

World Class Filtration Solutions

Materials and products for applications in filtration and separation



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Aerospace and Defence

Nuclear

Energy

Process

Food and Beverage

Printing

Water Treatment

Pharmaceutical

Biosciences and Scientific

Porous Media and Materials

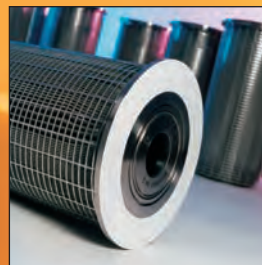
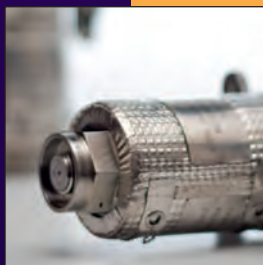
The Company

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. Our expertise is wide and varied spanning over 30 years, with products used in markets such as:

- Aerospace and Defence
- Nuclear
- Energy
- Process
- Food and Beverage
- Printing
- Water Treatment
- Pharmaceutical
- Biosciences and Scientific
- Porous Media and Materials

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.



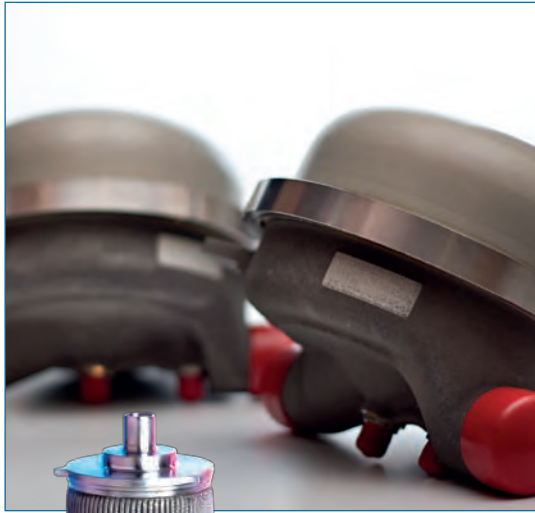
Porvair Filtration Group manufacture for a wide variety of industrial, pharmaceutical and biomedical applications, as well as supplying filtration solutions for extreme conditions of temperature, pressure and corrosion for the aerospace and nuclear markets.

We have the capability to provide a range of products from a single, specialised, retrofit element to complete fabrications, packages and vessels to meet the precise needs of a complex application.

This is complimented with on-site support and a complete after sales service. In addition to our acknowledged leadership in both engineering and quality, we also have the capability to offer the services of our extensive laboratory, development and testing facilities to meet international standards.

Porvair continues to research new materials for the application into filtration and separation. Examples are the development of metallic membranes or the use of specialist surface modification, to provide chemical or physical properties that are beneficial to the separation activity or the longevity of the filtration equipment.





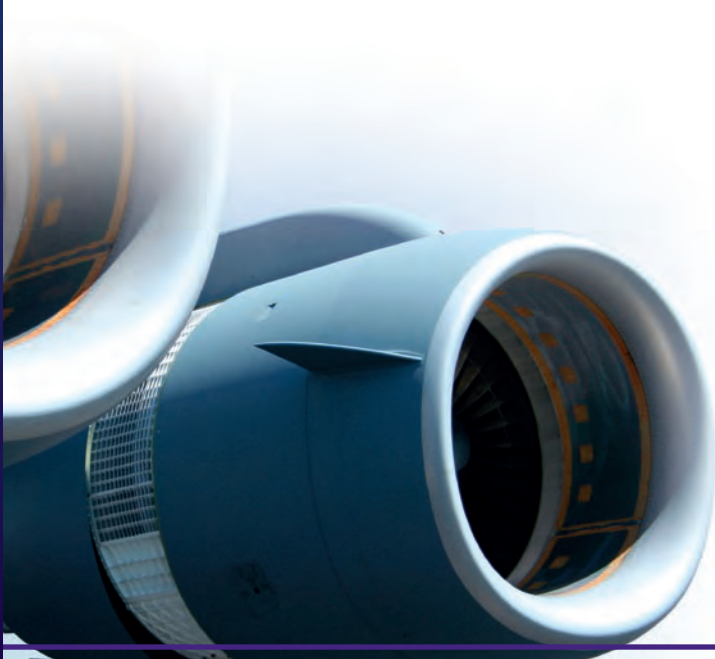
Effective filtration within aircraft and military equipment, to ensure all systems are free from contaminants, is vital. High performance is essential to meet and exceed expectations, guaranteeing safety, long service life, reliability and cost effectiveness in the most demanding situations.

Porvair Filtration Group designs and manufactures specialist filtration components and assemblies to meet the exceptional technical challenges of aerospace and defence industries for contamination control in hydraulic, fuel, lubrication and air systems. Our filters protect vital sub-systems in aircraft, helicopters, military vehicles, missiles and spacecraft such as:

- fuel inerting systems
- flight controls
- fuel management
- thrust reversers
- braking and steering
- power generation
- air intakes

Porvair has vast experience in development, design, certification and project management in the Aerospace industry.

Our key areas of expertise include, supply chain management of parts, assembly of hydraulic, fuel and air components, testing to customer specifications and products including filter assemblies, non-return valves, pressure relief valves, and special strainers.



Within the nuclear industry there are ongoing operational challenges and potential hazards associated with environmental emissions and the protection of the workforce. Therefore the industry demands exceptional levels of technical expertise and quality, in conjunction with specific skills to solve many of its most intractable problems. Processes in the filtration sector, including high temperatures, high radioactivity, high solids loads and chemically aggressive environments all present challenges.

Porvair Filtration Group offers both the engineering competence and quality infrastructure to meet those challenges and produce solutions to ensure the efficiency and safety of those processes, using a range of technologies, products and techniques.

Porvair have over 30 years experience in supplying high quality filtration solutions to the nuclear industries within Europe, the USA and the UK. Working across the field, designing and supplying filtration and other equipment, we offer solutions to the power generation, fuel production, reprocessing, decontamination and decommissioning and waste packaging sectors.





Porvair Filtration Group have supplied a comprehensive range of filtration and separation products to the energy market for many years. We supply all major sectors of the power generation, distribution and supply industry, and our technology is used over a wide range of applications. These include:

- the distribution of natural gas
- conditioning and treatment of fuel oils, hydrocarbons and produced water
- clean coal technologies
- gasification and fuel cell technology

Our unrivalled experience and extensive product range ensures we can supply a fully engineered tailored solution for every application.



Porvair is active in a number of areas concerning the generation and safeguarding of energy production, and is leading innovations in gasification technologies to enable the production of synthetic natural gas (syngas or biogas) as part of alternative clean energy techniques. The clean up of natural gas by the filtration of particulate and the separation of liquids using the latest separation techniques, ensures that the cost of ownership to the network companies is minimised and the availability of clean, dry natural gas is ensured. **Porvair** provide filtration solutions in both integrated package and individual filter vessels and housings.

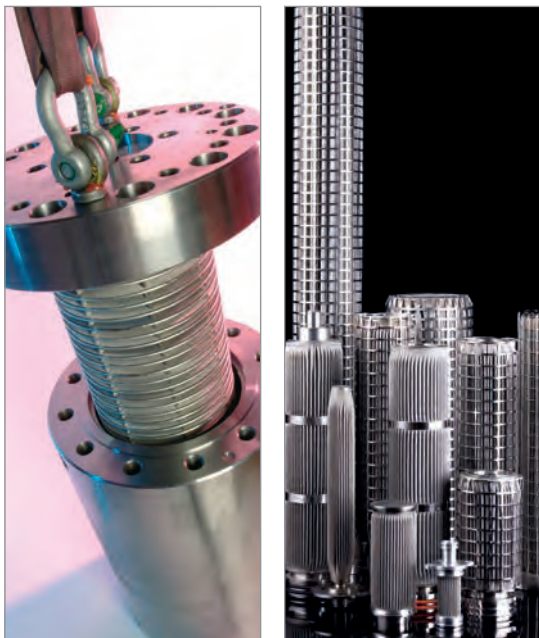


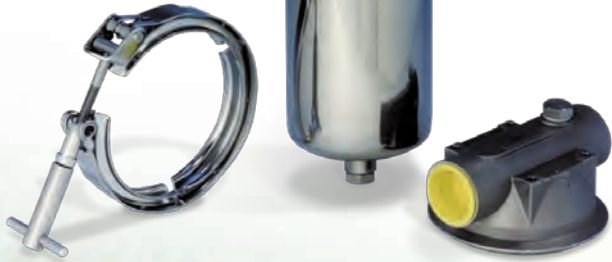
The process industry demands filters that can withstand the most extreme and aggressive conditions of temperature, pressure and corrosion, whilst safeguarding operators and systems from particulates and ensuring environmental protection. Each filtration and separation requirement presents its own critical challenges and requires superior reliability, durability and a robust product construction.

Porvair Filtration Group supplies the process industry with innovative and performance driven filtration equipment (elements, cartridges and vessels). We provide highly specialised filtration solutions for use throughout the manufacturing process and we have proven filtration solutions for the production of chemicals such as:

- nitric acid
- maleic anhydride
- caprolactum
- hydrogen peroxide
- sulphuric acid
- phosphoric acid
- magnesium nitrate
- HDPE and LLDPE

By using the latest in metallic filter media technology, we are able to provide improved performance, and reduced plant operating costs, enabling longer campaigns and greater materials recovery.





Filtration within food and beverage processing, is a safe and economic method for removing impurities and extending the shelf life of many consumable products. High cleanliness standards and stringent contamination control is of utmost importance within the industry, ensuring the manufacture of superior quality produce, a significant reduction of waste and a minimum of product spoilage.

Porvair Filtration Group provides innovative filtration and separations solutions to this industry and prides itself in being able to offer high quality, cost effective filters for all stages of the purification or separation process.

Our range of filters are installed to effectively remove particulates, yeast, mould spores and bacteria for use in the following process applications:

- wineries
- breweries
- cider
- mineral water
- soft drinks
- food and dairy
- culinary steam sterilisation and sanitisation
- powder handling of milk powders, raw materials in bakeries and other food powders
- sparging to achieve efficient mass transfer of gas into liquid

Porvair products are manufactured under strict quality process controls and are fully validated and technically supported by our qualified scientists and laboratory services. Our polymeric filter cartridges, manufactured from FDA-approved media under clean room conditions, include a wide range of end adaptors to enable easy retrofitting into new or existing competitor housings and all membrane filter cartridges are 100% integrity tested during production.

Printing

The use of quality inkjet filtration products is essential to reduce print head or fine nozzle blockages, increasing productivity, decreasing maintenance, improving print quality and minimising costs. Enhanced cleanliness, through filtration of aqueous or solvent based fluids and colourants within inkjet machinery, allows higher flow rates and therefore accelerated printing times.

Porvair Filtration Group experience in filtration and separation technology in the inkjet market, allows us to design, develop and manufacture filtration solutions to suit every application. Our filter media is compatible with all commonly used solvents and chemicals, and is designed to provide consistent batch to batch ink quality, long run periods between purge cycles and minimum hold-up volume to reduce wastage and product loss during change out.

Our range of products include:

- last chance filters (LCF)
- inline filters
- capsule filters

Our manufacturing capabilities include plastic injection moulding and mould tool design, enabling us to offer full over moulding practices using the highest grades of engineering materials. Additionally we offer a full assembly service with a wide range of skills including electronics and testing of complete fluid management systems.

Porvair offers a complete range of standard inkjet consumables under our Inprinta brand. Visit www.inprinta.com for further information.



Water Treatment

The removal of contaminants from untreated water has become a leading issue, due to environmental concerns and the threat of future water shortage. An effective purification process is necessary to eliminate organic, chemical or other debris to meet stringent regulations for drinking water, as well as for the chemical, industrial, pharmaceutical and science markets.



Supported by a strong research and development team, the technical expertise and capability of **Porvair Filtration Group** ensures we are at the forefront of clean water filter technology, enabling us to deliver cost effective, reliable clean water solutions tailored to our customers requirements.

We have a range of diffused aeration products for the treatment of both industrial and municipal effluent. Aeration is an effective method for breaking down the organic components of effluents. Sewage aeration systems have two functions:

- to provide oxygen to feed the oxygen breathing aerobic bacteria that decomposes organic matter.
- to stir the effluent to ensure that it is homogeneous for efficient oxygenation

Our diffused aeration products have been designed to optimise these functions and provide:

- easy fitting into new installations
- easy retrofitting into existing installations
- high oxygen transfer efficiency
- low operating costs
- low maintenance costs

Included in the range are both BioVyon™ sintered porous polyethylene and EPDM membrane products:

- BioVyon™ disc diffusers
- 7 Inch easy-fit BioVyon™ dome diffusers
- BioVyon™ tubular diffusers
- tubular membrane diffusers
- membrane disc diffusers.



Filtration and separation processes in the pharmaceutical industry are critical, not only to ensure products are adequately purified and fit for consumption, but also to optimise process economics and prevent loss of valuable product. **Porvair Filtration Group** provides innovative solutions that meet the customer's requirements as well as standards set by the regulatory authorities.

Manufacturing of our high performance cost effective products is underpinned by our quality assurance programme, cGMP practices and clean room environment to ensure products meet the stringent requirements of the pharmaceutical, generics and veterinary medicines industry. Applications for these products include sterile filtration for LVP and IV's, sterile air for fermenter feeds, sterile vent filters, solvent extraction, veterinary products, ophthalmic solutions, sterile growth media and sera products.

Our polymeric cartridge filters are constructed from FDA-approved materials carrying the CFR 21 number for biological safety and materials of construction meet USP Class VI-121°C plastics. Designed and manufactured for robustness, our sterilising grade polymeric filters are fully validated providing retention of $>10^7$ colony forming units per square centimetre of effective filtration area as stipulated by PDA Technical Reports 26 and 40.

The **Porvair** range of metal cartridge filters, cartridge housings and filtration systems are manufactured from 316L stainless steel and other alloys and can be surface treated to meet the exacting requirements of the pharmaceutical industry. Coded vessels are supplied to BS5500, ASME VIII U-Stamp and other standards as required.





Life science industries such as the medical, pharmaceutical and healthcare, have a growing need for superior technologies and products in filtration, separation, purification, aeration and liquid transfer.

Porvair Filtration Group is at the forefront of new material development and products for these progressive markets; industries which are aimed at improving people's lives. Our selection of BioVyon™ sintered porous plastic materials and products, have been developed using novel technologies, to move the technical boundaries in these markets that are forever demanding tomorrow's products today. Manufactured to current good manufacturing practices (cGMP), the BioVyon™ range is made to demanding regulatory standards as required by the WRAS, FDA and USP.

The range of BioVyon™ materials and applications are continuously expanding. Driven by new market requirements we have developed a range of proprietary technologies for physical or chemical modification to our BioVyon™ porous plastics including:

- ultraclean (low extractables)
- super-hydrophobic
- long living hydrophilic
- anti bacterial
- high surface area
- composites

Applications include separation or filtration for healthcare, medical and pharmaceutical products, shut off valves for catheters, diagnostic wick and sample preparation devices.

More specific applications and markets include:

- laboratory sample preparation and small scale purification
- cell culture
- process chromatography.





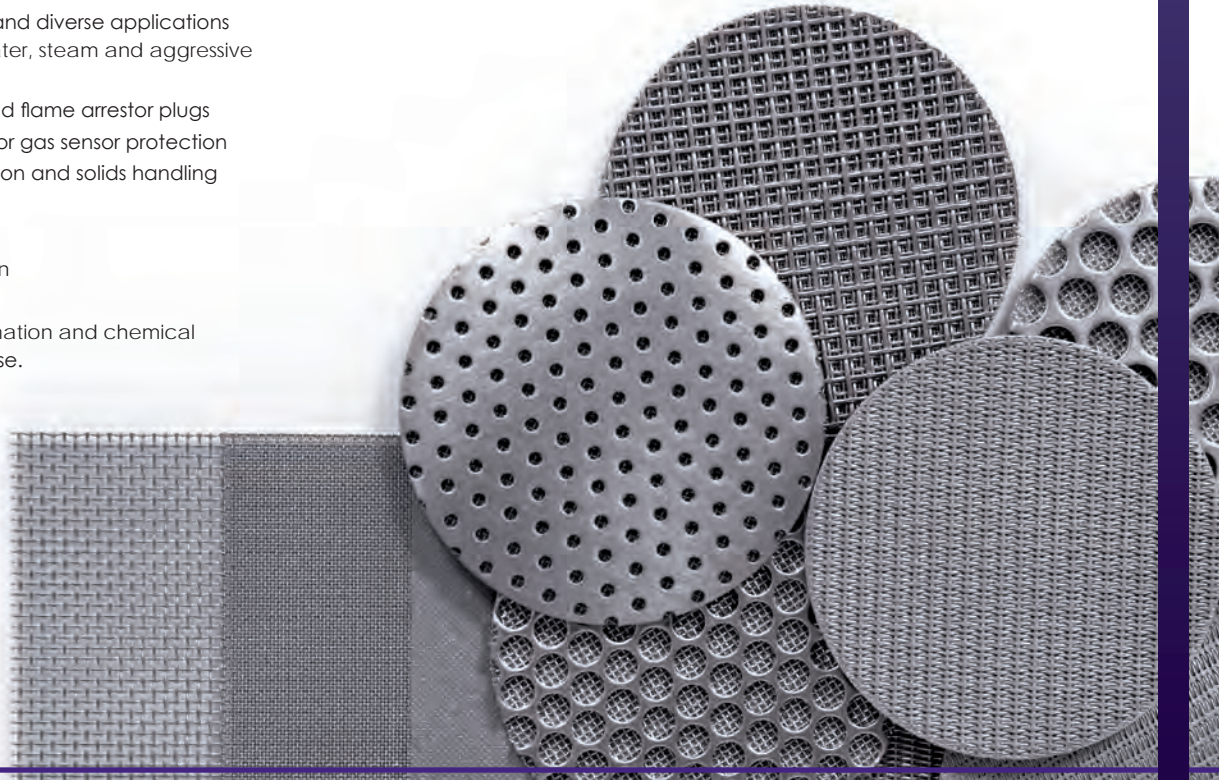
Porvair Filtration Group manufacture an extensive range of porous materials to provide optimum solutions for a wide variety of applications. These materials can be purchased for OEM products or we can integrate and package into finished products.

Our extensive media and material portfolio includes:

- Vyon® sintered porous plastic powder materials including the BioVyon™ materials produced specifically for the life science industry.
- Sinterflo® materials include Sinterflo® P sintered porous stainless steel powder materials and Sinterflo® M sintered mesh materials.

The applications for these materials include:

- filtration, many and diverse applications including air, water, steam and aggressive chemicals
- battery vents and flame arrestor plugs
- flame arrestors for gas sensor protection
- powder fluidisation and solids handling
- silencing
- vacuum tables
- sensor protection
- sparging
- fragrance emanation and chemical controlled release.



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 multidisciplinary teams, not only within the company, but often in partnership with our customers. This continuous development of products and materials is vital, to enable us to offer new and better solutions.

Porvair has implemented various methodologies to drive out waste and process variance across the company to achieve our goal of zero defects.

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

Quality is at the heart of every stage of our operation and a fundamental part of our culture. We are ISO9001 approved and hold many other accreditations for the various industries we serve.

Research and Development

Development plays a fundamental part in our operations and, as a result, we have developed a number of new bespoke products based on our established porous polymeric materials (Vyon®) and sintered metal media (Sinterflo®), as well as developing a range of filters for fuel tank inerting applications.

Although we operate across many filtration and separation markets there is significant interaction between each division in terms of product research and development. The new product development team is drawn from scientists and engineers from across all divisions encouraging new ideas and new solutions. The success of this approach has been in the interaction of chemists and engineers working together to find practical solutions to some extremely complex scientific challenges identified in the chosen market areas.

Engineering

From initial concept design through manufacture and validation to in service support, our highly experienced team of dedicated engineers work to develop the optimal filtration solution. Our team utilises the latest engineering tools of 3D AutoCAD®, Finite Element Stress Analysis, Computational Fluid Dynamics (CFD) and bespoke pressure vessel design software (PD5500, ASME VIII, EN13445). This is combined with our knowledge and strong ethos of working closely with our customers, ensuring filtration solutions that meet customers requirements.



Manufacturing

Porvair Filtration Group produce filters and filtration systems, as well as a range of porous materials, at production sites within the UK and the USA. We manufacture for a wide variety of industrial, pharmaceutical and biomedical applications, as well as supplying filtration solutions for extreme conditions of temperature, pressure and corrosion for the aerospace and nuclear markets.

Our production capabilities include the complete element or cartridge construction, along with the build of entire tubeplate and vessel assemblies. We boast specialist fabrication skills and techniques in all of our manufacturing sites around the world as well as extensive ISO cleanroom facilities.

Testing and Laboratory

Our dedicated test, development and laboratory services underpin our design and development activity, from filtration media and material characterisation, product verification testing to customer systems simulation trials and in service performance evaluation. Our capabilities include filtration characterisation, environmental testing and analysis.

Quality

Our policy is to provide products and services that consistently satisfy the commitments made to our customers by complying with their requirements, working together as a team and by achieving continual improvement in our skills, systems, processes and performance.

We have a dedicated team of quality professionals with many years experience in definition, implementation and maintenance of quality management systems meeting multiple industry requirements. This extends across the workforce through a strong quality culture and a philosophy of 'getting it right first time' driven from the top of the organisation.

Our quality management systems are regularly audited internally and by customers and regulatory bodies. We hold ISO9001 at our manufacturing sites along with, EN 9100 and EASA Part 21 Subpart G at facilities in the UK and USA. We are NQA1 capable subject to specific project requirements.





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