porvair
filtration group

Industrial Process

Food, Beverages, Pharmaceuticals and Chemicals

World Class Filtration Solutions

Porvair Filtration Group in the Industrial Process Industries

Porvair Filtration Group is an international leader in the development and supply of materials and products for applications in filtration and separation.

Porvair manufacture in both the UK and USA and have an extensive network of sales offices and distribution channels throughout the world. **Porvair**'s expertise is wide and varied and its products are used in markets such as:

- Aerospace and Defence
- Nuclear and Energy
- Chemical Process
- Industrial Process
- Sciences and Laboratory

Our ongoing success is based on a dedication to technical excellence and superior customer service. Our future will be built on our investment in Research and Development to provide innovative new products that exceed the expectations of our customers in solving the challenges that they face.

The processes of the manufacturing industry are as diverse as the products themselves. **Porvair Filtration Group** appreciate that the quality of your product depends on reliably clean equipment and services.

We realise that in order to successfully offer a filtration solution we must first understand the process involved. **Porvair** has long experience in working with designers and end users to supply filtration products to industries such as food, beverage, pharmaceuticals and chemical processing.

To achieve this, **Porvair** have developed a range of stainless steel* filters and elements designed to work under the most demanding of conditions.

This brochure explains the benefits of **Porvair** products in the following applications:

- steam filters
- spargers
- stainless steel filter elements
- 'pulse jet' cleanable, filter systems.

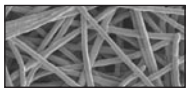
Whether for a new plant or the retrofit/upgrading of an existing plant, we carefully assess each customer's needs to define a product most suitable for your requirements.

The foundation of our products is the filter media itself. **Porvair** are able to offer a range of media that will fulfil the most demanding duties.

**Our range includes stainless steel and polymeric sintered media, as well as higher Cr/Ni alloys.*

Sparging test on Vyon tubing.

Porvair can manufacture filter elements in either a pleated or plain cylindrical form. These are offered in the following filter media configurations.

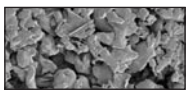


Sinterflo® F Sintered Metal Fibre

Manufactured from random laid metal fibres, sinter bonded to form a uniform high porosity filter medium, Sinterflo® F demonstrates a significantly low-pressure drop, high permeability and excellent dirt holding capacity. Sinterflo® F offers long life and minimal maintenance cost. Available in grades 0.3 to 60 microns absolute.

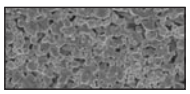
Sinterflo® M Sintered Metal Mesh

A sintered woven metal mesh providing very high strength, good permeability filter medium with a tightly controlled pore size. Available in single or multi layered, laminated structures and various alloys, Sinterflo® M can be pleated to reduce envelope size. Available in grades 3.5 to 60 microns absolute for complex types.



Sinterflo® P Sintered Metal Powder

A robust filter material manufactured from sinter bonded metal powders, Sinterflo® P offers depth filtration and a high resistance to corrosion. Its self-supporting construction eliminates the need for additional hardware, producing an efficient, cost effective filter. Available in grades 0.4 to 60 microns absolute.



Sinterflo® PM Sintered Powder Membrane

An advanced patented metallic filter media that combines the strength of the sinter bonded metal powder with the levels of filtration efficiency associated with membranes. An ultra-thin layer of fine, narrow distribution, metallic, carbide and/or ceramic powder is applied producing a highly resistant membrane. The membrane generated is available as both micronic and sub-micronic pore structures for surface filtration at HEPA+ levels of filtration. Ideal when combined with pulse jet blowdown cleaning for uninterrupted operation.

Table 1 **Available Grades for Sinterflo® Media**

Stainless Steel Fibre		Stainless Steel Powder		Stainless Steel Mesh	
Liquids	Gases	Liquids	Gases	Liquids	Gases
3.0µm*	0.3µm*	6µm*	0.4µm*	5.0µm	3.5µm
5.0µm	1.3µm	10µm	0.7µm	8.0µm	6.0µm
10µm	2.5µm	15µm	1.2µm	10.0µm	8.0µm
15µm	4.0µm	25µm	3.1µm	15.0µm	13.0µm
20µm	5.0µm	30µm	4.5µm	20.0µm	16.0µm
30µm	8.0µm	40µm	6.0µm	30.0µm	20.0µm
40µm	10.0µm	60µm	10.0µm	35.0µm	22.0µm
60µm	15.0µm			70µm	55µm

**Recommended for culinary steam applications.*

Vyon® T Sintered Polymer

Available in liquid filtration ratings from 5 to 10 micron in ultra high molecular weight polyethylene. Applications in filtration (gas/liquids), aeration and fluidising.

Vyon® D, F and HP Sintered Polymer

Available in liquid filtration ratings from 10 to 100 micron in high density polyethylene. Applications in fluidising cones, DIP coatings, aeration and air slides, filtration (gas/liquids), aeration, separation, venting, piezometer, tips and acoustics, venting.

Vyon® PPD Sintered Polymer

Available in liquid filtration ratings from 5 to 10 micron in polypropylene.

Vyon® PP and PPHP Sintered Polymer

Available in liquid filtration ratings from 15 to 70 micron in polypropylene.

Vyon® Porvent and Porvent PP

Available in HDPE and polypropylene. Rated 15 microns in liquids. Applications in filtration and venting.

Table 2 **Available Grades for Vyon® Porous Media**

Name	Material	Filtration Grades	
		Liquids	Gases
Vyon® D	HDPE	10µm	6µm
Vyon® PPD	Polypropylene	5µm	1µm
Vyon® F	HDPE	40µm	25µm
Vyon® PPF	Polypropylene	20µm	10µm
Vyon® HP	Polypropylene	70µm	50µm
Vyon® PPHP	Polypropylene	60µm	40µm
Vyon® Porvent	HDPE	15µm	5µm
Vyon® Porvent PP	Polypropylene	15µm	5µm
Vyon® T	UHMWPE	10µm	2µm

Filter Elements

Porvair filter elements are manufactured from 316 stainless steel and other higher Cr/Ni alloys, in pleated or plain cylinder form, providing a high surface area to give good flow efficiency and dirt-holding capacity.

Features and Benefits

- Cleanable 316 stainless steel filter cartridge.
- High surface area from pleated filtration medium.
- Robust, all-welded construction.
- High dirt holding capacity.
- Filtration ratings available from 1 to 450 micron absolute.
- High flow rate capability.
- Outer stainless steel support cage for added strength in reverse direction.
- Available in sintered fibre, mesh and powder configurations.

Porvair filter elements are also available in an industrial standard format that will fit many existing filter housings.

Materials of Manufacture

Filter medium, protection mesh, support mesh, inner core, outer guard and end fittings, all grade 316L stainless steel. Other grades include 304L and 310 stainless steel, Hastelloy® X, Inconel® 600/601/625 and Monel®.

Assembly by TiG welding.

Available in metal fibre, woven wire mesh and sintered powder.

Gaskets and 'O' Rings

Chemraz, EPDM, Nitrile, PTFE, Silicone, Viton, PTFE coated Viton.
Also FDA approved Viton, EPDM, Silicone or PTFE.

Cartridge Dimensions (Nominal)

Diameter:		66mm (2.6")
Length:	05	125mm (5")
	10	250mm (10")
	20	498mm (20")
	30	745mm (30")
	40	1012mm (40")

End Fittings Available

Double ended ended, 222 (Single plug-in 'O' ring seal), 226 (twin plug-in 'O' ring seal) and threaded.

Operating Temperature

Maximum continuous 300°C (572°F).
Higher temperatures are available on application.

Effective Filtration Area

(Each 250mm module)

Plain cylindrical:	0.050m² (0.55ft²)
Pleated:	0.13m² (1.4ft²)

Maximum Differential Pressure

Out to in (forward), all lengths:	10bar
In to out (reverse), all lengths:	2bar

Porvair provide a comprehensive range of filters for use as prefilters, filters and sub-micron membrane filters. They are suitable for use in new installations or as replacement cartridges in existing systems.

With a broad range of quality filtration products, tested and guaranteed to international standards, **Porvair** is recognised as a leading supplier of filtration systems for critical applications. Our filters are in service in applications as diverse as the biotechnology, pharmaceutical, electronics, nuclear, chemical, food and beverage industries. This supports our proven capability in the field of high efficiency filtration by satisfying the particular requirements of each customer, while meeting the most exacting industry standards.

We manufacture filter cartridges using a wide range of depth and membrane filter media, with filtration ratings from 0.04 micron microbial to 90 microns absolute.

They are available in a range of industry standard lengths from 125mm (5") to 1000mm (40") nominal, with end fittings to suit most industry standard filter designs. This ensures that the cartridges can be easily and securely fitted into existing filtration systems.

All **Porvair** filter cartridges are supplied with a set of seals or 'O' rings, which can be selected according to chemical compatibility and the method of steam sterilisation or sanitisation to be used.

Depth Cartridge Filters

Suitable as either prefilters or final filters, **Porvair** have a comprehensive range of depth filter cartridges.

They are available in a range from 0.5 to 90 microns absolute rated to a Beta ratio of 5000 (99.98% efficiency) depending on the cartridge type.

This compares favourably with nominally rated cartridges where performance can be misleading without the removal efficiency at the specified rating or other qualifying test data.

Products

- Klearfil
- Polyfil II
- Tekfil
- Microfil GP

Membrane Cartridge Filters

The **Porvair** range of membrane cartridges is designed to provide sub-micron filtration from 0.04 to 1.2 microns (absolute microbial).

We have selected each membrane to suit the characteristics of particular process applications, giving us a range of cartridges which combine high performance filtration with high flow rates and the ability to be repeatedly integrity tested.

Membrane cartridges can be used as prefilters or final filters and are suitable for particulate or microbial reduction in critical applications, including sterilisation by filtration.

Products

- Biofil PES
- Hydrofil
- Fluorofil
- Fluorofil Plus
- Chemifil

Please refer to our *Microfiltration* sales literature for further details.

Filter Housings

A full range of stainless steel industrial and sanitary housings are available from 10 bar to 20 bar, with both single and multi-element housings to suit every application. The housings have in-line BSP port connections for ease of installation. Tri-clover and weld connections are available.

A special range of high-pressure 350 bar rated housings are also available on request. Housings manufactured from other alloys and made to other design codes are also available on request, please contact us for further details.

Optional Material and Surface Treatments

- Stainless steel 316L
- Hastelloy®
- Internal welds ground flush and smooth
- Electro polished
- Mirror finished
- Surface finish 240 grit
- Various coatings

Control Systems

Some of the control options available are:

- solenoid operated valve
- control timer

Coded Vessels

Vessels can be supplied to BS5500, ASME VIII U'Stamp, ADM-TÜV. Other standards are available upon request.

The systems are designed and built to individual customers specifications and needs. A tailored pulsed jet supply system is vital to a good performance of the filter assembly.

Please contact our sales office for further assistance, details and advice.

Technical Data Specification FIA2110 Style Housing

FIA2110 - Table 3 Table 4 - Table 5 - Table 6 Table 7 Table 8

Table 3 Bowl Length

1	310mm (12")	Nominal
2	580mm (23")	Nominal
3	800mm (31")	Nominal
4	187mm (7")	Nominal

**Add 45mm to the bowl length for 226 style elements*

Table 4 Connection Option

1	1" BSP female para. in/out standard
2	¾BSP female para. in/out via adapter
3	2" ASA 150lb flanges in/out
4	1" RJT fittings in/out
5	1" Tri-clover in/out
6	¼" BSPP female in/out via adapter
7	1½" ASA 150lb flanges in/out
8	1" NPT in/out

Table 5 Element Option

1	222
2	DDE
3	226p

Table 6 Indicator/Vent Fitted

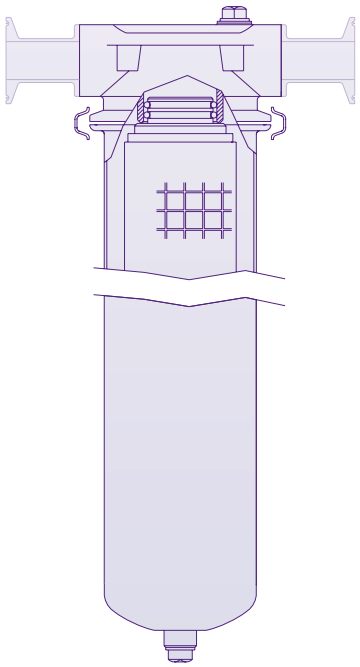
N	None fitted
G	Indicator fitted
V	Vent fitted (2 way)
S	Vent fitted (3 way)

Table 7 Drain Tap

N	None fitted (plug only)
D	Tap fitted

Table 8 Bowl Seal

V	Viton	Standard
N	Nitrile	
S	Silicon	
E	Epom	
F	PTFE coated Vitron	Standard



Technical Data Specification FIA2600 Style Housing

FIA2600 - Table 9 - Table 10 - Table 11 Table 12 - Table 13

Table 9 Number Round

3
5

Table 10 Standard Length

10	250mm (10")
20	498mm (20")
30	745mm (30"
40	1012mm (40")

Table 11 Element Option

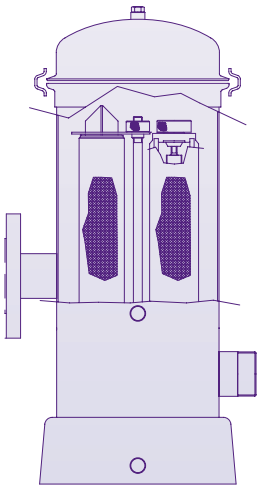
B	Code 7: 226 fin
C	Code 8: 222 fin
M	DOE knife edge

Table 12 Connection Option

1	2" BSPT male
2	2" ASA 150lb flanges
3	2" RJT
4	2" sch. 40 stubb pipes
5	1½" ASA 150lb flanges
6	2" NPT male
7	1¼" BSPT male

Table 13 Seal

V	Viton
N	Nitrile
S	Silicon
P	PTFE
E	EPDM



Process Steam

Used in those areas where there is no direct contact with the manufactured product, such as indirect heating.

Porvair have a full range filter grades and materials to achieve the level of filtration required for any process requirement.

Culinary Steam

Defined by 3A Standard 609-01 as "*Steam that is free of entrained contaminants, relatively free of water in liquid form and is suitable for use in direct contact with milk or milk products or product contact surfaces.*"

In practice this means that the steam filter should be capable of removing 95% of particles 2 microns in size and be manufactured from 300 series stainless steel or higher.

Suitable grades are available in sintered metal fibre, mesh and powder for this application.

Benefits

- Removal of pipe-scale, ensuring that there is no fouling of valves or injectors.
- Ensures that there is no contamination of product.
- Increases system efficiency.
- Protects sterile equipment.

Please contact a **Porvair Filtration Group** representative to select the most suitable **Porvair** steam filter for your application. Our representative will direct you to a specific size of filter housing (please see drawings on page 7).

Porvair design and manufacture pulsed jet blowback filter elements and full systems for recovering and containing valuable powders for a wide range of applications. Whether for a new plant or the retrofit/ upgrading of an existing powder processing plant, we carefully assess customer needs to define a system customised to meet the requirements.

Features and Benefits

- 100% stainless steel 316L or Hastelloy® pleated high area sintered metal fibre filter.
- Reduction in spares and less maintenance required.
- Excellent cleanability.
- Repeatedly steam sterilisable.
- Optional clean in place.
- Total pharmaceutical product compatibility.
- Low pumping costs due to very low clean pressure drop.
- Improves product recovery.
- Improves internal cleanliness.
- Eliminates cross-contamination between batches and operator exposure.

Applications

The **Porvair** Pulsed Jet filtration system has a track record of success in the following types of applications:

- dryers
- granulators
- fluidised bed
- mixers/blenders
- milling systems
- pneumatic conveying systems
- powder recovery and analysis systems.

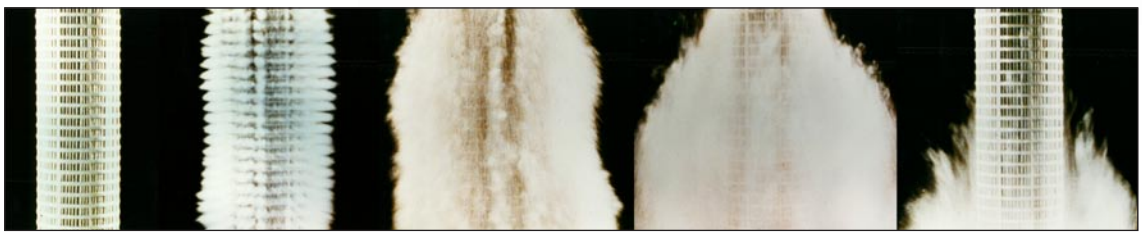


Figure 1 Moving across the photograph from left to right: the metal fibre element loaded with dust; the dust is removed from the surface by the pulsed jet action; the dust is carried away; the dust begins to settle; and quickly falls to the bottom of the vessel leaving a clean element. The sequence time is less than half a second. The cleaning pulse is made whilst process flow continues.

Porous Metal Spargers

Porvair offer a complete range of porous materials for gas/liquid contact applications across a variety of industries, including:

- food and beverage
- waste and water treatment
- chemical process
- pharmaceuticals

As a manufacturer of porous media and elements, we are able to specify, design and manufacture the most efficient product for a given application.

The key to efficient gas transfer is to generate very high volumes of fine bubbles. It has been shown that a 1mm bubble has 6 times the gas/liquid contact than that of a 6mm bubble. Therefore, we recognise that bubble size is essential to optimise mass transfer and reduce gas consumption and energy costs.

The elements are designed and manufactured from uniform, fine, controlled pore size media to achieve excellent performance in the distribution of a large number of small gas bubbles for a higher interfacial area.

Applications

Intrusive and non intrusive tangential pipeline spargers:

- for the treatment of wastewater
- volatile stripping
- steam injection

Tank spargers:

- fermentation
- agitation
- bioremediation
- oxygen stripping
- de-watering
- dissolved air flotation processes used by major oil companies

Features and Benefits

- Rugged, fixed pore media.
- Bubble size can be controlled by a wide range of available media pore sizes.
- Temperature and corrosion resistant materials of construction.
- High quality, all-welded robust construction.
- Higher diffusion rates from smaller sparging elements.
- Cleanable.
- Sparger diameter and connector designed to meet application requirements.

Elements are available in Sinterflo® sintered porous stainless steel or Vyon® sintered porous polyethylene or polypropylene.

Stainless steel spargers are supplied in stainless 316L and higher alloys such as Inconel® and Hastelloy® for very aggressive applications. Being manufactured from such resistant materials, **Porvair** spargers are cleanable and if necessary heat or steam sterilisable. Depending on the system parameters, we design using mesh, metal fibre or metal powder sparging media for optimum economics.

Sinterflo® Sintered Porous Stainless Steel

Format: Tubular

Table 14 **Sinterflo®**

Grade	Typical Mean Flow Pore Size	Air Permeability (m^3/min per m^2 at 10 mbar)
S10	6µm	0.9
S20	10µm	2.3
S30	15µm	5
S40	30µm	21.3
S50	60µm	36

Vyon® Sintered Porous Polyethylene or Polypropylene

Format: Flat shapes, domes and tubular
Thickness: From 0.75mm to 6mm (dependent on grade)

Table 15 **Vyon®**

Grade	Typical Mean Flow Pore Size	Air Permeability (m^3/min per m^2 at 10 mbar)
T	10µm	4
D	20µm	10
F	30µm	30
HP	90µm	>100

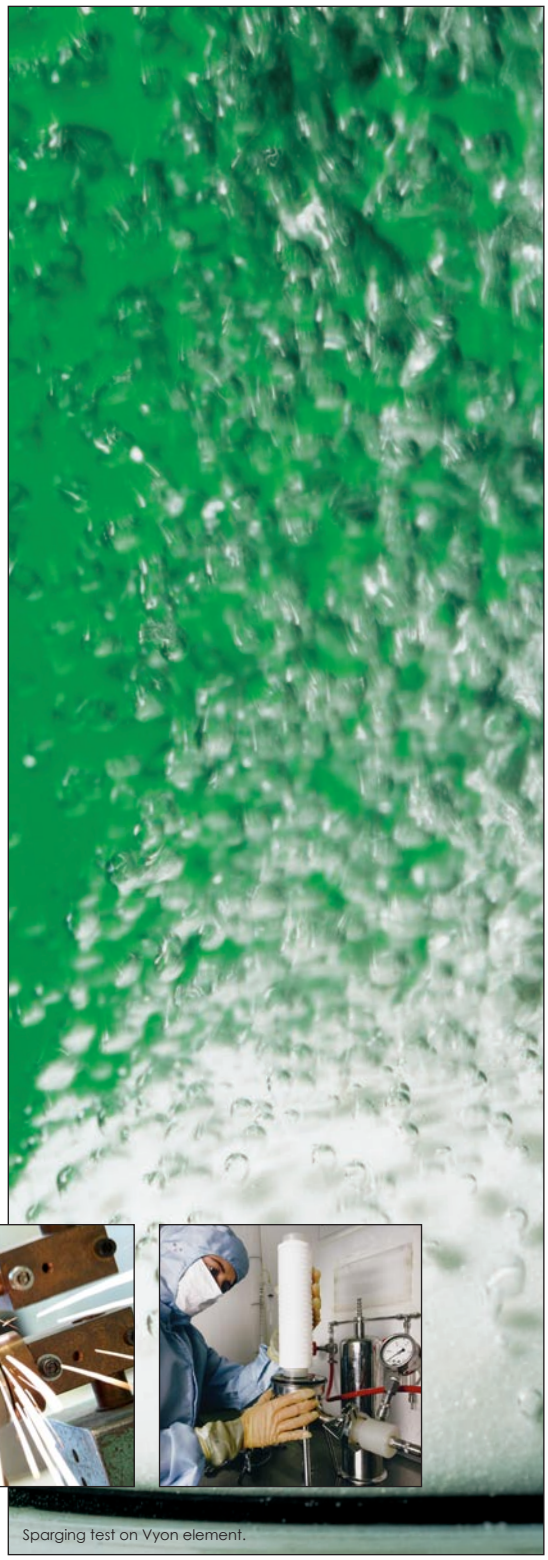
Vyon® sintered porous polyethylene and polypropylene has regulatory approval for many food, beverage, pharmaceutical and biotech applications. It has also been found to be an ideal media for both industrial and municipal wastewater treatments.

Porvair Filtration Group has a policy of continuous improvement in all areas of its business. Listening to the customers' present and future requirements is a vital part of our operations and a key part of driving change.

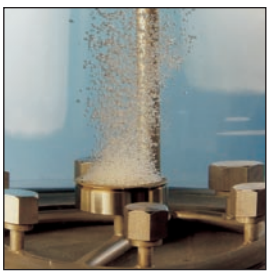
We understand that product development involves building multidiscipline teams, not only within the company, but often in partnership with our customers, improving project efficiency and ensuring complete customer satisfaction. This continuous development of products and materials is vital, to enable us to offer new and better solutions to applications. Porvair has implemented Six Sigma and other methodologies to drive out waste and process variance across the company. The ultimate goal is to achieve zero defects.

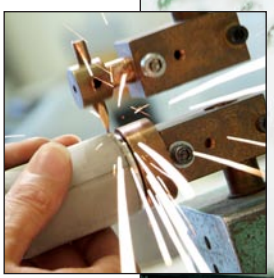
We have a dedicated team of scientists, engineers, production and quality professionals working towards the best possible filtration solutions for our customers. **Porvair** has a fully equipped test house and laboratory, and our experienced design engineers use the latest CAD technology, with 3D solid modelling, integrated with a finite element analysis system to give full structural assurance capability.

Quality is at every stage of our operation and a fundamental part of our culture. **Porvair** is ISO9001:2008 approved at a number of our manufacturing facilities and holds many other accreditations for the various industries we serve.



Sparging test on Vyon element.





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Porvair Filtration Group Ltd.

1 Concorde Close
Segensworth
Fareham
Hampshire
PO15 5RT
UK

Tel: +44 (0)1489 864330
Fax: +44 (0)1489 864399
Email: info@porvairfiltration.com

Porvair Filtration Group Inc.

10190 Maple Leaf Court
Ashland
Virginia 23005
USA

Tel: +1 804 550 1600
Fax: +1 804 550 3262
Email: infoUS@porvairfiltration.com

www.porvairfiltration.com

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