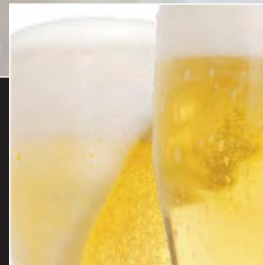


# Microfiltration

## Polymeric Cartridge Filters



*World Class Filtration Solutions*



## Porvair Filtration Group and Microfiltration

**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 and our products are used in markets such as:

- Aerospace and Defence
- Nuclear
- Energy
- Process
- Food and Beverage
- Printing
- Water Treatment
- Biopharmaceuticals
- 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.

### Biopharmaceuticals

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** has over 25 years experience in providing 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.

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.

Our range of filters for the pharmaceutical industry are manufactured specifically for:

- **Sterilisation, clarification and bioburden reduction of liquids:**
  - Biofil™ and Biofil™ Plus
  - Hydrofil™
  - Aquafil™
- **Sterile process gas and venting:**
  - Fluorofil™ and Fluorofil™ Plus
  - Chemifil™
  - Ventafil™
- **Prefiltration and clarification:**
  - Polyfil™ II
  - Klearfil™
  - Tekfil™
  - Microfil™

### Food and Beverage

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, whilst reducing waste by minimising product spoilage.

Backed by over 25 years experience in providing innovative filtration and separations solutions to the food and beverage industry, Porvair Filtration Group prides itself in being able to offer high quality, cost effective filters for all stages of the purification or separation process. The bio-safety of all materials used in the manufacture of our cartridges is assured by FDA approval and meets, or exceeds, the latest EC Directives for Food Contact.

Our range of filters are installed to effectively remove particulates, yeast, mould spores and bacteria for use in wineries, breweries, cider, mineral water, soft drinks, food and dairy products, culinary steam, powder handling and sparging applications:

- **Clarification, stabilisation and sterilisation of liquids:**
  - Biofil™ and Biofil™ Plus
  - Vinofil™
  - Hydrofil™
  - Aquafil™
- **Sterile process gas and venting:**
  - Fluorofil™ and Fluorofil™ Plus
  - Chemifil™
  - Ventafil™
- **Prefiltration and clarification:**
  - Polyfil™ II
  - Klearfil™
  - Tekfil™
  - Microfil™
- **Guard filtration:**
  - Trapfil™
- **Potable, mineral and processing water protection:**
  - Cryptofil™

### Industrial and Chemical Process

Porvair Filtration Group is a leading manufacturer and supplier of filtration and separation products to the industrial process industries. With a broad range of quality filtration products tested and guaranteed to international ASTM standards test methods, they can be safely employed to replace competitors' products with significant cost savings.

Our filter range can be used in process applications such as specialist inks, UV curable inks, laminates, coatings and lacquers, electronics grade chemicals, water treatment, carbon fibre precursor, paint, parts washing, powder handling and transmission, cosmetics and toiletries:

- **Sterilisation, clarification and bioburden reduction:**
  - Biofil™ and Biofil™ Plus
  - Hydrofil™
  - Aquafil™
- **Solvent filtration, sterile process gas and venting:**
  - Fluorofil™ and Fluorofil™ Plus
  - Chemifil™
  - Ventafil™
- **Prefiltration and clarification:**
  - Polyfil™ II
  - Klearfil™
  - Tekfil™
  - Microfil™
- **Potable, mineral and processing water protection:**
  - Cryptofil™





Liquid Filtration

**Biofil™ II and Biofil™ Plus** polyethersulphone membrane cartridge filters

A range of microbially rated cartridge filters featuring the latest developments in membrane technology, Biofil™ II cartridges are based on a naturally hydrophilic polyethersulphone (PES) membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all Porvair cartridge filters, the polyethersulphone membrane provides a high strength, long life cartridge of consistently precise microbial retention.

**Vinofil™** double layer membrane filters for wine and beer filtration

Vinofil™ membrane cartridges have been specifically designed for wine and beer filtration, as a final filter for cold biological stabilisation. Vinofil™ cartridges utilise a double layer of naturally hydrophilic polyethersulphone (PES) membrane with a mirrored asymmetric pore structure, which provides graded filtration throughout its depth, resulting in higher throughputs and long service life. When combined with quality all-polypropylene components and high integrity manufacturing techniques, the Vinofil™ filter cartridge is ideally suited to the most demanding process conditions.

**Hydrofil™** nylon 6.6 membrane cartridge filters

A range of microbially rated cartridge filters featuring the latest developments in membrane technology, Hydrofil™ HT cartridges are based on a naturally hydrophilic nylon membrane. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all Porvair cartridge filters, the nylon membrane provides a high strength, long life cartridge of consistently precise particle retention across a wide range of particle sizes.

**Aquafil™** single Layer polyethersulphone membrane cartridge filters

A range of cartridge filters featuring the latest developments in membrane technology, Aquafil™ cartridges are based on a naturally hydrophilic polyethersulphone membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all Porvair cartridge filters, the polyethersulphone membrane provides a high strength, long life cartridge.

Liquid and Gas Filtration

**Fluorofil™ and Fluorofil™ Plus** ePTFE membrane cartridge filters

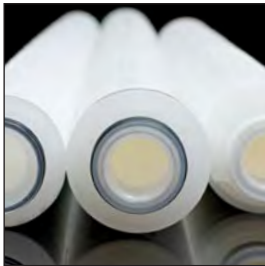
Fluorofil™ and Fluorofil™ Plus cartridges are manufactured using a highly hydrophobic ePTFE membrane. The enhanced ePTFE membrane offers exceptionally high gas flow rates at low pressure differentials. Fluorofil™ and Fluorofil™ Plus cartridges are recommended for sterile gas filtration and venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Fluorofil™ and Fluorofil™ Plus filter cartridges particularly suitable for wet gas sterilising applications, such as fermenter air feed.

**Chemifil™** polypropylene membrane cartridge filters

Chemifil™ cartridges are manufactured using a polypropylene membrane of uniform thickness and high voids, with a homogeneous structure and controlled pore sizes. Designed for the removal of sub-micron organic and inorganic particulate matter, the inherent structural stability of the membrane eliminates any risk of media migration and minimises the release of particles.

**Ventafil™** ePTFE membrane cartridge filters for autoclave venting

Ventafil™ cartridges are manufactured using a highly hydrophobic ePTFE membrane and are designed meet the demanding filtration requirements of the pharmaceutical, laboratory and sterile production environments. The enhanced ePTFE membrane offers exceptionally high gas flow rates at low pressure differentials and are suitable for a wide range of small-scale sterile venting applications.



**Polyfil™ II** absolute rated pleated polypropylene cartridge filters

A range of absolute rated cartridge filters featuring the latest developments in meltblown polypropylene filter media technology, Polyfil™ II cartridges are based on a robust all polypropylene construction, offering removal ratings from 0.5 to 105 micron absolute.

**Klearfil™** absolute rated pleated depth filters

A range of absolute rated cartridge filters featuring the latest developments in meltblown polypropylene filter media technology, Klearfil™ cartridges are based on a robust all polypropylene construction, offering removal ratings from 0.5 to 75 micron absolute.

**Tekfil™** polypropylene depth cartridge filters

Tekfil™ is a high flow, graded depth filter with high contaminant capacity for long life. Constructed from FDA approved polypropylene with excellent performance characteristics, it is an economic choice for a wide range of applications.

**Microfil™** absolute rated pleated glass fibre cartridge filters

A range of absolute rated cartridge filters featuring the latest developments in borosilicate glass fibre filter media technology, Microfil™ GP cartridges are constructed from robust glass fibre and polypropylene filtration layers, offering removal ratings from 0.5 to 5 micron absolute.

**Trapfil™** polypropylene guard filters for clear, bright beverages

The Trapfil™ filter has been specifically developed for the retention of diatomite and polyvinylpyrrolidone (PVPP) particles. It is manufactured from materials which are 100% FDA (Food and Drug Administration) approved and fully welded for strength and integrity.

**Cryptofil™** designed for the removal of cryptosporidium oocysts

Cryptofil™ filter cartridges are utilised for the control of Cryptosporidium oocysts in water used in the food, beverage and ultrapure water industries. The Cryptofil™ cartridge has been developed after extensive research and has resulted in filter media with continuously graded fibre density. This yields progressively finer oocyst retention through the depth of the media. This graded density depth filtration mechanism, combined with optimised pleated pack configuration and resultant high surface area, affords high flow capability and exceptional oocyst retention capacity.





**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 have a fully equipped test house and laboratory and a dedicated team of scientists, engineers, production and quality professionals working towards the best possible filtration solutions for our customers.

### Quality

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

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.

Our polymeric cartridge filters are manufactured in an ISO Cleanroom environment by staff fully gowned to minimise any risk of contamination during production.

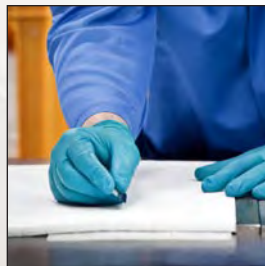
Every membrane cartridge is integrity tested and, if required, pulse flushed with 18MΩ.cm pyrogen-free ultra-pure water to give rapid resistivity recovery rates and low TOC levels. As a further safeguard, every membrane cartridge is individually and batch identified with a unique serial number, allowing users to maintain their own process records. All particulate cartridges are batch integrity tested, flushed with pyrogen-free ultra-pure water and each particulate cartridge is identified with a batch serial number. Every polymeric cartridge filter is supplied with a certificate of quality and an operating instruction leaflet.

Registered to ISO 9001, Porvair Filtration Group procedures are subject to high standards of quality assurance as demonstrated through its Drug Master File status.

### Material Conformity and Validation

The bio-safety of all materials in the manufacture of our cartridges is assured by FDA approval, USP Class VI and meets or exceeds the latest EC Directives for Food Contact.

Our membrane cartridges have been tested and shown to be 100% retentive in line with HIMA and ASTM F838-05 guidelines for *Brevundimonas diminuta* challenge (0.2 micron), *Serratia marcescens* (0.45 micron) and with *Saccharomyces cerevisiae* (0.65 micron). To guarantee the bacterial retention performance of every cartridge, a correlation has been made between the bacterial challenge and integrity tests. A comprehensive validation guide for our cartridges is available on request.



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 technical support service capabilities include:

#### • Laboratory services:

- Filter integrity testing
- Contamination identification
- Filterability testing
- Filter and media efficiency testing
- Dirt holding capacity testing
- Filter failure analysis
- Compatibility investigation
- Flow versus pressure drop measurements
- Particle counting

#### • Validation services:

- Process specific validation
- Filter compatibility
- Retention studies
- Microbial challenge tests
- Endotoxin and particulate testing
- Extractables testing

#### • On-site services:

- Customer plant surveys
- Process filter optimisation
- Trouble-shooting
- Pre inspection review

#### • Training (held at customer site or at Porvair's technical facilities):

- Integrity testing
- SIP and CIP methods





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filtration group

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