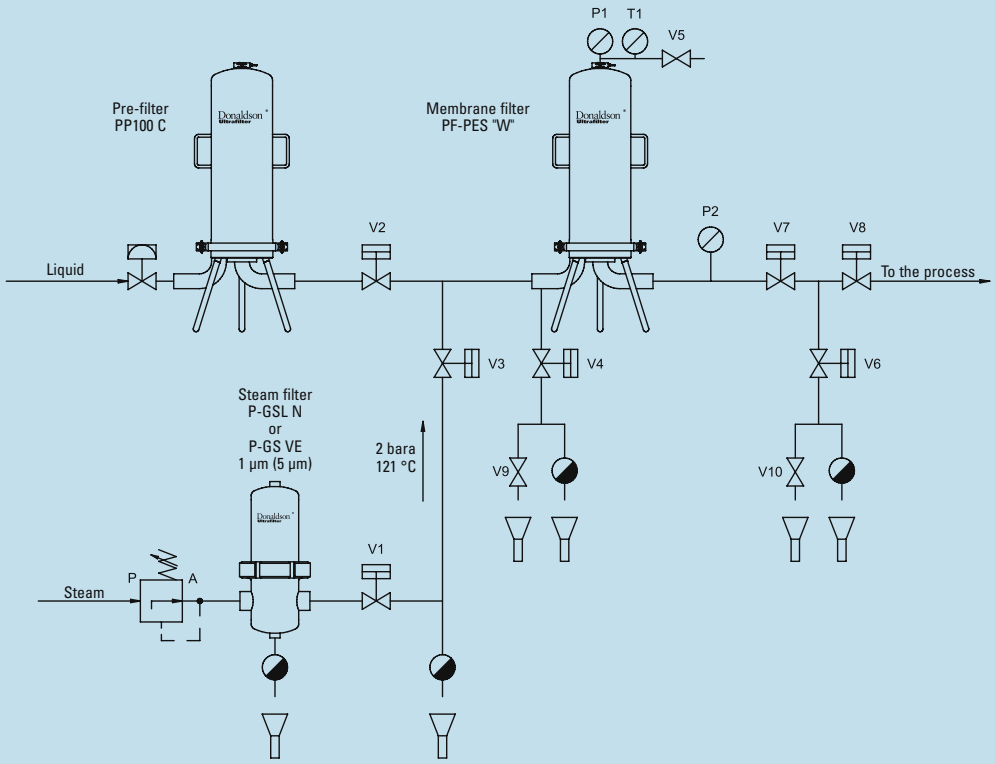


No end caps

Other sizes upon request

Steam Sterilisation Instructions for Liquid Filters

Work Flow: Sterilisation Instructions for Liquid Filters in Flow Direction



(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.

Integrity Test Devices

Membra-Check

Filter Test Center (FTC)

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.

Service with the Highest Standards

Our service is always nearby. With our technical service and support network throughout Southeast Asia, we can routinely service your production systems as well as provide on-site support whenever needed.

With one of Donaldson's service centers you receive quick and cost-effective competent services for all filtration applications from one source.

Donaldson
Ultrafilter™

Compressed Air Filtration · Filters for Sterile Air, Steam and Liquids · Refrigerant Drying · Adsorption Drying · Condensate Drains · Condensate Purification Systems · Process Air and Gas Processing

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