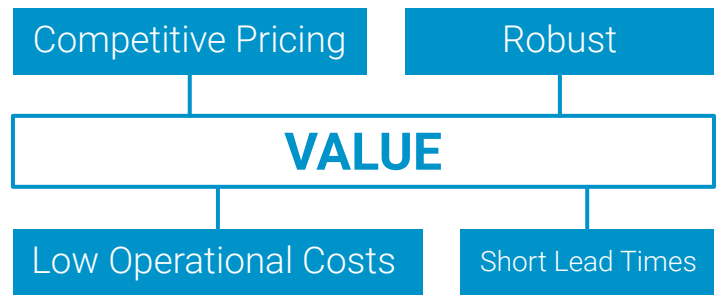
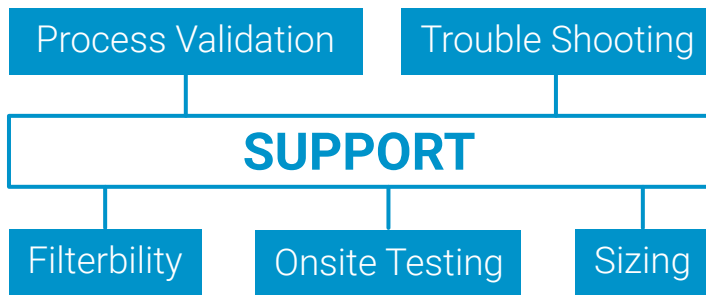


# BorsoCAP FILTER CAPSULES



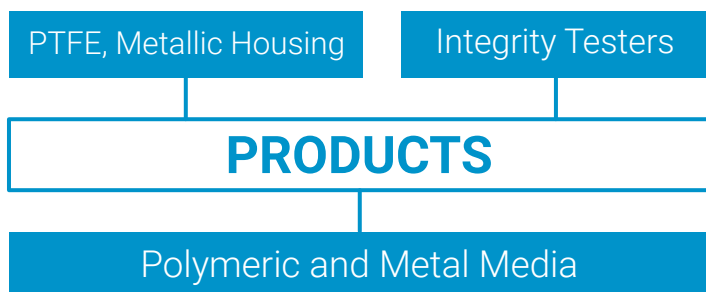
## BorsoCAP-PES Easy-wet PES Filter Capsules



- High flow rates at low pressure drops vs other membrane materials
- Superb chemical and thermal compatibility
- Easy-Wet technology for rapid integrity testing
- Membrane is fully validated to retain bacteria
- All materials are FDA CFR Title 21 and USP VI approved
- Meets latest EC food contact guidelines
- Available in a range of sizes and pore ratings
- Available with a range of fittings and vent options for incorporation into single-use systems



Van Borselen's BorsoCAP-PES, easy-wet, PES capsule filters offer a key benefit that overcomes a major drawback of similar filter capsules from competitors; they can be rapidly wetted and integrity tested with minimal usage of water. Facilities from breweries to pharmaceutical plants can benefit from consistent and rapid integrity tests with low water usage. Wetting, testing and flushing are available in a single unit with Van Borselen Intelligent Integrity Test (IIT) technology. The capsules are available in designs that allow for secure, leak-free connections, and draining and venting options.





BorsoCAP-PES filter capsules are manufactured with a polyethersulfone (PES) membrane that allows a high flow with minimal pressure drop while ensuring full retention of contaminant bacteria and yeast. BorsoCAP-PES membrane has low-binding characteristics that offer reduced adsorption of products.

BorsoCAP-PES filter capsules can be wetted with as little as 5 litres of water when incorporated into Van Borselen Filters Intelligent Integrity Test (IIT) system; wetting and testing can take place in a single operation driven by the test instrumentation.

The capsules are uniquely constructed using a proprietary process to ensure that they are easily wetted for consistent integrity testing.

## Features and Benefits

- Robust construction of shell and core to withstand high pressure drops and chemical and thermal stress
- Simplified and rapid integrity testing
- Minimal adsorption of product
- High flow with a low pressure drop
- True sterile filtration at each micron rating
- Variety of connections for testing and installation
- Also available in cartridge format



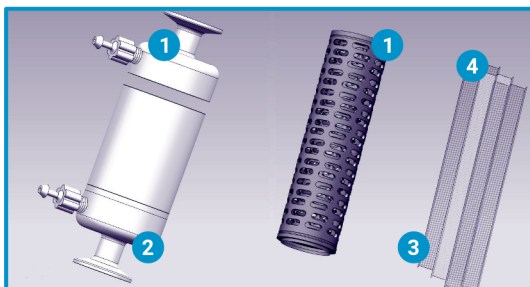
## Materials of Construction

All materials are FDA CFR Title 21 and USP VI approved. The capsules meet EC10/2011 requirements.

1. Polypropylene core, adaptor and shell
2. Variety of inlet and outlet, vent and drain fittings
3. Polypropylene support and drainage layers
4. PES membrane for superior flow and life

## Traceability and Integrity

- Test parameters correlate with retention of bacteria at each grade
- Each individual module of every capsule is tested to ensure that there is no risk of 'masking' of defective modules within a capsule.
- Each module is marked with a batch and unique number that allows full traceability.



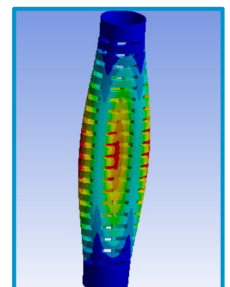
Finite Element Analysis optimised polypropylene shell (1)

Vent and drain points (2)

Robust encapsulated cartridge (1)

Polypropylene drainage and support layers (3)

Easy-wet PES membrane (4)



# Applications

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## Active Pharmaceutical Ingredients

BorsoCAP-PES capsules offer a solution to provide fully sterile filtration without validating cleaning processes for housings and ancillaries; a variety of connections and drainage and vents are available with the capsule.

## Food and Beverage Filtration

The PES membrane used for BorsoCAP-PES capsules offers low adsorption characteristics that prevent the detrimental effects of sterile filtration on the organoleptic properties of beverages. The membrane is resistant to caustic cleaning and hot water sanitisation.

## Growth Media Filtration

BorsoCAP-PES capsules can be autoclaved at high temperatures for long periods to ensure sterility. The PES membrane results in low loss of nutrients. Sanitary connections offer rapid integration with pumps and vessels.

## Water filtration

BorsoCAP-PES capsules at 0.2 µm are designed to fully retain exceptionally small bacteria such as Pseudomonads that are frequently encountered as contaminants in purified USP water and, table and mineral waters.

## Food and beverages

BorsoCAP-PES capsules suitable for the filtration of water and weak acid/alkali chemicals.

# Regulatory Compliance

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- All materials of construction are compliant with FDA CFR Title 21 and USP VI.
- Animal Ingredients where present meet requirements to ensure that they are free of BSE/TSE transmissible agents.
- The materials of construction are free of melamine, bisphenol A and cyanuric acid.
- The complete capsules have been tested to ensure that Specific and Overall Migration Limits for both acidic (B) , alcohol and oil emulsions (D1) product in accordance with EC 10/2011, are not exceeded.
- ISO class 8 cleanroom production
- Capsules are flushed with purified water prior to packaging.

# Traceability and Integrity

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To ensure that the filter capsules are integral; each module used in the manufacture of a capsule is individually tested. Onsite and laboratory-based qualification procedures (IQ, OQ and PQ) for integrity testing can be carried by Van Borselen Filters to meet regulatory requirements. Process based qualification for bacterial retention, compatibility and extractables is available.

## Steam sterilisation, autoclave and hot water sanitisation

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Forward flow at 125°C for 5 X 30 min cycles (adapter dependent)  
Autoclave at 135°C for 20 X 30 min cycles  
Hot water at 90°C for 100 X 30 min cycles

## Maximum and recommended operating pressures

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Recommended max. differential pressure 2.1 bar  
Maximum differential pressure 6.5 bar at 50°C  
Max. reverse differential pressure 2 bar at 50°C

# Nominal length (actual) for a triclover inlet/outlet capsule

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5 in 'junior-based' (140 mm), 10 in 'full-size-based' (328 mm)

## Microbiological Security with Pharmaceutical Grade Testing

Pore	Microbial retention at $\geq \log 7$
0.1 $\mu\text{m}$	Brevundimonas diminuta
0.2 $\mu\text{m}$	Brevundimonas diminuta
0.45 $\mu\text{m}$	Serratia marcescens/Oenococcus Oeni
0.65 $\mu\text{m}$	Saccharomyces cerevisiae
1.0 $\mu\text{m}$	Saccharomyces cerevisiae

Pore Size	Diffusive flow per 10 in capsule (at pressure)
0.1 $\mu\text{m}$	18 ml/min (2900 mbar)
0.2 $\mu\text{m}$	18 ml/min (1800 mbar)
0.45 $\mu\text{m}$	18 ml/min (1300 mbar)
0.65 $\mu\text{m}$	18 ml/min (800 mbar)
1.0 $\mu\text{m}$	18 ml/min (450mbar)

Filter	Media	Length (In)	In/outlet connection	Micron Rating	Drain/vent
BC	PES	015 = 1.5"	1T - 1" TC	01 - 0.1 micron	B - Bleed valve
		025 = 2.5"	S4 - 1/4" swagelok	02 - 0.2 micron	
		050 = 5"	S2 - 1/2" swagelok	45 - 0.45 micron	
		10 = 10"	S5 - 5/16" swagelok	65 - 0.65 micron	
		20 = 20"	N4 - 1/4" NPT	100 - 1 micron	
		30 = 30"	N2 - 1/2" NPT		
			3NF - 3/8" NPTF		
			3H - 3/8" hosebarb		
			2H - 1/2" hosebarb		
			4Q - 1/4" CPC		
			4QF - 1/4" CPCF		

### Example code

BC	PES	050	1T	2	B
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## Flow vs. Clean Pressure Drop for a 10 inch Capsule with 1 inch TC connections in Water

