

**Borsovino™** membrane cartridges have been specifically designed, by Van Borselen Filters for wine and beer filtration, as a final filter for cold biological stabilisation. Borsovino™ 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 Borsovino™ filter cartridge is ideally suited to the most demanding process conditions.

Borsovino™ cartridges exploit the narrow pore size distribution and high void volume of the media to provide a choice of cartridges capable of meeting the requirements of most applications. Careful media selection ensures that Borsovino™ cartridges are also very suited to critical particle control down to 0.2 micron ratings. Borsovino™ cartridges offer high flux rates and low differential pressures, a feature common to polyethersulphone membranes.

Borsovino™ cartridges benefit from the low binding characteristics of polyethersulphone membranes. They are also highly resistant to integrity failure caused by steam sterilisation and have excellent compatibility with CIP sterilising agents.

As a consequence Borsovino™ cartridges provide a combination of features and benefits not hitherto available from cartridges based on PVDF, nylon, mixed esters of cellulose or polysulphone membranes. They are suitable for applications ranging from sterile filtration, stabilisation and the clarification of a wide range of beverages.

## Applications

Borsovino™ cartridges are suitable for the sub-micronic filtration of a wide range of beverage fluids, in applications where the characteristics of a naturally hydrophilic membrane are required.



Typical applications include

- **Wine and sparkling wine**

For the clarification, stabilisation and sterilisation of various beverages, including the removal of yeast and spoilage organisms. Low colour removal is an additional advantage.

- **Beer**

For the stabilisation of beer, including the removal of yeast and spoilage organisms.

- **Mineral water and soft drinks**

For applications where an integral prefiltration membrane is required.

- **Process water supply**

For use in water treatment systems as either a sterilisation filter or for bioburden reduction.



### Features and Benefits

- **Borsovino™ II cartridges**

The Borsovino™ 0.45 micron rated filter removes yeasts and moulds including the smallest spoilage bacteria such as *Oenococcus oeni*. The Borsovino™ 0.65 micron rated filter removes contaminating yeast, moulds, and spoilage bacteria from beverages. The Borsovino™ 0.2 micron rated cartridges provide sterile filtration for bottled water and other beverage grade water applications.

- **Guaranteed microbial ratings**

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- **Low binding and fouling**

Borsovino™ cartridges have excellent low colour removal characteristics and are resistant to fouling, typically 10 times lower than nylon, 2 times lower than polysulphone and similar to PVDF.

- **Will not hydrolyse**

The polyethersulphone membrane used in Borsovino™ cartridges is extremely resistant to hydrolysis. Resistance to continuous steam sterilisation and hot water sanitisation.

- **Excellent chemical compatibility**

Extremely resistant to all conventional chemical regenerating agents and processes across the entire pH spectrum from 1 to 14.

- **Cartridge integrity and low TOC levels**

Each Borsovino™ module of every cartridge is individually integrity tested. Each complete filter cartridge is flushed with pure water which is inspected daily for pyrogens using the standard LAL test.

- **Suitable for steam sterilising**

Borsovino™ cartridges incorporating a stainless steel support ring can be subjected to steam sterilisation at 125°C (257°F) without loss of integrity.

- **Full traceability**

All Borsovino™ cartridges are individually and batch identified with a unique serial number. Each Borsovino™ cartridge is supplied with a Certificate of Quality and an operating instruction leaflet.

- **Controlled manufacturing environment**

Borsovino™ cartridges are manufactured in an ISO Cleanroom environment by fully gowned staff, minimising the risk of contamination.

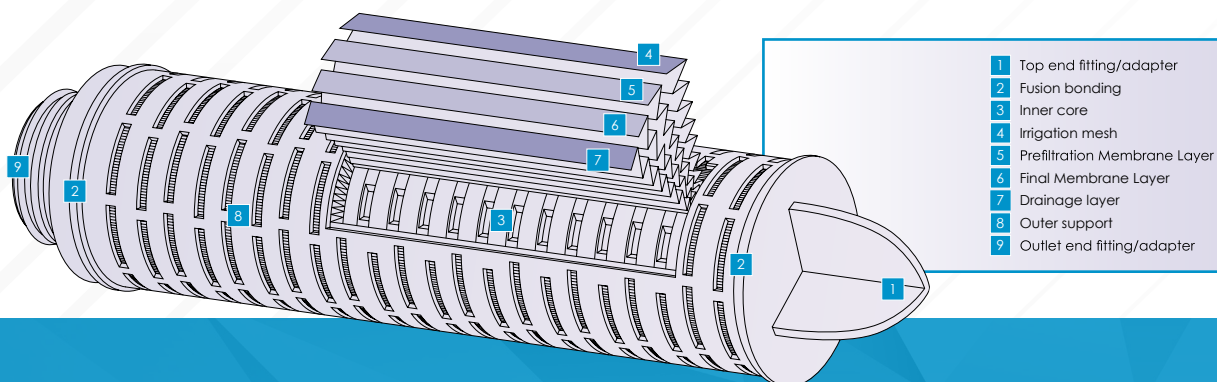
### Cartridge Construction

Borsovino™ cartridges are manufactured from a multi-layer combination of irrigation mesh, dual filter membrane, membrane support and drainage material. Borsovino™ cartridges have optimal pleat geometry to maximise the available filtration area and to ensure an efficient flow through the cartridges.

An all thermal fusion bonded assembly process eliminates the use of resins and binders.

Manufactured as standard with injection moulded polypropylene inner and outer supports, Borsovino™ cartridges are designed with the strength necessary to withstand thermal stresses encountered during steam sterilisation and subsequent cooling. They can be steam sterilised and will retain total integrity following steaming at 125°C (257°F).

All components used in the construction of Borsovino™ cartridges are FDA approved to 21CFR and meet or exceed the latest EC Directives for Food Contact.



## Specification

### Materials of Manufacture

Filter membranes	: Dual Polyethersulphone
Membrane support	: Polyethersulphone
Irrigation mesh (support)	: Polyethersulphone
Drainage layer	: Polyethersulphone
Inner core	: Polyethersulphone
Outer support	: Polyethersulphone
End fittings	: Polyethersulphone
Support ring	: Stainless steel

### Cartridge Dimensions (Nominal)

Diameter	: 70mm (2.8")
Length	: 1 module (short) : 125mm (5")
	1 module : 254mm (10")
	2 module : 508mm (20")
	3 module : 762mm (30")
	4 module : 1016mm (40")

### Effective Filtration Area

Absolute Microbial Rating	Effective Filtration Area (each 254mm (10") module)
0.2, 0.45 and 0.65µm	0.48m <sup>2</sup> (5.2ft <sup>2</sup> )

### Cartridge Treatment

Standard : Cleaned and flushed with pyrogen-free water.

### Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

### Maximum Differential Pressure

Normal flow direction at :

20°C (68°F)	: 6.0bar (87psi)
80°C (176°F)	: 4.0bar (58psi)
100°C (212°F)	: 3.0bar (44psi)
120°C (248°F)	: 2.0bar (29psi)

Reverse flow direction at

20°C (68°F)	: 2.1bar (30psi)
80°C (176°F)	: 1.0bar (15psi)
100°C (212°F)	: 0.5bar (7psi)

### Operating Temperature

Maximum continuous : 85-90°C (185-194°F)

### Sterilisation

*In situ* steam 80 x 20 minute cycles at 125°C (257°F).

Hot water 100 x 20 minute cycles at 85-90°C (185-194°F).

### Extractables

Minimum total extractables. Please refer to the Borsovino™ Validation Guide.

### Integrity Testing

Each Borsovino™ module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Procedural details are available from **Van Borselen Filters**.

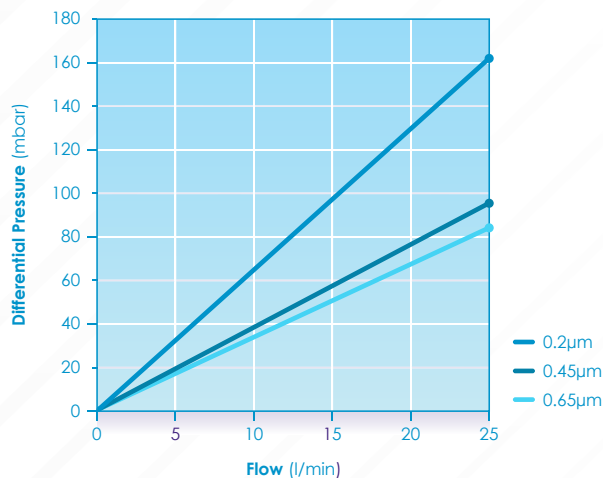
### Clean Water Flow Rates

- Typical clean water flow rate:

A 254mm (10") Borsovino™ single cartridge exhibits the flow-ΔP characteristics indicated below, for solutions with a viscosity of 1 centipoise.

- Other solutions:

For solutions with a viscosity of greater than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



### Range

Suitable for use in Van Borselen filter housings and as direct replacements for existing cartridges, Borsovino™ cartridges can be supplied with end fittings to suit most hardware installations without modification. They are available in single or multiple module units of 10, 20, 30 and 40 inches, and in a choice of three microbial ratings: 0.20, 0.45 and 0.65 micron. Each cartridge is supplied with all necessary seals or O-rings to ensure chemical compatibility.

### Quality Assurance

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Registered to ISO 9001, Van Borselen Filters 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 Borsovino™ cartridges is assured by FDA approval, USP Class VI and meets or exceeds the latest EC Directives for Food Contact.

Borsovino™ 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* and *Oenococcus oeni* (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 Borsovino™ cartridges is available on request.

### Chemical Compatibility

Borsovino™ cartridges are compatible with industry standard CIP processes. Care must be taken to ensure that the cartridge and seals selected are compatible with the application. Since operating conditions vary considerably between applications, verification by the end user is recommended.

### Filter Housings

Please contact a **Van Borselen Filters** representative for further information on our range of filter housings.

#### Van Borselen Filters

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VAN BORSELEN FILTERS

