

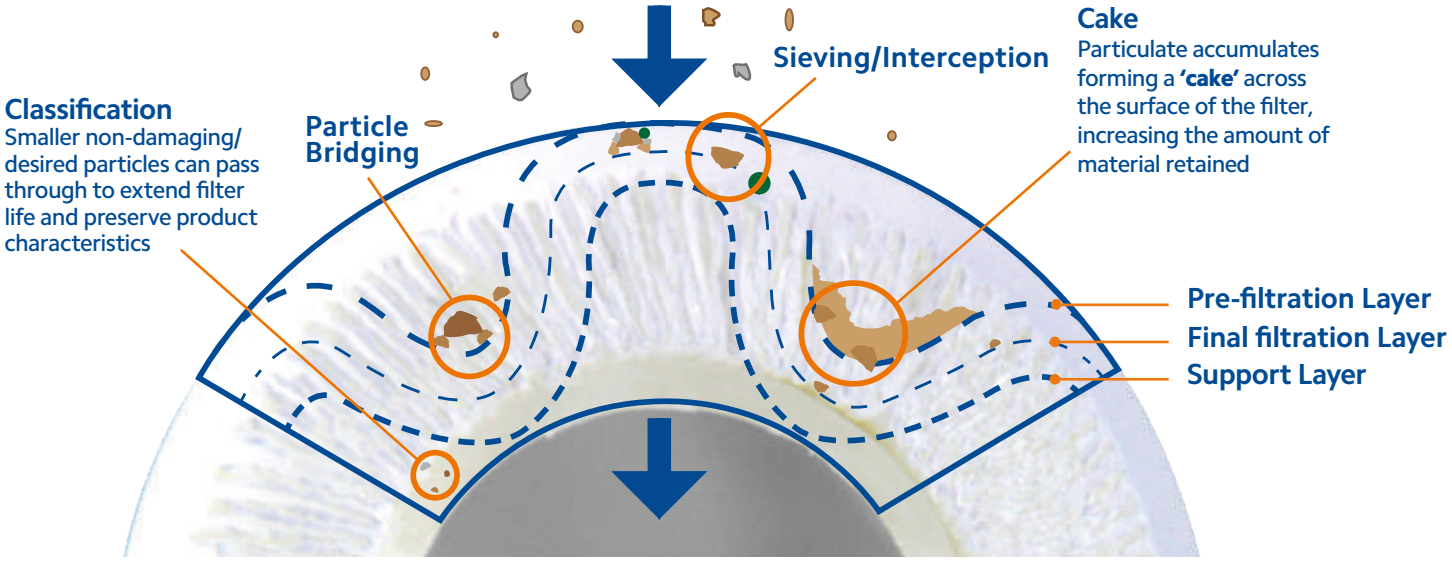
Pleated Filtration

www.fileder.co.uk

Pleated Technology

Pleated filters are widely used as effective surface filtration due to their excellent flow rates and high efficiency.

Pleating dramatically increases available surface area whilst maintaining high dirt loading and low pressure drops. Much of the media used in pleated cartridges also has some depth characteristics, thanks to its multi-layer construction, thereby aiding particle retention and classification.

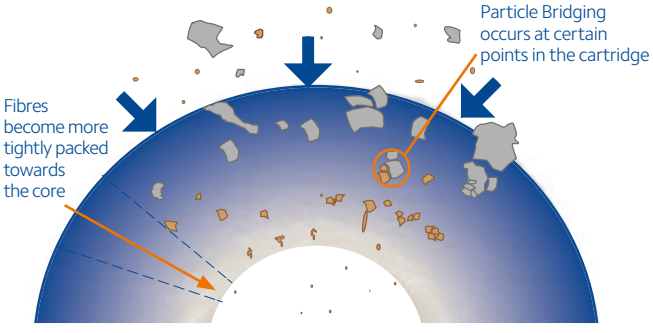


Surface Filtration Technology

Pleated filters are the ideal technology of choice over depth filtration for retention of known or uniformly sized particles.

The Standard (SPE) range of cartridges features a single layer media, which filters on the principles of direct interception and 'caking' where multiple particles accumulate across the media pore. Over time this leads to partial closure, which can increase efficiency and the chance to target finer particles.

The entire Premier range includes support and pre-filtration layers providing an element of depth characteristics. These layers retain larger particles, ensuring the specified micron rating of the cartridge can be utilised for exacting classification.



Depth Filtration Technology

The fibres become more tightly packed throughout a depth cartridge, progressively reducing the size of particles that can pass through the filter.

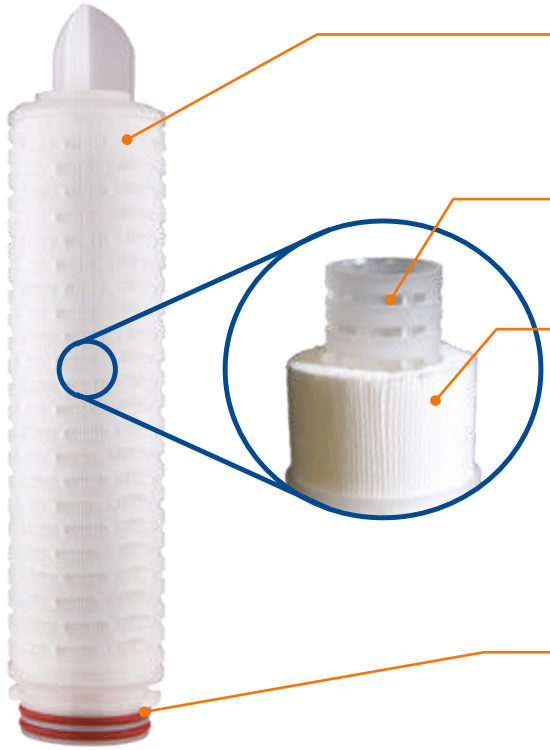
Advantage: Economic to produce.

Disadvantage: Higher pressure drop means a shorter service life compared to pleated cartridges.

Premier Pleat Construction

The Premier Pleat, Crypto and Bubble Point ranges are all constructed with a rigid inner core and outer polypropylene cage. Offering protection for the pleat pack, the cage also allows a variety of end-caps to be thermally bonded to the cartridge. This secure construction technique prevents bypass, creating a seal strong enough for repeated steam or chemical sterilisation as well as cartridge integrity testing.

Developments in 2018 see a new outer cage design that increases its void volume by over 10%. Whilst maintaining cartridge strength, increasing the open area allows a more uniform distribution of flow across the entire pleat pack ensuring low pressure drop and maximised dirt holding capacity.



Outer support cage

- Provides product strength and rigidity.
- Protects the pleat pack, ensuring media integrity.
- New outer cage design with increased void volume.

Inner support cage

- End-caps are bonded to the support core for product security and strength, ensuring no bypass and enabling integrity testing.

Media

- Pleated construction increases surface area, delivering high flow rates, low initial clean pressure drop and optimised dirt holding.
- Designed with an optimum balance of filtration media and void volume, the pleat pack is engineered to ensure that the entire surface area of the cartridge is used.

Thermally bonded end-cap

- No adhesive ensures no leaching of additives.
- Numerous end-caps and seals available to suit various housings (refer to pages 32 and 33).

Identification

Lot Coded

- Laser etched lot code on membrane and Cryto cartridges
- Traceable back to raw materials

QR Code

- Links directly to further information for each product

Barcode

- Product traceability
- Stock management integration

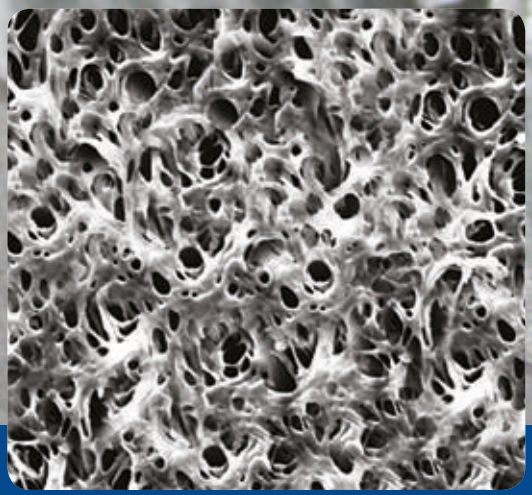


Packaging

Four Protective Layers

- Vacuum sealed inner packaging
- Tough outer polybag layer provides additional protection
- Individual product boxes
- Heavy duty outer carton

SPECTRUM



Bubble Point

0.2-1.2 micron

The validated, integrity tested range of industry specialised beverage grade filters uses the latest technology to create a highly asymmetric, permanently hydrophilic membrane. Capable of higher throughput and with greater membrane depth capability, the new Bubble Point range extends membrane life in high loading applications. Suitable for use in many critical applications from biological filtration, through to the validated removal of spoilage microorganisms for beer, cider, wine and fruit juice classification.



Bacterial Control

The 0.2 micron Bubble Point (BD) is specifically targeted towards bottle wash and final filtration for bacterial reduction, to prevent spoilage and maximise shelf life.



Spoilage Microorganism Reduction

Typically used as the final stage of the bottling / kegging process in beer filtration applications is the 0.45 µm Bubble Point (SE).



Yeast Removal and Clarity

Used for the removal of yeast, as well as ensuring desired clarity in wine applications are the 0.45-1.2 µm Bubble Point (SE, SA & CA) cartridges.

The Bubble Point range uses a highly asymmetric polyesthersulfone media. This modified media, with an initial increased pore diameter, significantly improves performance and durability, critical for high load contaminant removal found in beverage applications.

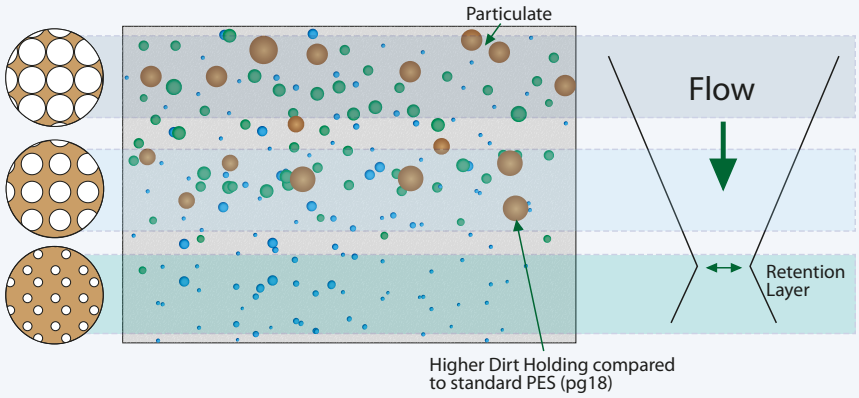
The increased dirt holding properties of the enhanced PES pore structure, with a greater void volume, protects the validated retention layer from premature fouling as typically occurs in standard PES media. This ensures high flow rates are maintained over an extended service life.

Low protein binding characteristics coupled with the modified PES pore structure result in a cartridge that provides consistent classification without altering the final product quality, retaining desired proteins, colourants and flavours.

Highly Asymmetric Pore Structure

- Inert and highly asymmetric polyethersulfone media with intrinsic hydrophilic properties
- Validated contamination removal at the desired micron size for precise classification
- Wider initial cone structure for enhanced dirt holding and optimised service life

Cross-section of Bubble Point Membrane Structure



Pore Size Variation | Cross Section of Media | Cross Section of Pore Structure

Hygiene and Traceability

- 100% integrity tested, with specific Quality Assurance Certificate supplied with every cartridge.
- Manufactured in a clean room environment, lot coded on the polypropylene cage for tracking and tracing.
- Each cartridge has double layered packaging. The inner plastic wrap is vacuum sealed and a tough outer layer provides further protection and cleanliness.
- Individually labelled and boxed for security and ease of product identification.

Integrity Testable

All SPECTRUM Bubble Point cartridges are 100% integrity testable giving known, precise and documented filter performance for ongoing quality control.

For ease of use, the fully automated SPECTRUM integrity tester offers an array of test protocols for complete peace of mind.

The Bubble Point Range



Bubble Point BD

Designed for the bottled water industry, the 0.2 micron Bubble Point BD provides complete bacteria and other microorganism protection.



Bubble Point SM

Typically used as the final stabilisation stage in the brewing industry, the Bubble Point SM rated at 0.45 micron removes potential spoilage organisms prior to packaging.



Bubble Point SC

The 0.65 micron Bubble Point SC provides the final filtration stage when protecting the unique characteristics of beers, wines and ciders is critical.



Bubble Point CA

Designed for intricate beverage challenges, the 1.2 micron Bubble Point CA retains the product's desired properties while providing high selective microorganism retention rates.



Bubble Point Quality from Start to Finish

Utilising even the most advanced polyethersulfone media would be ineffective if the cartridge manufacturing process did not meet the required standards and quality controls. SPECTRUM's meticulous and exacting specification means that every individual cartridge is subject to a rigorous multi-stage quality check.

1 Raw Material Check

The flat sheet PES membrane's physical and performance characteristics are analysed and validated, including:

- Pore size
- Media thickness
- Tensile strength
- Burst pressure

2 Performance Validation

Both the permeability and bubble point are determined and compared to the cartridges stated specification.

3 Cartridge Construction

The tested PES membrane flat sheet is combined with two layers of polypropylene media, in a clean room environment, to provide additional media strength and support.

4 Final Checks

- Before shipping, each individual element is again 100% quality checked.
- Diffusional flow and bubble point are verified to ensure that the cartridges perform to the expected criteria.
- Cartridges are laser etched with the lot code, vacuum sealed and bagged again to ensure complete cartridge traceability and cleanliness.

Efficiency

Cartridge (Micron Rating)	Bacterial Challenge	Efficiency
BD (0.2 µm)	*Brevundimonas diminuta*	≥99.99999%
SM (0.45 µm)	*Serratia marcescens*	≥99.99999%
SC (0.65 µm)	*Saccharomyces cerevisiae*	≥99.99999%
CA (1.2 µm)	*Candida albicans*	≥99.99999%

Materials of Construction

Filter Media
Polyethersulfone

Core
Polypropylene

Support Media
Polypropylene

Cage
Polypropylene

End-cap
Polypropylene with stainless steel ring

Seal
Silicone

Configurations

Micron (µm)

BD = 0.2	SM = 0.45	SC = 0.65	CA = 1.2

Length (")

10	20	30	40

End-cap (refer to page 32)

QG	ZH

Specification

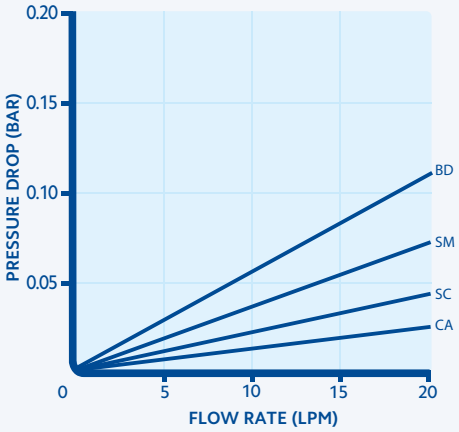
Efficiency
≥99.99999%

Max. Operating Temperature
80°C

Max. Sterilising Cycles
30 x 30 min cycles at 135°C

Surface Area
0.55 m² per 10"

Max. Operating Pressure Differential
6 bar at 21°C



Water at 20°C. 10" cartridge.

Quality Assurance Certificate

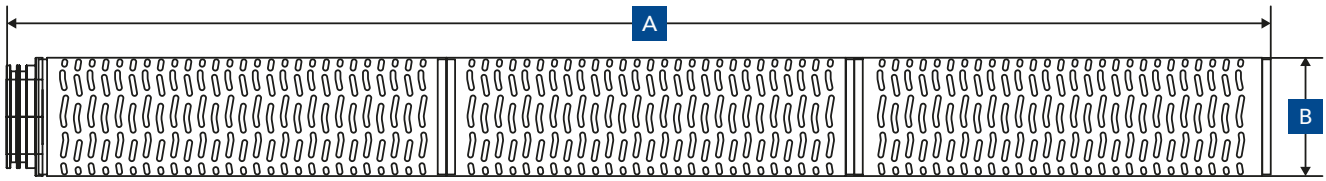
Bubble Point cartridges are shipped with a Quality Assurance Certificate, which provides the typical media properties and membrane performance characteristics of the polyethersulfone media used in the construction of the cartridge. The certificate contains the following typical information:

- Materials of construction
- Bacteria retention
- Bubble point values
- Diffusional flow rate
- Membrane performance characteristics

Compliance

BS6920 Approved
WRAS Approved
FDA Compliant Materials
USP Class VI - 121°C Plastics
Regulation (EC) 1935/2004
Regulation (EU) No10/2011

Dimensions & Packaging



	A (mm)		B (mm)	Packaging	
Length	QG	ZH		Box Qty	Box Weight (kg)
10"	270	310	70	9	4
20"	520	560	70	9	7
30"	770	810	70	9	10
40"	1020	1060	70	9	14

Part Number

Code	Length	End-cap
BD	10, 20, 30, 40	QG, ZH
SM		
SC		
CA		

e.g. BD10ZH

End-Caps

Pleated Cartridge Configurations

Where product codes indicate an optional end-cap is available, a choice can be made from the following styles. End-cap variations are made to suit housing designs and application requirements, which dictate the reliability and integrity of the seal, along with the ease of cartridge change out.



AA

Double Open Ended

Open-end gaskets, for use with housings containing a knife edge seal mechanism.



CG

213 with Closed Recess

Single internal O-ring, seals onto housings that have a spigot.



EG / MG

222/224 with Closed Recess

Double external O-rings seal into female housing receiver with a closed, recessed end, which is for housings with spigots.



EH / MH

222/224 with Fin Adaptor

Double external O-rings seal into female housing receiver whilst the Fin locates into housing plate holes to maintain vertical orientation.



FG

226 with Closed Recess

Bayonet type tabs lock into female housing receiver whilst the recessed end locates into housings with spigots.



FH

226 with Fin Adaptor

Bayonet type tabs lock into female housing receiver whilst the Fin locates into housing plate holes to maintain vertical orientation.

Stainless Steel Encapsulated End-Caps



QG

222 with Closed Recess

Suitable for high temperature housings, the QG configuration is suitable for repeated sterilisation and offers one of the best seals possible with its double O-ring fitting and stainless steel insert.



ZH

226 with Fin Adaptor

Suitable for multi-round high temperature housings, the ZH configuration provides the most positive seal with double O-rings and twin locking tabs. The encapsulated stainless steel insert makes the Z fitting suitable for repeated sterilisation.

Seals

Pleated Cartridge Configurations

Providing a water-tight seal between the housing and cartridge, O-rings and gaskets are essential to the integrity of the filter and come in a range of materials, including Silicone, EPDM, Teflon® and Viton® to suit most applications.



Silicone



EPDM

Teflon®



Viton®

Chemical Compatibility

The below table details the different compatibility of each O-ring within different applications. (Source: Cole-Parmer)

	Silicone	EPDM	Teflon	Viton®
Beer	Excellent	Excellent	Excellent	Excellent
Whisky & Wine	Excellent	Excellent	Excellent	Excellent
Deionised Water	Fair	Excellent	Excellent	Excellent
Alcoholic Methyl	Excellent	Excellent	Excellent	Fair
Aromatic Hydrocarbons	Poor	Poor	Excellent	Excellent
Sodium Hydroxide	Excellent	Good	Excellent	Poor
Hydrochloric Acid	Poor	Poor	Excellent	Excellent
Synthetic Hydraulic Oil	Good	Excellent	Excellent	Excellent

O-ring Sizing

This actual size chart is a useful aid in identifying common replacement O-rings. Place your current O-ring onto the chart to match the size required.

