



Donaldson
FILTRATION SOLUTIONS

P-GS
STEAM FILTER ELEMENTS

Compressed Air & Process Filtration



When Purity Counts...Count on Donaldson

As one of the world's leading manufacturers of compressed air purification equipment and process filters, and with over 35 years of expertise, Donaldson has built a comprehensive engineering, manufacturing, and customer support network providing filters that meet the most demanding application requirements.

Donaldson innovative designs focus on energy-efficient operation and reliable performance to minimize operating expenses and reduce downtime. Donaldson provides industrial air, sterile air, culinary steam, and liquid filtration products from prefiltration to final, and from low to high capacity, so when purity counts, count on Donaldson.

The Donaldson P-GS sintered stainless steel filter element is used for filtration of steam, gas, and liquid. The P-GS 5 micron filter element exceeds 3-A guidelines for the production of culinary steam under Accepted Practice T609-04. Improved steam quality ensures longer service life of the filter elements being sterilized and increases the efficiency of the entire process. The P-GS provides high dirt holding capacity at low differential pressure and high flow rate, and it can be regenerated by back flushing or ultrasonic cleaning to deliver long filter life and reduced operating costs.

FEATURES & BENEFITS

- Thirteen sizes, three micron ratings, and connection options to meet virtually all purification requirements in steam, gas, and liquid filtration applications.
- High-quality continuous 316L sintered stainless steel filter media construction with 304 SS welded end caps ensures excellent material resistance to steam and aggressive gases.
- Heavy-duty design withstands a maximum differential pressure up to 72 psi and an operating temperature range of -60°F to 400°F (with optional Fluoraz®* o-rings).
- The P-GS 5 micron element exceeds 3-A guidelines for the production of Culinary Steam under Accepted Practice T609-04.
- The 50+% porosity level ensures high dirt holding capacity at low differential pressure and high flow rate.
- Multiple regenerative methods are possible including back-flushing, ultrasonic cleaning, and solvent cleaning with hydrogen peroxide and other chemicals allowing for longer filter life and reduced operating costs.
- All components meet the FDA requirements for contact with food in accordance with the Code of Federal Regulations (CFR), Title 21. The filter element is manufactured according to DIN EN ISO 9001.

*Fluoraz is a registered trademark of Greene, Tweed & Co.

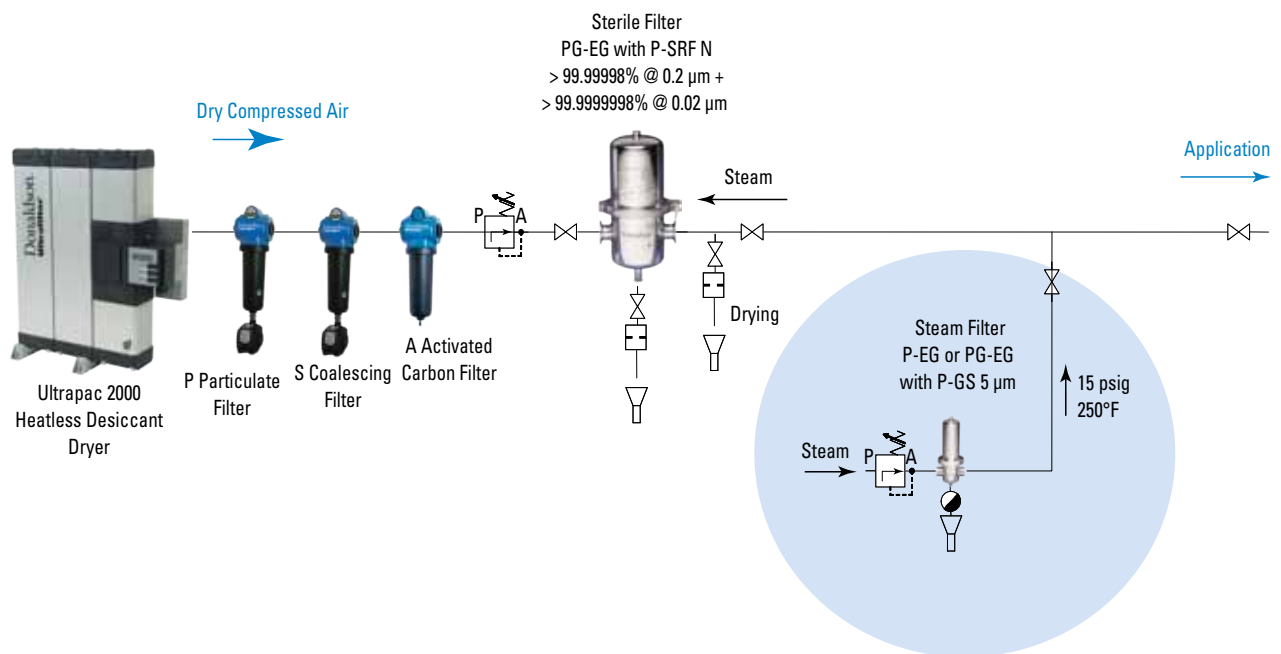


APPLICATIONS

There are several terms used for steam from “process steam” used in process applications as a source of energy for process heating, pressure control and mechanical drives to “culinary steam” used in food processing which is often required to meet 3-A Culinary Standards and 3-A Accepted Practices for the dairy industry. Process steam does not generally come in contact with the final product whereas culinary steam can, and often does, come in direct contact with the final product.*

<p>Steam Filtration</p> <ul style="list-style-type: none"> Aseptic packaging Breweries Chemicals Dairies Electronics Food & beverage Pharmaceuticals Plastics 	<p>Gas Filtration</p> <ul style="list-style-type: none"> Carbon dioxide Compressed air Highly aggressive gases Nitrogen Tank ventilation 	<p>Liquid Filtration</p> <ul style="list-style-type: none"> Chemicals Cosmetics Paints Salt & seawater Syrups Coolants Food & beverage Pharmaceuticals Solvents Water
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RECOMMENDED STERILE AIR INSTALLATION WITH STEAM FILTER



* For more information on steam terminology, please refer to Donaldson’s Process Filtration Culinary & Process Steam brochure.

PRODUCT SPECIFICATIONS

Continuous Operating Temperature Range	-60°F to 300°F (EPDM o-rings) -60°F to 400°F (Fluoraz o-rings)
Filtration Surface	0.54 ft ² per 10" element (10/30) (For other element sizes see correction factors filtration surface)
Configurations	UF 2" plug connection and flat end cap P7: 2 x 226 o-rings, 2 bayonet locking tabs and locating fin
Maximum Differential Pressure	72 psid, regardless of the system pressure or temperature
Typical Service Life	Total filter element life dependent on cleaning cycle frequency. Element replacement recommended after a maximum of 6 cleanings to prevent loss of integrity.

NOMINAL FLOW RATES AT RECOMMENDED SURFACE LOADS FOR 10" ELEMENT (10/30)

Element Pore Size (μm)	Saturated Steam lbs/hr per 1 cm ²			Gases/Air cfm per 1 cm ²	Liquids up to 3 cp viscosity gph per 1 cm ²
	29 psi	58 psi	87 psi		
1	0.28	0.19	0.13	0.035 to 0.12	0.3 to 1.3
5	0.33	0.21	0.15	0.035 to 0.12	0.3 to 1.3
25	0.42	0.26	0.19	0.035 to 0.12	0.3 to 1.3

RETENTION RATES AT MINIMUM SURFACE LOAD THICKNESS

Steam (250°F, 198 lbs/hr) & Air (68°F, 53 scfm)				Water (68°F)			
Element Pore Size (μm)	98% (μm)	100% (μm)	Minimum Surface Load Thickness (in)	Element Pore Size (μm)	98% (μm)	100% (μm)	Minimum Surface Load Thickness (in)
1	0.5	1	0.05	1	2	12	0.05
5	1	2	0.08	5	3	15	0.08
25	5	15	0.12	25	12	35	0.12

MATERIALS

Filter Media	316L sintered stainless steel	CFR Title 211.65
End Caps	304 stainless steel	CFR Title 211.65
O-Rings Standard	EPDM	CFR Title 177.2600
O-Rings Optional	Fluoraz (high temp) Silicone Buna N PTFE over silicone PTFE over Viton®*	CFR Title: 177.2600 CFR Title: 177.2600 CFR Title: 177.2600 CFR Title: 177.1550 CFR Title: 177.1550

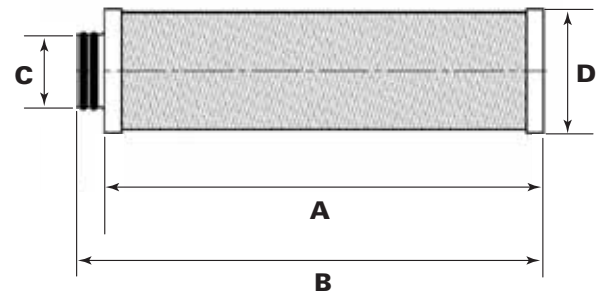
* Viton is a registered trademark of DuPont Performance Elastomers L.L.C.

UF PLUG CONNECTION

Element Size	Dimensions (inches)				D	Correction Factors**
	A	B	C (I.D.)*	C (O.D.)*		
03/10	3.0	3.4	0.8	1.2	1.65	0.12
04/10	4.1	4.6	0.8	1.2	1.65	0.17
04/20	4.1	4.6	1	1.5	2.05	0.19
05/20	5.0	5.6	1	1.5	2.05	0.25
05/25	5.0	5.6	1	1.5	2.44	0.32
07/25	7.1	7.6	1	1.5	2.44	0.47
05/30	5.0	5.7	1	1.5	3.39	0.46
07/30	7.1	7.7	2	2.4	3.39	0.68
10/30	10.0	10.6	2	2.4	3.39	1.00
15/30	15.0	15.6	2	2.4	3.39	1.55
20/30	20.0	20.6	2	2.4	3.39	2.10
30/30	30.0	30.6	2	2.4	3.39	3.28
30/50	30.0	30.6	3.2	3.5	5.50	5.89

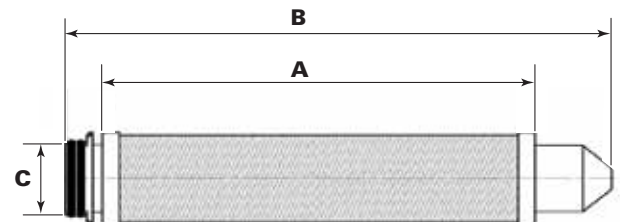
* Plug-type connection with double o-ring

** Correction factors filtration surface area



P7 CONNECTION

Size	Dimensions (inches)		
	A	B	C
5"	4.92	7.48	2.22
10"	9.84	12.40	2.22
20"	19.68	22.24	2.22
30"	29.53	32.08	2.22



QUALITY ASSURANCE

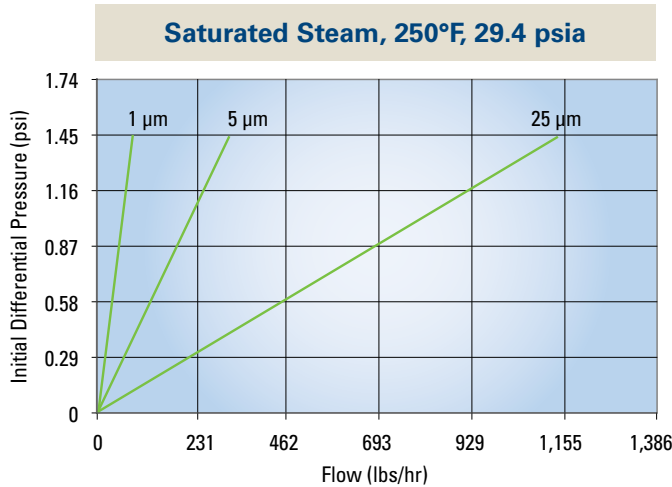
All components of the P-GS filter element with welded end caps are FDA listed for food contact use in the Code of Federal Regulations (CFR), Title 21.

All products have been inspected and released by Quality Assurance as having met the following requirements:

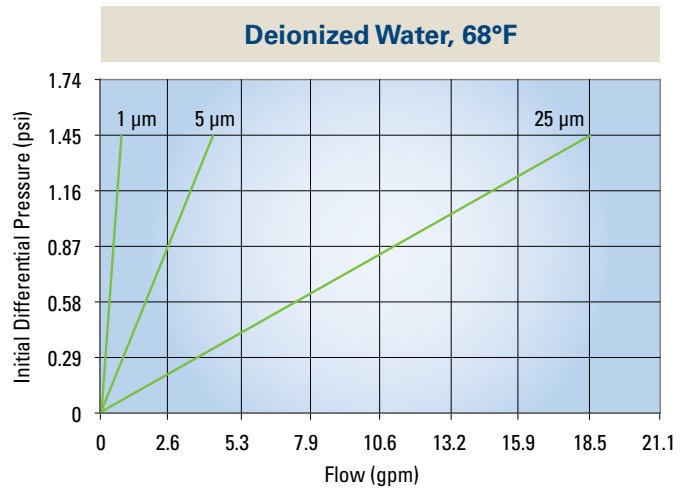
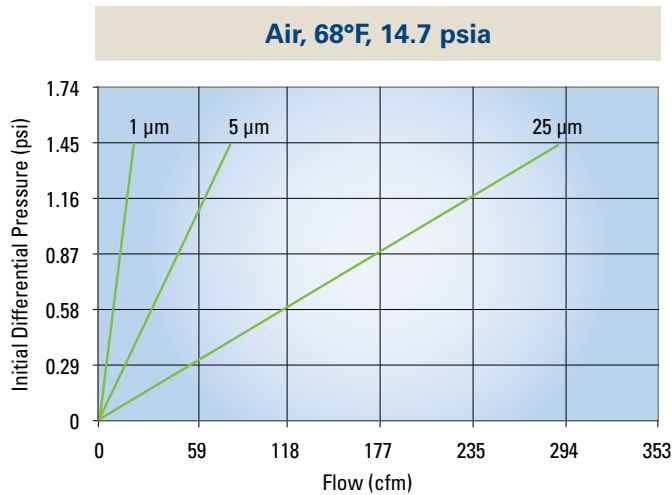
- All filter elements are fabricated without the use of binders, adhesives, additives or surface-active agents.
- All filter components based on plastics are non-toxic and are certified bio-safe in accordance with current USP Class VI Tests for Plastic.
- All filter elements are staged, assembled, tested, and packaged according to DIN EN ISO 9001.

FLOW CHARACTERISTICS FOR 10" ELEMENT (10/30)

Properly sizing a steam filter system will depend on a number of variables, including: flow rate (pounds per hour), pressure, element micron rating, and acceptable pressure drop across the filtration system.



Correction Factor for Steam Temperature				
Steam Temperature (°F)	212	250	285	320
Correction Factor	0.5	1	2	3



PRESSURE CORRECTION FACTORS

Nominal and maximum flow for other pressures can be calculated with the correction factors below.

Pressure (psig)	15	29	58	87	100	116	145	174	203	232
Correction Factor	0.25	0.36	0.6	0.9	1.0	1.1	1.4	1.6	1.9	2.1

Steam filter elements are commonly regenerated to reduce differential pressure drop, remove settled contaminants, and prevent permanent contamination buildup. The Donaldson P-GS Filter elements can be regenerated using a number of different techniques. In general, the more frequently an element is cleaned, the better the regeneration. It is recommended that all cleaners are in compliance with CFR, Title 21. The following is some general background in methods of steam filter element regeneration.*

COUNTER-FLOW

The filter media can be washed with either clean liquid or clean gas in a reverse, or counterflow, cycle. Pulsing the flow to loosen attached particles can enhance cleaning. This method is excellent where retained particles are on the surface of the media. Use of a soft nylon brush can also enhance this method of cleaning.

SOLVENT CLEANING FORWARD FLOW

In some cases, oil and other contaminants in the steam cause particles to be retained on or within the filter media. Detergents and/or solvents might be required in these instances, not only to remove the oil or oil-like contaminants, but also to allow particles to be released. The chemical resistance of o-rings should be checked prior to solvent cleaning. After cleaning with solvents, it is essential to flush with cold water thoroughly and let all liquid evaporate.

ULTRASONIC CLEANING

The most thorough regeneration can be achieved using ultrasonic cleaning. In this method, filter elements are immersed in a non-flammable solvent or water bath in which ultrasonic waves lead to a loosening and removal of particles embedded in the media. Regeneration is nearly total, leaving elements close to their original state.

CLEAN STEAM

In many applications steam comes in contact with the product itself. For example, direct injection of steam into large vats of processed foods is one method used to cook those foods. In other cases, steam is used to clean or sterilize surfaces, tools and containers used in processing and packaging of various products such as pharmaceuticals. In all cases, steam is being generated and distributed in piping systems, and these often end in small orifices or nozzles that can be easily fouled by contaminants in the steam.

Filtration of steam is essential to avoid product contamination and equipment downtime. Particulate contaminants found in steam can include rust, scale, dirt and sediments carried over from the water source.

* Contact a Donaldson representative for more details on P-GS steam filter element regeneration and sanitation guidelines.

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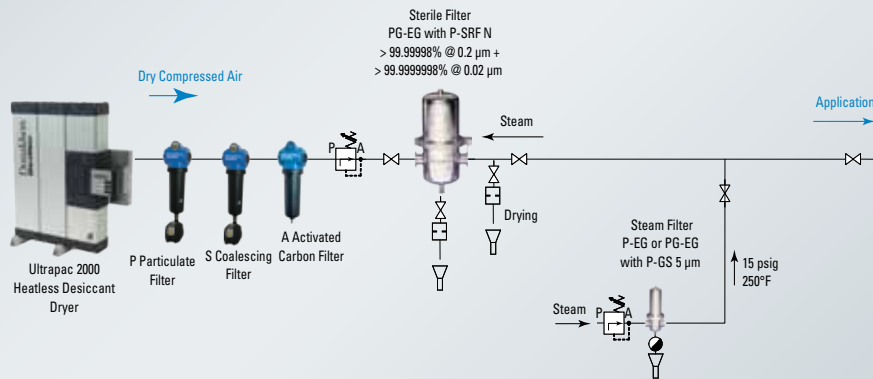


LEADING TECHNOLOGY



- Over 1,000 engineers and scientists worldwide
- Proprietary media for durability and performance

FILTRATION SOLUTIONS



- Energy saving, reliable filters and dryers
- Industrial air, sterile air, culinary steam, tank venting and process liquid filtration

KNOWLEDGEABLE SERVICE



- Ready-to-ship filters and POU dryers within 24 hours
- Technical expertise and support



* PF-EG & PG-EG single filter element housings meet 3-A Sanitary Standards.



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