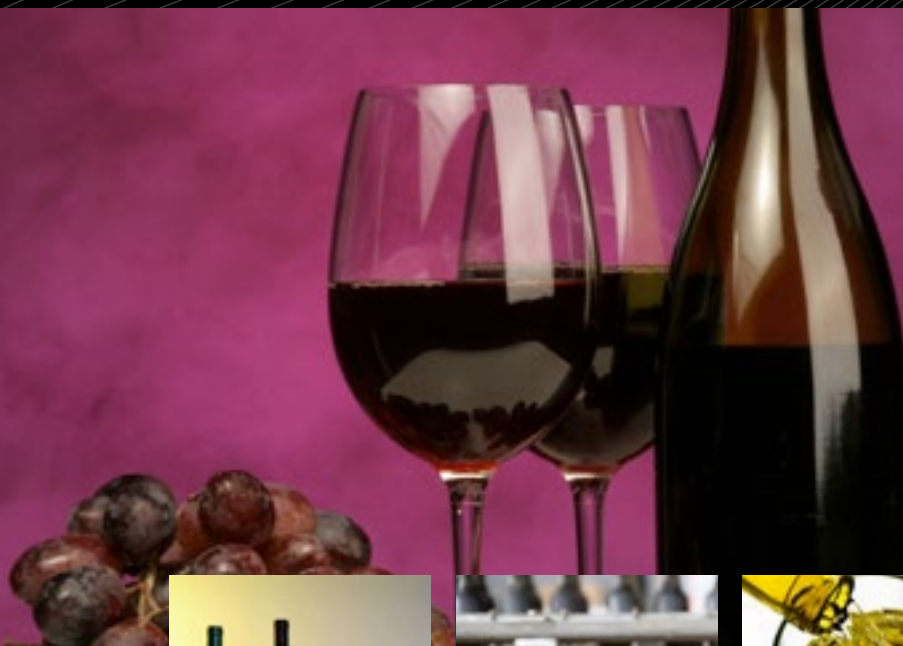


Focus on: **the Wine Industry**

Product Design, Development, Manufacture and Technical Support



Committed to Serving the Wine Industry

Archaeologists have proved that the earliest wine production came from sites across Europe and the Middle East as early as 6000 to 5000 BC.

Whilst, at a very fundamental level, it is still the art of transforming fruit into alcohol, today's thriving wine industry is both an art and a science, requiring a great deal of skill and knowledge, and investment in machinery and technology.

The 5 basic steps for wine making are: harvesting; crushing and pressing; fermenting; clarifying; ageing and bottling. Porvair Filtration Group has extensive experience in providing innovative filtration and separation solutions to the global wine industry. Our filters can safely be used without compromise to the quality of the finished product.

Working together to understand your business and wine processing goals

Porvair Filtration Group has extensive experience in providing innovative filtration and separation solutions to the global wine industry. Our filters can be safely used without compromise to the quality of the finished product.

Porvair: Your Partner in Filtration and Separation

At Porvair we understand the challenges the industry faces and are committed to partnering with our customers to improve process control, increase production efficiency and reduce costs - without compromising the product quality. 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 with CIP and SIP processes
 - Compatibility investigation
 - Flow versus pressure drop measurements
 - Haze formation and stability analysis
 - Particle counting and turbidity
- **Validation services:**
 - Process specific validation
 - Filter chemical compatibility
 - Retention studies
 - Microbial challenge tests
 - Regulatory standards support
 - 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



We are committed to partnering with our customers to find the best filtration and separation solutions



1
Prefiltration and Clarification (Trap Filtration)

Prefiltration and clarification are important to ensure an economically viable process.

Porvair's absolute rated prefilters and trap filters can be used to reduce bioburden prior to pasteurisation, and increase the lifetime of downstream sterile membrane filters.

Trap filtration with absolute grade filters ensures that the bulk of solids, such as diatomaceous earth (DE) and other additives are removed. This ensures the sterile filter membranes downstream are protected.

Porvair's prefilters are robustly manufactured to withstand harsh CIP processes and can be effectively back-washed to extend life.

Porvair products designed for this application:

- Polyfil™
- Klearfil™
- Microfil™
- Trapfil™
- Aquafil™

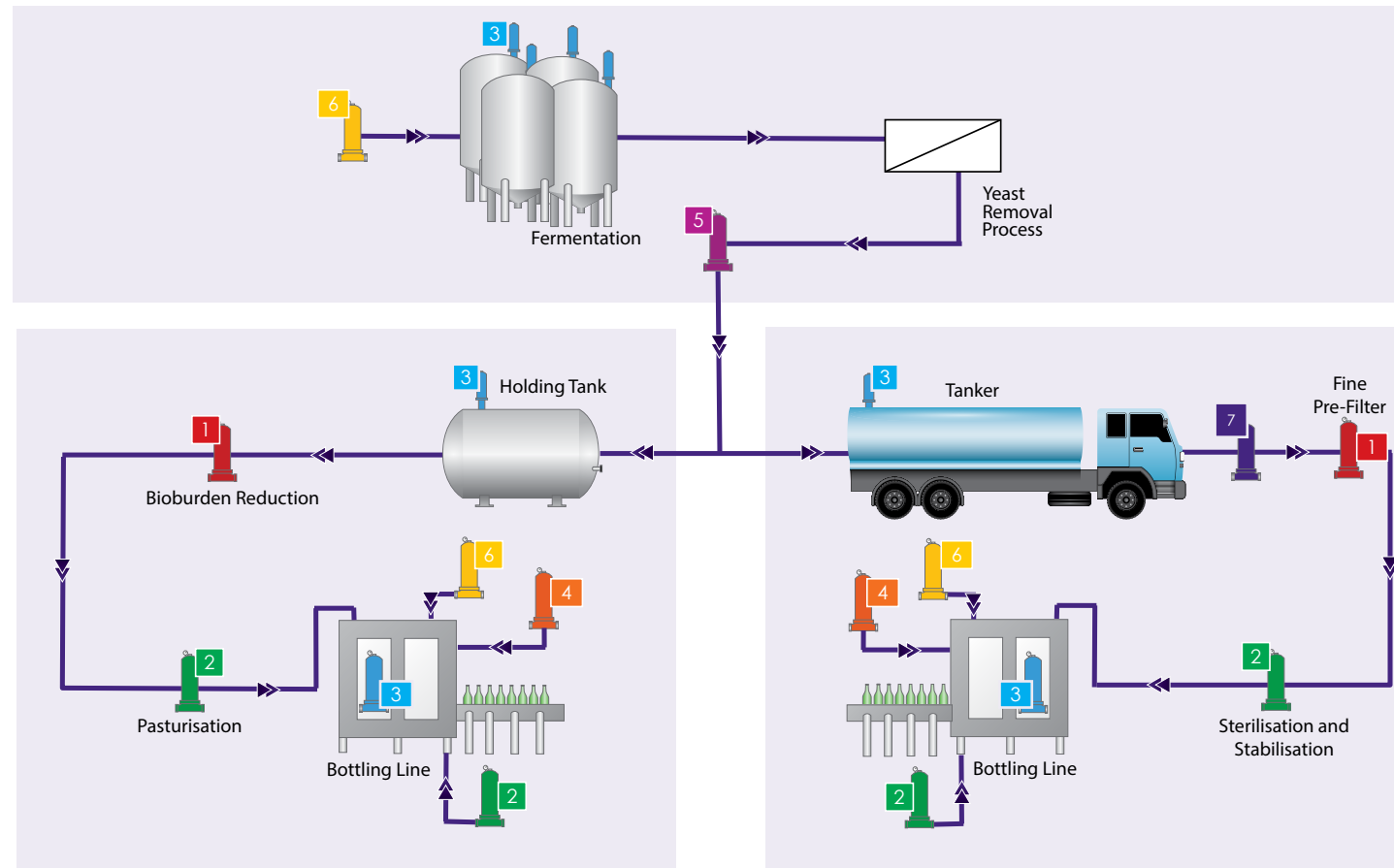
2
Stabilisation and Sterilisation

Stabilisation is crucial to protect the wine during storage. Stabilisation can be used to reduce age-related colour development in white wine. Biofil™ filters remove spoilage organisms while minimising colour adsorption and flavour removal.

Porvair membrane filters are easily regenerated and fully integrity testable to ensure an economical and secure process.

Porvair products designed for this application:

- Biofil™
- Biofil™ Plus
- Vinofil™
- Hydrofil™
- Stabifil™



3
Sterile Process Gases and Venting

Compressed gases such as carbon dioxide, nitrogen and oxygen come into direct contact with the wine during its manufacturing process. These operations include feed-gas for fermenters, maintaining 'top-pressure' in storage vessel and bottle filling. It is vital that these gases are sterile to prevent contamination of the product to ensure quality and shelf-life. Sterile venting is critical for product storage vessels, pipelines and packaging to prevent contamination. An effective tank filter will ensure sterility while reducing the risk of damage due to pressure changes during empty-fill operations and steam condensation.

Porvair products designed for this application:

- Fluorofil™
- Fluorofil™ Plus
- Chemifil™
- Ventafil™

4
Bottle Rinsing and drying Filtration

The removal of spoilage organisms such as yeast and bacteria from glass and PET bottles is assured with the use of our integrity testable membrane filter, the Biofil™ PES.

Process water for bottle rinsing can be effectively sterilised using Biofil™ PS filters. CIP chemicals can be prefiltered using Polyfil™ and Klearfil™ filters.

7
Tanker Transfer

Our filters can provide the assurance of quality during transfer from tank to tank, or tank to process. Suitable filters include Klearfil™, Polyfil™ II or Biofil™ PES depending on the requirements.

6
Steam Filtration

Sinterflo® P sintered stainless steel powder filter can be safely used for sterilisation of process equipment and both direct and indirect thermal processing of foods stuffs.

Sinterflo® P filters can filter steam to the 3A Culinary Steam Standard.

Culinary steam filtration is vital for the sterilisation of bottling and canning lines, product packaging, sterilising equipment, removing pipe-scale, and the prevention of fouling of valves and injectors. A culinary grade filter will ensure that membrane filters further downstream are not damaged by particles entrained in the steam during SIP.

Porvair products designed for this application:

- Sinterflo® P Sintered Metal Powder

5
Yeast Removal Process

Primary filtration processes can sometimes fail to effectively remove yeast or release powder. Guard filtration can be used to remove yeast cells that pass through during crossflow filtration and centrifugation. Trapfil™ Filters can be used to capture powder released during cake filtration.

Porvair products designed for this application:

- Klearfil™
- Polyfil™
- Microfil™
- Trapfil™

Sterile Membrane Filtration

Biofil™ II and Biofil™ Plus polyethersulfone 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 polyethersulfone (PES) membrane with a mirrored asymmetric pore structure. The PES membrane has a minimal effect on the organoleptic properties of wine. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all **Porvair** cartridge filters, the PES membrane provides a high strength, long life regenerable cartridge of consistently precise microbial retention.

Vinofil™ double layer membrane cartridge filters

Vinofil™ membrane cartridges have been specifically designed for wine filtration, as a final sterile filter for wines with a high Indice de Colmatage (IC index). Vinofil™ cartridges utilise a double layer of naturally hydrophilic polyethersulfone (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 with consistent microbial retention.

Stabilisation

Stabilfil™ porous polymer composite filters

Stabilfil™ has been developed as a unique technology that is at the interface of **Porvair's** filtration and porous material technology. The unique manufacturing process allows contact between the polyvinylpyrrolidone (PVPP) - based adsorbent and the wine to be at its optimal. The product can be manufactured in the format of a filter cartridge and will fit into most industry standard housings used in the wine industry; thus providing an economic means by which the stabilisation process can be integrated into the processing of beverages.

Stabilfil™ is highly flexible due to the robustness of the composite material, which enables it to be easily regenerated and incorporated into any process where the detrimental effects of wine-ageing need to be mitigated.

Sterile Process Gases and Venting

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 'true' sterile gas filtration and venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Fluorofil™ and Fluorofil™ Plus filter cartridges particularly suitable for tank venting, bottling and fermenter feed gases.

Ventafil™ ePTFE membrane cartridge filters for autoclave venting

Ventafil™ cartridges are manufactured using a highly hydrophobic ePTFE membrane and are designed to meet the demanding filtration requirements of 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. The BSP threaded connection allows for easy installation.

Prefiltration, Clarification and Guard Filtration

Polyfil™ II absolute rated pleated polypropylene cartridge filters

A range of absolute rated high-area 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 cartridge filters

A range of absolute rated high-depth cartridge filters allowing effective filtration of gel-like contaminants. 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 that enables resistance to harsh CIP processes. Microfil™ GP cartridges are constructed from robust glass fibre and polypropylene filtration layers, offering removal ratings from 0.5 to 5 micron absolute.

Aquafil™ single layer polyethersulfone membrane cartridge filters

A range of cartridge filters featuring the latest developments in membrane technology, Aquafil™ cartridges are based on a naturally hydrophilic polyethersulfone 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 polyethersulfone membrane provides a high strength, long life cartridge.

Trapfil™ polypropylene guard filters for clear, bright beverages

The Trapfil™ filter has been specifically developed for the retention of diatomite and PVPP particles. The Trapfil™ filter is designed to withstand repeated backwash and caustic cleaning cycles for extended life.

Steam Filtration

Sinterflo® stainless steel filters for steam filtration

A range of Sinterflo® stainless steel filters for the production of particulate-free culinary steam for critical applications that come in direct contact with beverages or product contact surfaces. These filters exceed the 3A Sanitary Standards 609-03, constructed to remove more than 95% of 2 micron particles.

Sinterflo® stainless steel process steam filters are used where clean, dry steam is critical for plant performance and continuous operation, but where there is no direct contact with the manufactured product.



Range

Our range of filters are suitable for use in **Porvair** filter housings and as direct replacements for existing cartridges, our cartridges can be supplied with end fittings to suit most hardware installations without modification. They are available in single or multiple module units of various lengths, and in a choice of microbial ratings. Each cartridge is supplied with all necessary seals or O-rings to ensure chemical compatibility.

Quality Assurance

Porvair Filtration Group cartridges are manufactured in an ISO Cleanroom environment by staff fully gowned to minimise any risk of contamination during production. All cartridges are 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 cartridge is individually and batch identified with a unique serial number, allowing users to maintain their own process records.

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 **Porvair** cartridges is assured by FDA approval and meets or exceeds the latest EC Directives for Food Contact.

Our 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.

Chemical Compatibility

The materials of construction are compatible with a wide range of chemicals and solvents, however, care must be taken to select the appropriate seal material. A comprehensive chemical compatibility guide is available. Since operating conditions vary considerably between applications, verification by the end user is recommended.

Filter Housings

Please contact a **Porvair Filtration Group** representative for further information on our range of filter housings.



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