Process Filtration & Water Treatment

Solutions for Beverage Production

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EXPERTS IN FILTRATION

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Solutions for Beverage Production

For over 35 years, Fileder has supplied process filtration and water treatment solutions to the beverage industry; ensuring products are bright, flavoursome and have the shelf life to meet regulatory and consumer demands, protecting our clients' brands.

SPECTRUM PENTAIR SUEZ Nitto HYDRANAUTICS Nitto Group Company AXEON WATER TECHNOLOGIES

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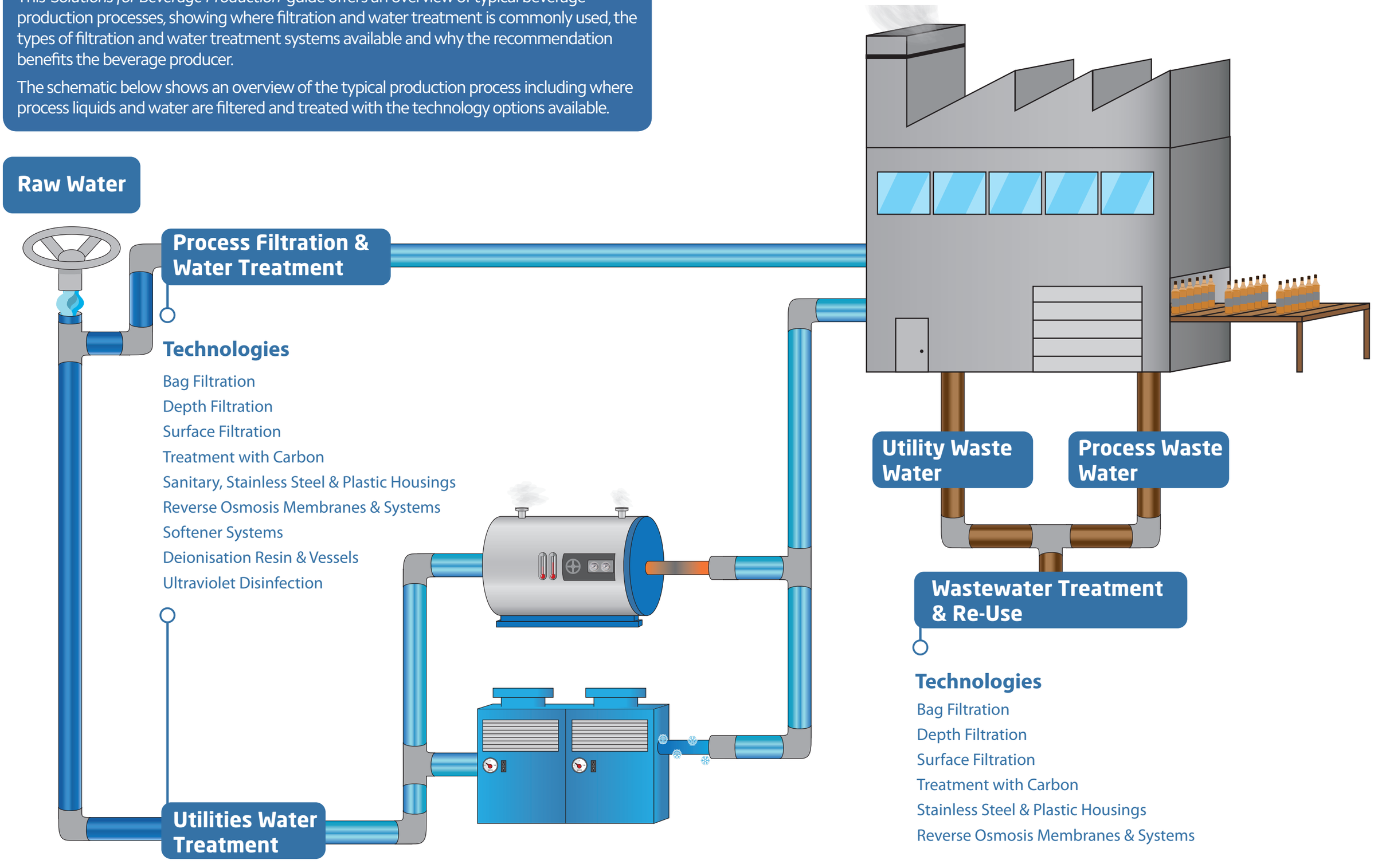
Typical Beverage Production Process

This '*Solutions for Beverage Production*' guide offers an overview of typical beverage production processes, showing where filtration and water treatment is commonly used, the types of filtration and water treatment systems available and why the recommendation benefits the beverage producer.

The schematic below shows an overview of the typical production process including where process liquids and water are filtered and treated with the technology options available.



Process Filtration Principles

Filtration Basics

Water and liquid filtration are key ingredients for all beverage producers to ensure quality is controlled. There are numerous factors to consider in process filtration with the main considerations shown below. In this guide, we offer general solutions, however each application should be considered individually.

Flow Rate

Determines the quantity and size/length of the filters required to keep pressure drop to a minimum and ensure best filtration practices are adhered to.

Temperature

The level for continuous exposure and peak temperatures with duration (e.g. steam sterilising regime).

Contaminant Type & Size

Type (hard, gelatinous or fibrous morphology) and quantity determines filter technology choice (bag, depth, surface etc.). Size to be removed indicates the upper limit of the micron rating.

Liquid Type

Chemical compatibility of the liquid product and cleaning products with the filter system components.

Efficiency

Filter efficiency affects type and therefore cost of filter. Pre-filters are lower cost and lower efficiency when compared to the final guard filter for the process.

Pressure & Pressure Drop

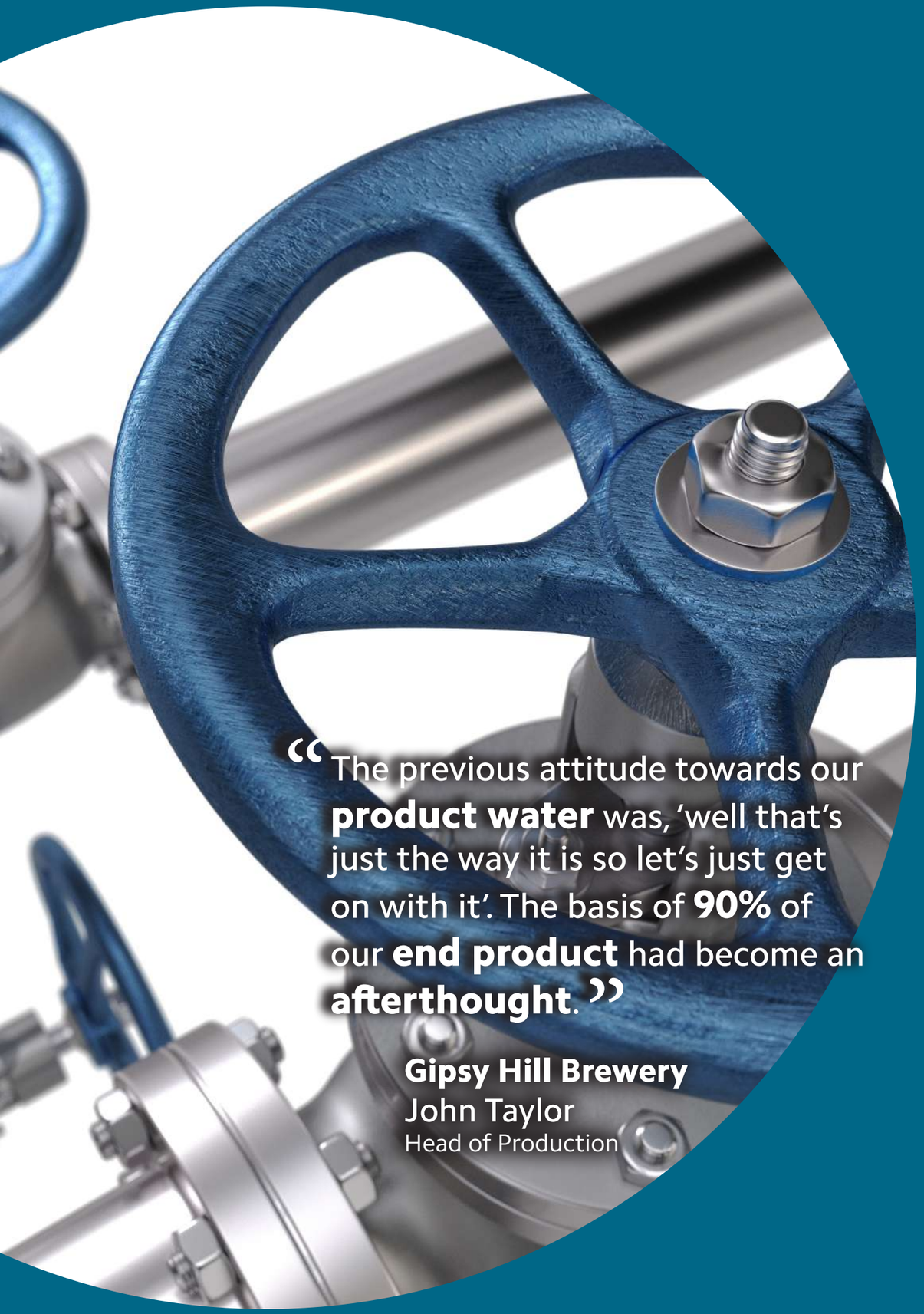
Continuous pressure rating of the filter housing and pressure drop across the filter system.

Environment

Location of the system may determine type of housing that is required e.g. External housings are SS.

Service Life

Over sizing systems affects filtration quality and duration between filter changes. This approach often gives better filtration results and lower running costs.



INCOMING WATER: The Challenges

Particles and Organics
Taste
Microorganisms
pH

Water Source

Beverage production benefits immeasurably from filtration and water treatment technologies, not only to produce water with properties specific to that beverage, but to remove hazardous and unwanted contaminants.

Water sources, including mains, boreholes, rivers and lakes contain challenging levels of various contaminants to be removed. This water will be employed for product, brewing liquor, dilution and applications supporting the production processes, such as wash down water, bottle washing, laboratory use and boiler feed.

Quality control of water in these applications is paramount to keep the process variations to a minimum, enabling consistent reproduction of the desired beverage. Control of waterborne contaminants protects the final packaged product from bacterial, parasitic and particulate contamination.

Pure Water Production

Many producers opt to convert incoming water to purified, reverse osmosis or demineralised water; for use as brewing liquor or product dilution as this reduces risk and taste variations significantly.

Incoming Water Treatment Solutions

Source Water

Pump

Rough Filtration
Bulk solids removal

PBH Bag Housing
EB Filter Bag
5-50µm

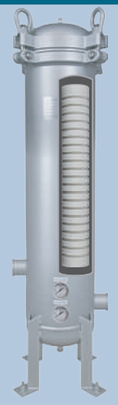
A

Hardness Removal
Softening

WTP Water Softener System

B

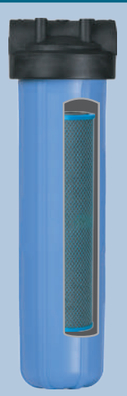
Particle Removal
Broad particle range



PFH Filter Housing
PSP Spun-Bonded Cartridge
5-20µm

C

Chlorine & Organics Reduction
Removes taste and odour



BigBlue20 Plastic Filter Housing
CFB-Plus Fibredyne
Carbon Cartridge

D

Parasite Removal
Protects against *Cryptosporidium*

PSFH Sanitary Housing
'Crypto' Pleated Cartridge
0.45-1µm

E

Ultraviolet Disinfection
Destroys microorganism cells

SUV SABRE UV System

F

Bacteria Removal
Physical removal to log7

PSFH Sanitary Housing
PPPES Pleated Cartridge
0.2µm

G

PTFE Air Vent Filter

Storage Tank

Fileder Recommends

A **Rough Filtration:** Removal of solids (grit, rust, and dirt) requires economic, high dirt-holding SPECTRUM bag filters.

B **Hardness Removal:** Prevents scale build-up on equipment. WTP softening systems are commonly used.

C **Particle Removal:** Removal of debris, such as dirt and scale flakes, protects pipework, systems and filtration from clogging. Polypropylene depth media used in SPECTRUM PSP traps a wide range of particles.

D **Chlorine and Organics Reduction:** Carbon technology reduces bad taste and odours by adsorbing organics and treating chemicals, such as chlorine. The modified carbon Fibredyne CFB-Plus also traps particles, preventing premature clogging.

E **Parasite Removal:** *Cryptosporidium* and cyst removal, using certified Crypto cartridges, protect from parasite infestation.

F **Ultraviolet Disinfection:** SABRE UV systems impede bacterial growth by sterilising microorganisms with UV light.

G **Bacteria Removal:** Membrane media filter cartridges are used to reduce bacteria levels. The SPECTRUM PPPES range is certified to log7 reduction of bacteria for use after DAL plants (deaerated liquor).

Pure Water Production Solutions

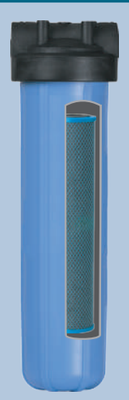
Source Water

Particle Removal
Broad particle range

PFH Stainless Steel Housing
PSP Spun-Bonded Cartridge
5-20µm

A

Chlorine and Organics Reduction
Protects RO membrane from chemical attack



BigBlue20 Plastic Filter Housing
CFB-Plus Fibredyne
Carbon Cartridge

B

Ions & Salts Removal
95% reduction of ions and salts

SRO-SYS
Reverse Osmosis System

C

Deionisation
Targeted removal of ions and salts

SV-FK Pressure Vessel
SRDI DI Resin

D

Storage Tank

Airborne Bacteria Removal
Protects stored water

PFH Stainless Steel Housing
PPPTFE Vent Filter
0.2µm

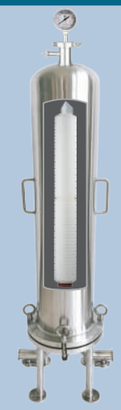
E

Ultraviolet Disinfection
Destroys microorganism cells

SUV SABRE UV System

F

Bacteria Removal
Physical removal to log7



PSFH Sanitary Housing
PPPES Pleated Cartridge
0.2µm

G

Beverage Application

Fileder Recommends

- **A** **Particle Removal:** Removal of debris, such as dirt and scale flakes, protects equipment from clogging.
- **B** **Chlorine and Organics Reduction:** Treatment with carbon reduces organics and treats chemicals. Pentair CFB-Plus Fibredyne modified carbon block cartridges treat chlorine and other chemicals that can attack the RO membrane.
- **C** **Ions and Salts Removal:** Purification of water by reducing levels of ions and salts by around 95%, using SPECTRUM SRO reverse osmosis membrane technology.
- **D** **Deionisation:** Further reduction in ions and salts by attracting these elements to SPECTRUM SRDI charged deionisation resin beads.
- **E** **Airborne Bacteria Removal:** Storage tank venting with 0.2 micron rated bacteria control PTFE media.
- **F** **Ultraviolet Disinfection:** SABRE UV systems impede bacterial growth by sterilising microorganisms with UV light.
- **G** **Bacteria Removal:** Membrane cartridges are used to reduce bacteria levels. The SPECTRUM PPPES range is certified to log7 reduction of bacteria.

Benefits for the Facilities Engineer

Water Treatment Systems

Protection of sites from contaminants contained in water is imperative in preventing bad taste, odour, colour, turbidity and microbiological factors affecting equipment and processed beverages. The choice of technology used to treat and filter water often depends on the expected contaminant types and levels from the water source.

CFB-Plus Fibredyne Carbon Cartridge

Reduced Clogging Risk
Sediment removal prevents premature clogging

High Quality Carbon
Triple capacity of traditional carbon block, gives longer life

Lower Energy Use
Excellent flow rate to pressure drop ratio

SoftH$_2$0-DUO Water Softening System

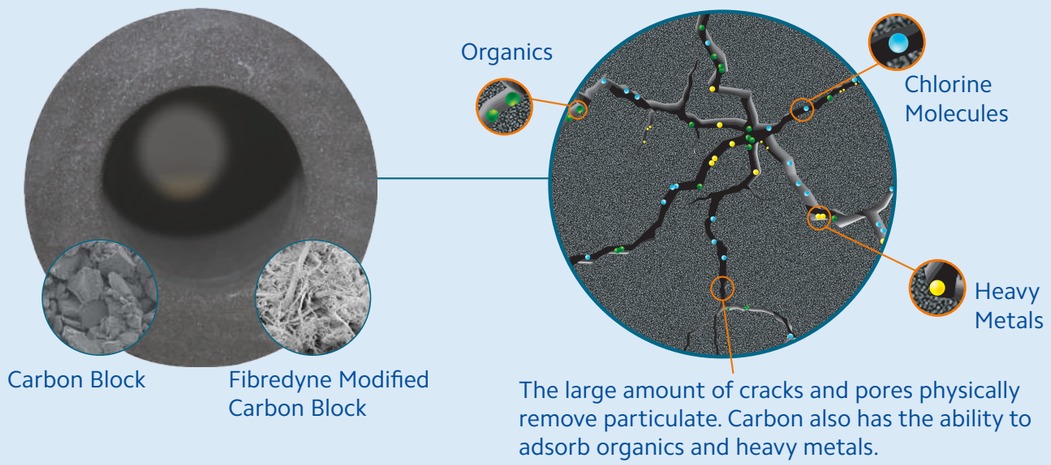
Greater Control
Easy to program with LCD display

Ease of Installation
Off-the-shelf systems that are simple to install

Reduced Downtime
Dual vessels allow for continuous use

Carbon Treatment Theory

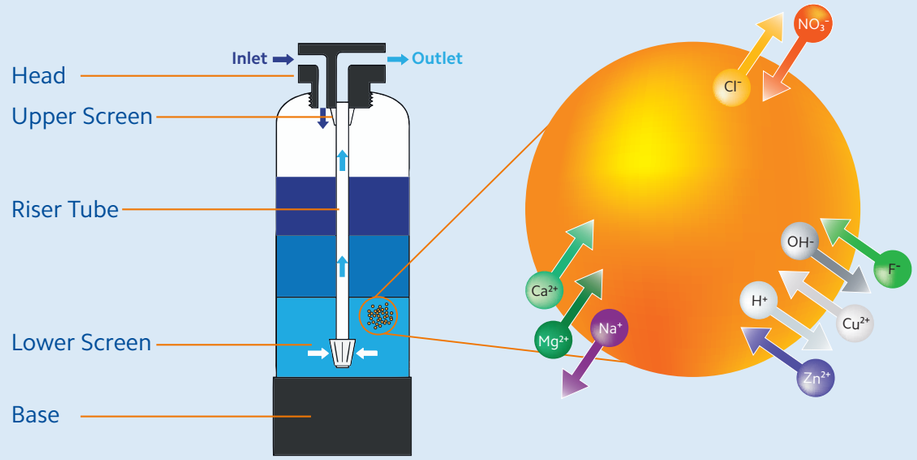
Contaminants are adsorbed by chemically binding the impurities to the carbon.



The large amount of cracks and pores physically remove particulate. Carbon also has the ability to adsorb organics and heavy metals.

Pressure Vessels and Resin

A pressure vessel system holds any resin type to ensure the water treatment process occurs thoroughly.



Benefits for the Facilities Engineer

Pure Water Production Systems

Applications, such as dilution, boiler feed, laboratory and wash down, benefit from reverse osmosis (RO) technology and/or deionisation (DI) to remove salts, ions and other contaminants. Bacterial growth in storage tanks is typically suppressed using ultraviolet (UV) disinfection systems and pleated membrane filter cartridges.

SRO-SYS Reverse Osmosis System

Reliable
All components built to high quality

Easy to Use and Install
Pre-built RO system with ergonomic design

Economic Solution
Low ongoing running cost

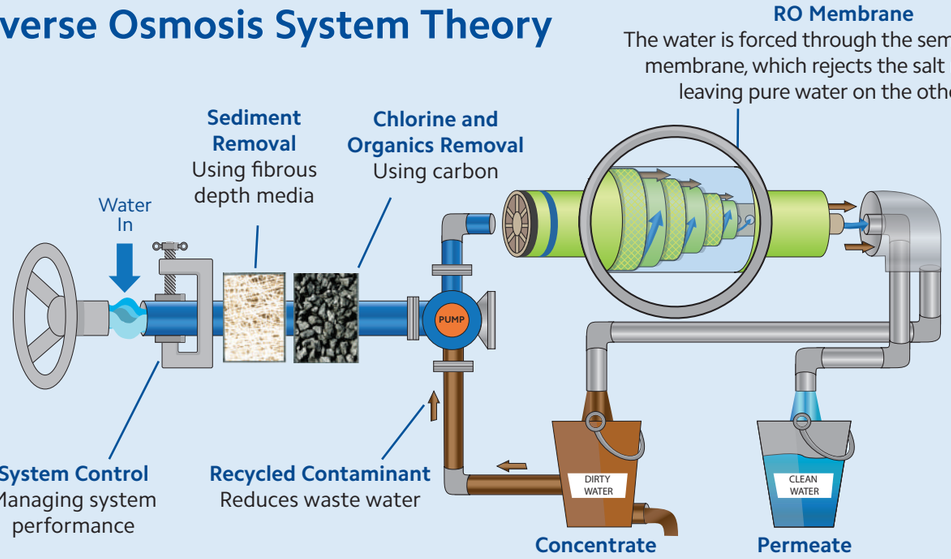
SUV SABRE UV System

Durable
Stainless steel construction

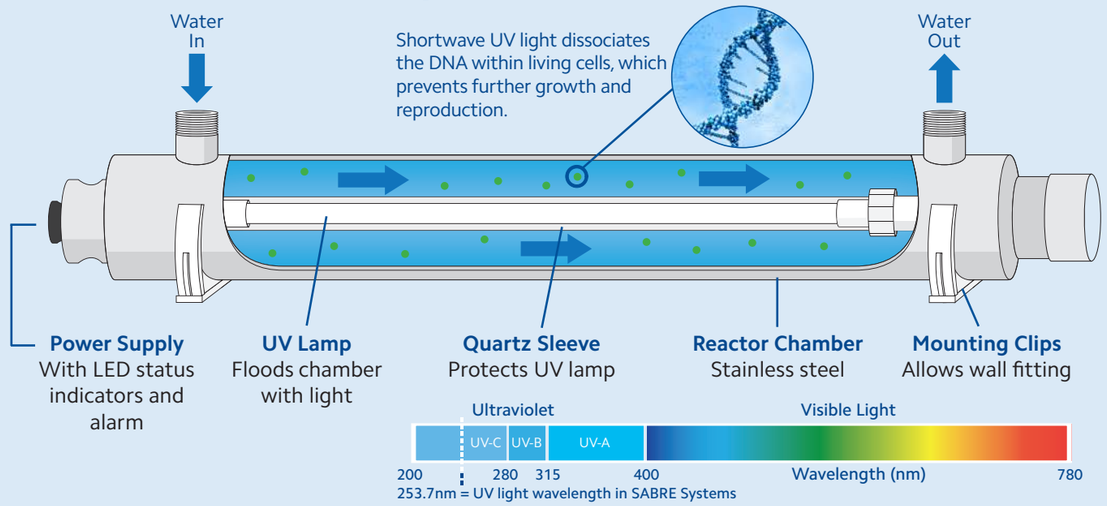
Easy to Use
Simple to install, operate and maintain

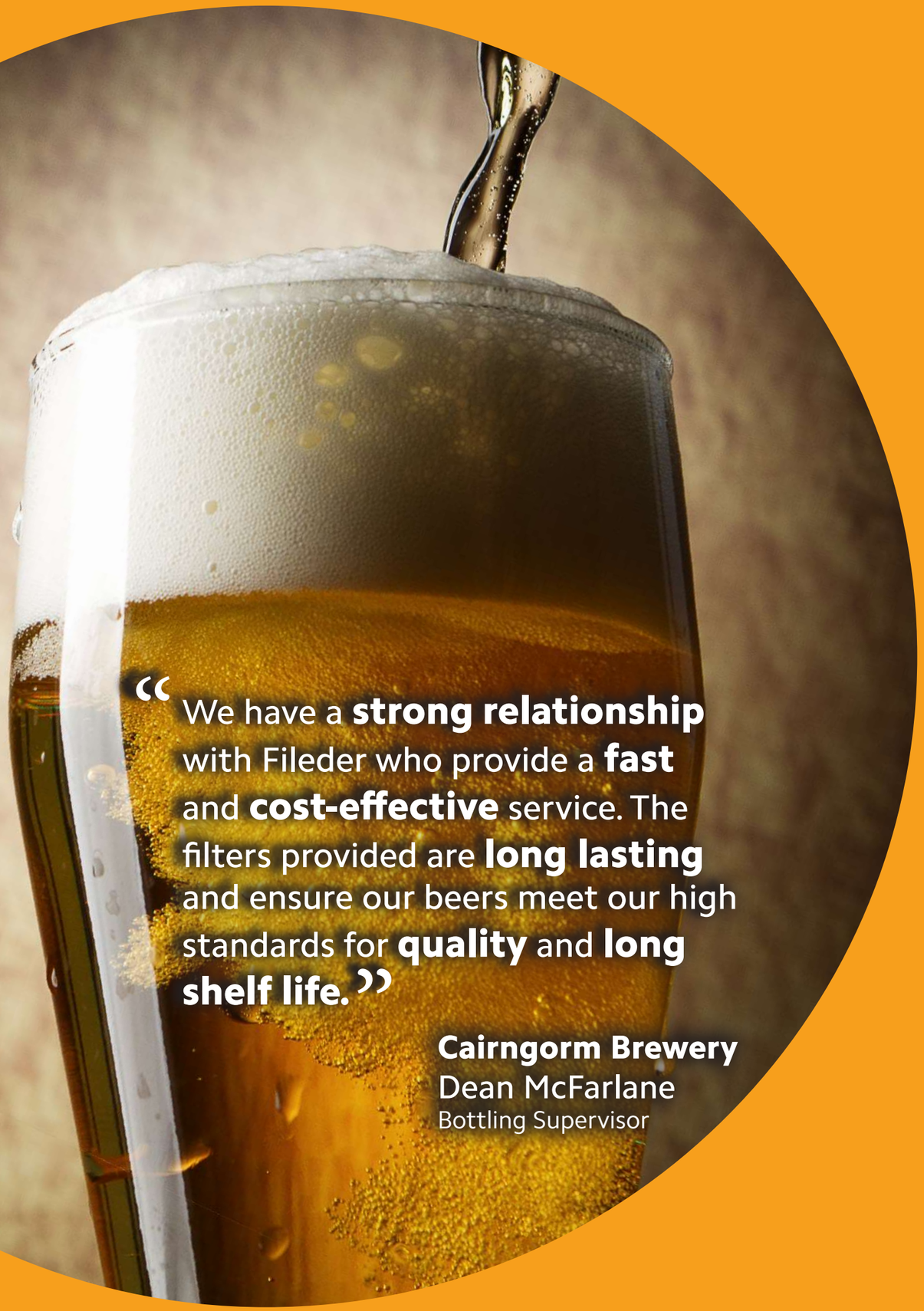
Alarm and LEDs
Offer audible and visual indicators of operation

Reverse Osmosis System Theory



UV Disinfection Theory





BREWERY: The Challenges

Haze
Quality
Shelf Life
Flavour

Beer Production

Filtration benefits beer (lager, ale, porter or stout) production by controlling the flavour, stability, appearance and shelf life of the packaged product. The areas where filtration is used depends on the brewer’s desire for the final product and typically falls into 4 categories:

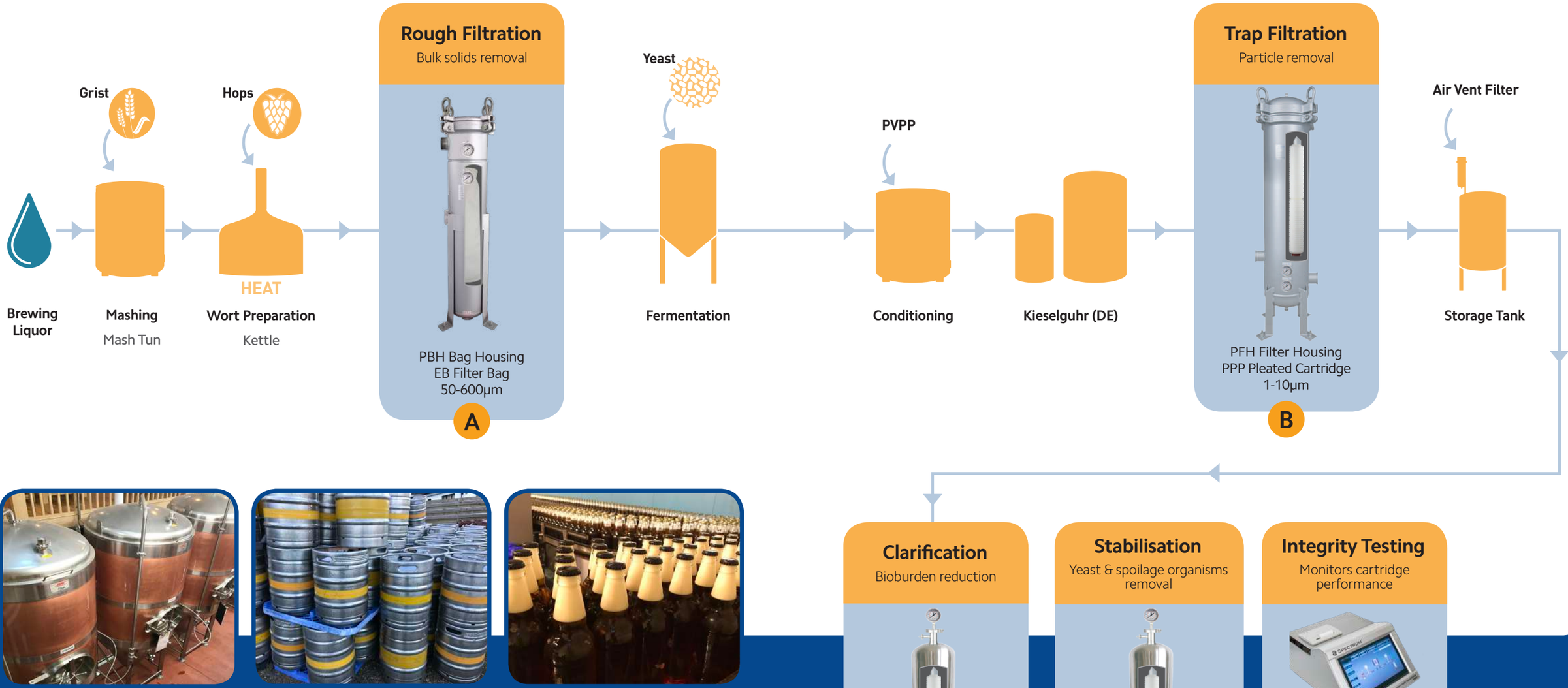
1. Incoming Water (brewing liquor production)
2. Rough Filtration (removal of bulk solids)
3. Trap Filtration (trapping visible particles)
4. ‘Sterile’ Filtration (bioburden reduction for clarification and packaging stabilisation)

Different brews use different processes, meaning one, two or all four of these filtration stages may be required. Challenges to the brew could be in the form of haze from polyphenols, appropriate yeast levels, the presence of spoilage organisms, the desired colour, flavour, brightness of appearance or a customer’s requirements for shelf life. These challenges can be overcome using the solutions that Fileder recommends.

Cider Production

Fermenting the juice of apples creates cider with dry to sweet varieties. Challenges include spoilage tendencies, such as acetification or blackening. Water treatment and filtration systems are used to produce a cider that has the desired appearance, flavour and shelf life.

Beer Production - Filtration Solutions



Fileder Recommends

A **Rough Filtration:** Removal of large amounts of solids, such as yeast and grist, requires economic, high dirt-holding technologies and typically SPECTRUM bag filters are used.

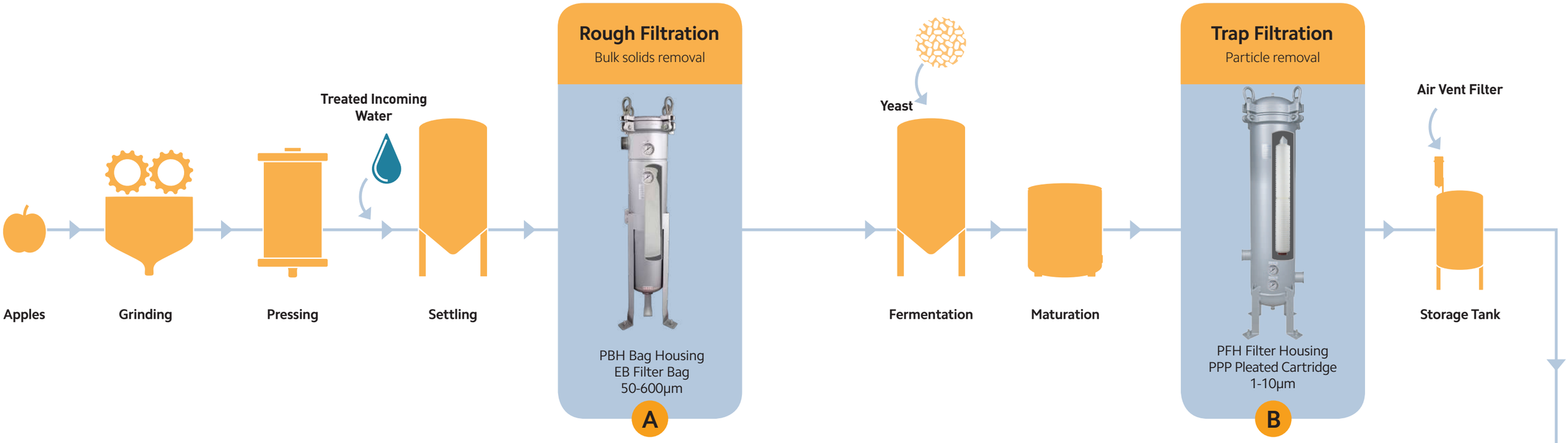
B **Trap Filtration:** The removal of visible particles improves aesthetics, protects tanks and enhances further filtration stages downstream. High efficiency Premier Pleated Polypropylene cartridges are best suited due to their exacting classification and dirt-holding capabilities.

C **Clarification:** Bioburden reduction is essential for product clarity and protection of the final membrane cartridge stage. SPECTRUM PPG glass fibre media pleated cartridges allow for high flow and excellent removal efficiency.

D **Stabilisation:** Known as 'Sterile' filtration, this final polishing stage removes yeast and spoilage organisms to prevent refermentation and extend shelf life. SPECTRUM Bubble Point cartridges are certified for beverage polishing before packaging.

E **Integrity Testing:** Employing the SPECTRUM Integrity Tester will measure a defined decay in pressure and monitors the cartridge filter media's ability to function within set tolerances.

Cider Production - Filtration Solutions



Fileder Recommends

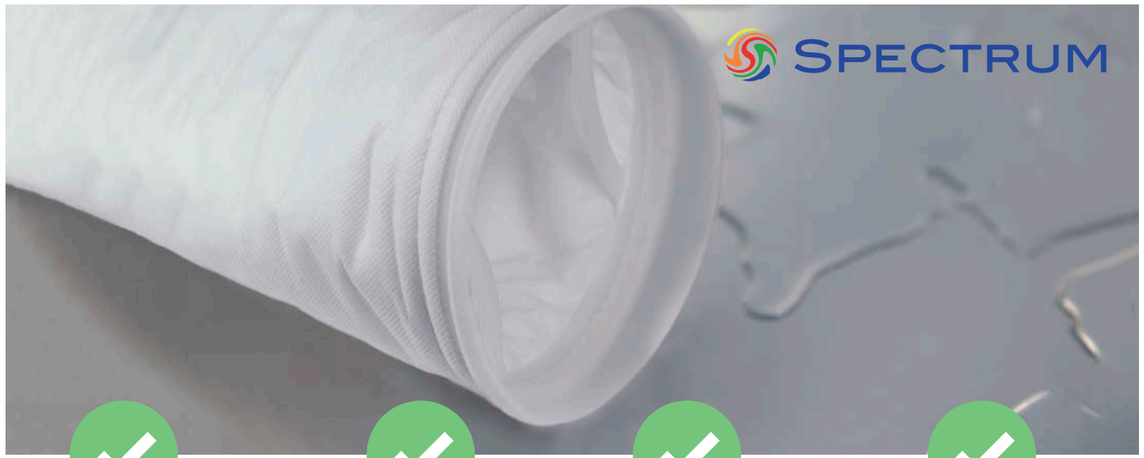
- **A** **Rough Filtration:** Removal of large amounts of solids, such as bulk pulp and fibres, requires economic, high dirt-holding technologies. Typically SPECTRUM bag filters are used.
- **B** **Trap Filtration:** The removal of visible particles improves aesthetics, protects tanks and further filtration stages downstream. High efficiency Premier Pleated Polypropylene cartridges are best suited due to their exacting classification and dirt-holding capabilities.
- **C** **Clarification:** Bioburden reduction is essential for product clarity and the protection of final membrane cartridge stage. SPECTRUM PPG glass fibre media pleated cartridges allow for high flow and excellent removal efficiency.
- **D** **Stabilisation:** Known as 'Sterile' filtration, this final polishing stage removes yeast and spoilage organisms to prevent reformation and extend shelf life. SPECTRUM Bubble Point cartridges are certified for beverage polishing before packaging.
- **E** **Integrity Testing:** Employing the SPECTRUM Integrity Tester will measure a defined decay in pressure and monitors the cartridge filter media's ability to function within set tolerances.

Benefits for the Brewer

Rough Filtration

Rough filtration is the removal of bulk solids. Process filtration often uses bags for this purpose as they remove large volumes of solids and are both quick and easy to changeout, making them economic to use.

EB/SB/PB Bag Filters



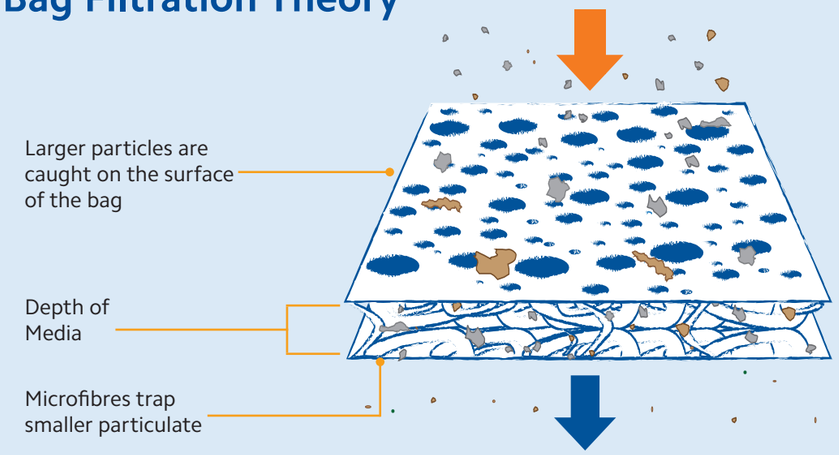
Compliance
WRAS approved and FDA compliant for foodstuffs

Large Surface Area
Great for high flow rates and bulk solids removal

Glazed Finish
The glazed finish minimises fibre release

Wide Compatibility
Single, double and multi-layer versions available

Bag Filtration Theory



EB Single Layer

SB Double Layer

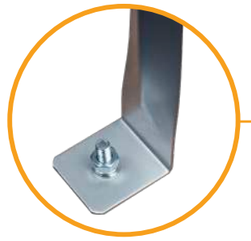
PB Multi-Layer

PBH Premier Bag Housing

Easy Filter Change
The securely fixed lid with eye-bolt fastenings make filter changes clean, quick and easy for the operator

Port Options
Wide range of port options available including BSPT-M and DN flanges

Filter Performance Indication
Two gauges can be fitted to give readings of pressure differential indicating when filter change is due



Industrial Compatibility
The height-adjustable mounting legs can be bolted to the floor to improve stability

Drain
Efficient drainage system aids housing cleaning

Benefits for the Brewer

Trap Filtration

Following fermentation and conditioning, a Kieselguhr system is sometimes used to reduce contaminant loading. Trap filters (either spun-bonded or pleated) are used to catch any Kieselguhr powder and other sediment before tank storage, prior to packaging.

PSP Spun-bonded Cartridge

Compliance
WRAS approved and FDA compliant for foodstuffs

Grooved Surface
Enhanced dirt-holding capacity and longer filter life

End-cap Options
Range of end-caps for better application compatibility

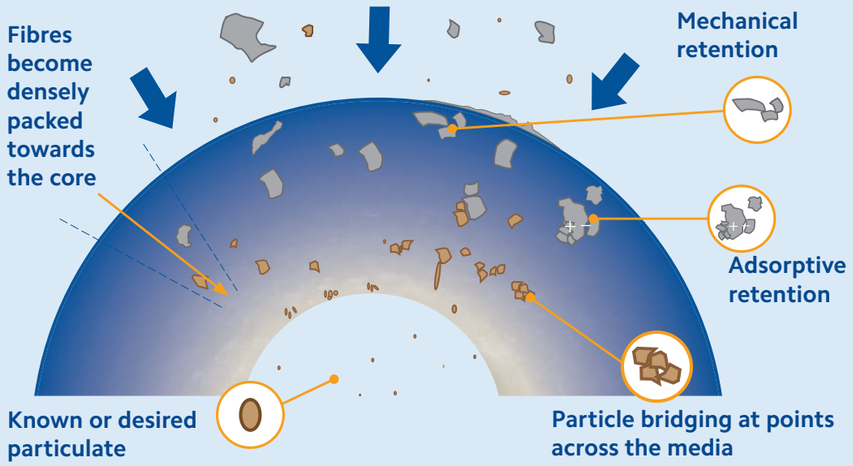
PPP Premier Pleated Polypropylene Cartridge

98% Efficiency
Exacting classification allows for controllability

Wide Range of Micron Ratings
Offers options for heavily loaded brews

4 Layers of Media
High dirt-holding capability increases economic value

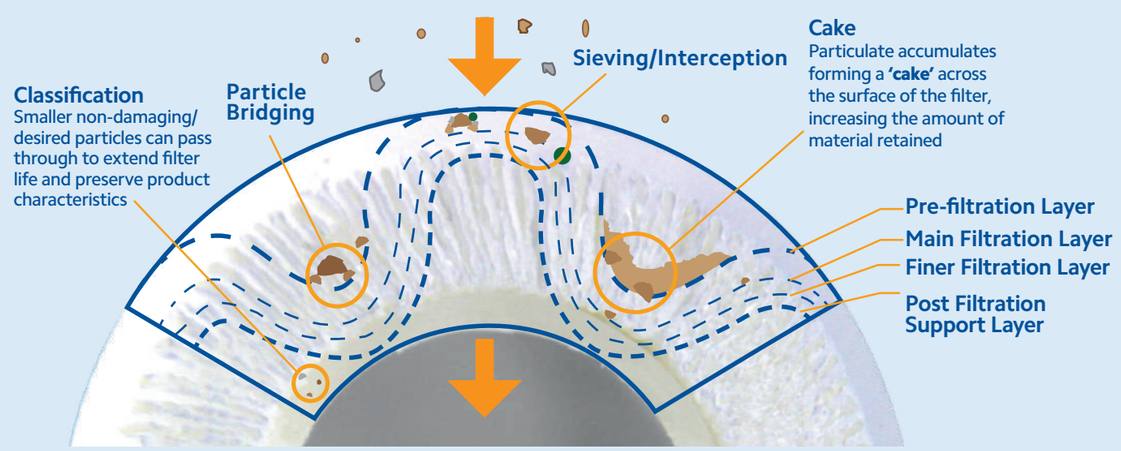
Spun-bonded Depth Filtration Theory



Grooved design:

Promoting:
- Increased dirt-holding
- Earlier removal of larger contaminants
- Longer service life

Pleated Filtration Theory



Benefits for the Brewer

Bioburden Reduction & Clarification

When the brew is ready to be packaged, bioburden reduction cartridges are used to remove the bulk of the yeast and spoilage organisms to improve clarity and protect the final polishing cartridge, before carbonation and packaging stages. Bioburden reduction cartridges are essential in providing good service life for the final polishing cartridge.

Stabilisation

The shelf life of packaged beers (bottles and kegs) is shortened by yeast and spoilage organisms that remain in the brew. 'Sterile' filtration is a term used for the final filtration stage before packaging. Using certified media and cleanroom construction, the validated 'Bubble Point' filter cartridge provides reliable performance.

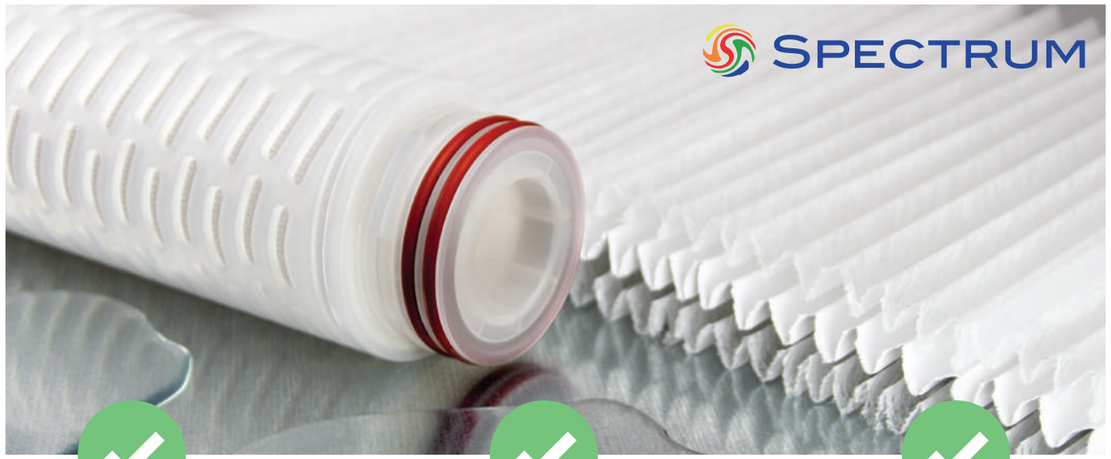
PPG Premier Pleat Glass Fibre Cartridge

Glass Fibre Media
Gives exceptional flow rate to pressure drop ratio

Absolute Rated
Very high efficiency cartridge

Pre and Post-filtration Layers
Maximise dirt retention capability

'Bubble Point' Validated Cartridge



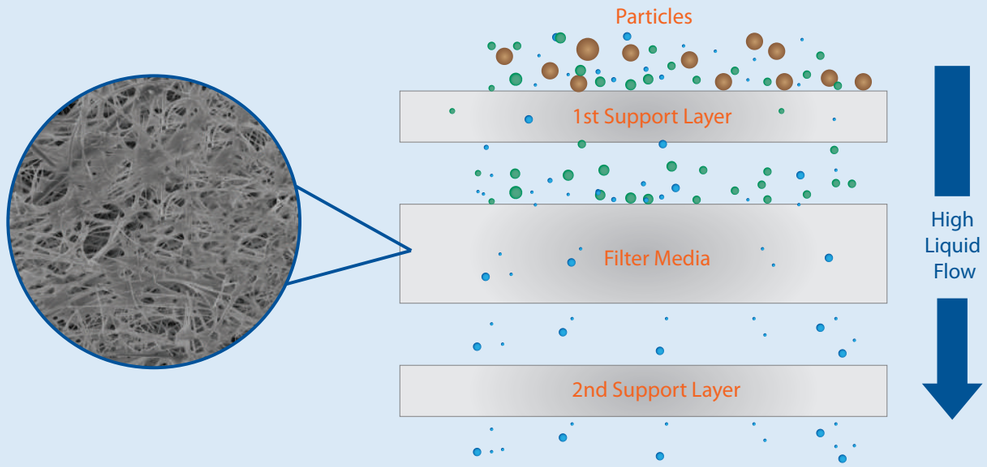
3 Layers of Media
High dirt-holding capacity and longer life

Highly Asymmetric Pore Structure
Designed for beverage applications, the higher dirt-holding capabilities increase service life

Certified to log7 Reduction
Reliable brew quality, guard cartridge filter

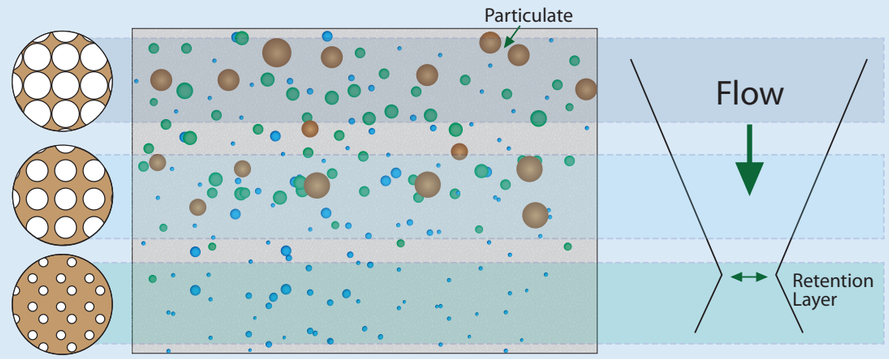
Particulate Retention Efficiency %

Particle removal efficiencies are determined using AC fine test dust, dispersed in water, at a constant flow rate.



Highly Asymmetric Pore Structure

Cross section of the 'Bubble Point' membrane surface, highlighting its graded density that enables the 'Bubble Point' to achieve its 99.99999% (log7) bacteria retention rates.



Benefits for the Brewer

Sanitary Cartridge Housings

Hygienic housings, designed for sanitising and sterilising; featuring crevice-free, polished, 316L stainless steel components. Enhanced microbiological safety is due to a high-quality surface finish and sanitary connections. Used for beverage production in critical applications with single and multi-round configurations for cartridges up to 40" length.

Gauge Port
Pressure drop indicates filter performance in service

Sanitary Finish
Highly polished, smooth surface finish, reduces areas of potential microbial adhesion

Eye-Bolts
Quick, easy and clean filter changes for the operator

Ports
Sanitary Tri-Clamp fittings for easy cleaning

Mounting Legs
Can be bolted to the floor for industrial stability and safety

Multi-Round

Single-Round

Integrity Testing

Although filter cartridge blockage can be easily detected during the process run, cracks or changes in pore structure cannot. The Integrity Tester measures filter cartridge properties before, during and after batch runs. There are various test methods that can be applied.

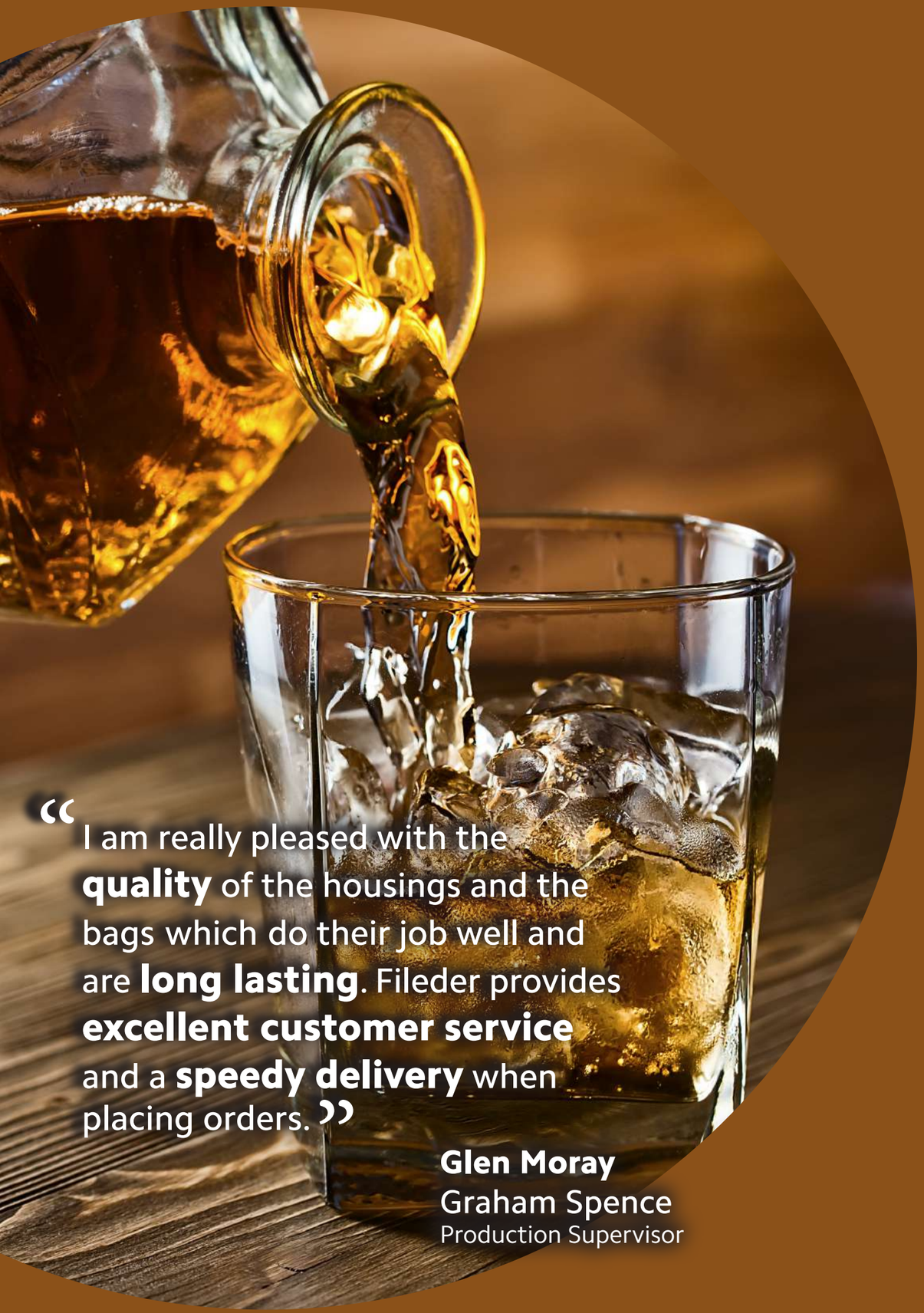
Test Types
Forward Flow
Bubble Point Test
Combined Forward Flow and Bubble Point Test

External Magnetic Interface
Controls the external magnetic air valve

USB Interface
Export data and install program updates

Printer
Save and print test results for records

Touch Screen
Displays data numerically and graphically



> “I am really pleased with the **quality** of the housings and the bags which do their job well and are **long lasting**. Fileder provides **excellent customer service** and a **speedy delivery** when placing orders.”
>
> **Glen Moray**
> Graham Spence
> Production Supervisor

DISTILLERY: The Challenges

Brilliance of Appearance
Chill Haze
Visible Particles
Flavour

Whisky Production

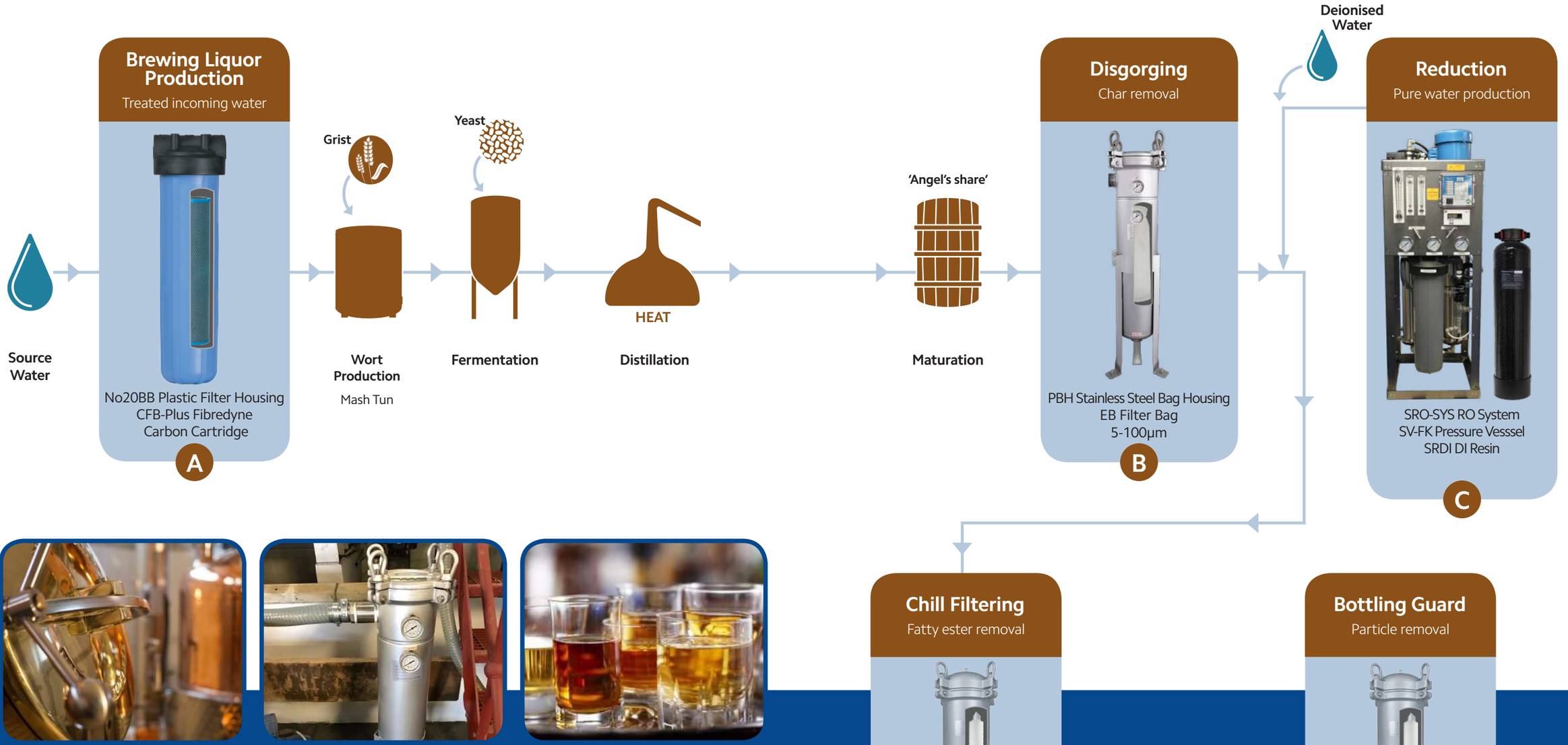
Aqua Vitae or ‘The Water of Life’ is the ancient term for distilled alcohol, establishing its important role through the ages. Whisky is a distilled alcohol made primarily from malted barley that is ground, mashed in a Mash Tun, Fermented, Distilled, Matured and then Vatted before Bottling. The final product has the requirement of being aesthetic so there is no visible particulate and no haze when water is added.

Gin & Vodka Production

Gin is a distilled alcohol commonly produced from fermenting grain, although other base ingredients (such as corn or rye) can be used. There are several methods of producing gin such as the ‘London Gin’ and the ‘Compounding’ method. For each, the final product appearance and flavour is of upmost importance and is controlled using filtration techniques.

Vodka is also a distilled alcohol, made from grain, molasses, potatoes or rice. The filtration solutions used for vodka at the Trap Filtration stage are similar to those employed in gin filtration, whereby visible particulate is removed.

Whisky Production - Filtration Solutions



Fileder Recommends

A **Brewing Liquor Production:** Depending on the water source and the distiller's process methods, water treatment is applied to control contaminants by adsorbing organics and treating chemicals such as chlorine, thus reducing bad taste and odours.

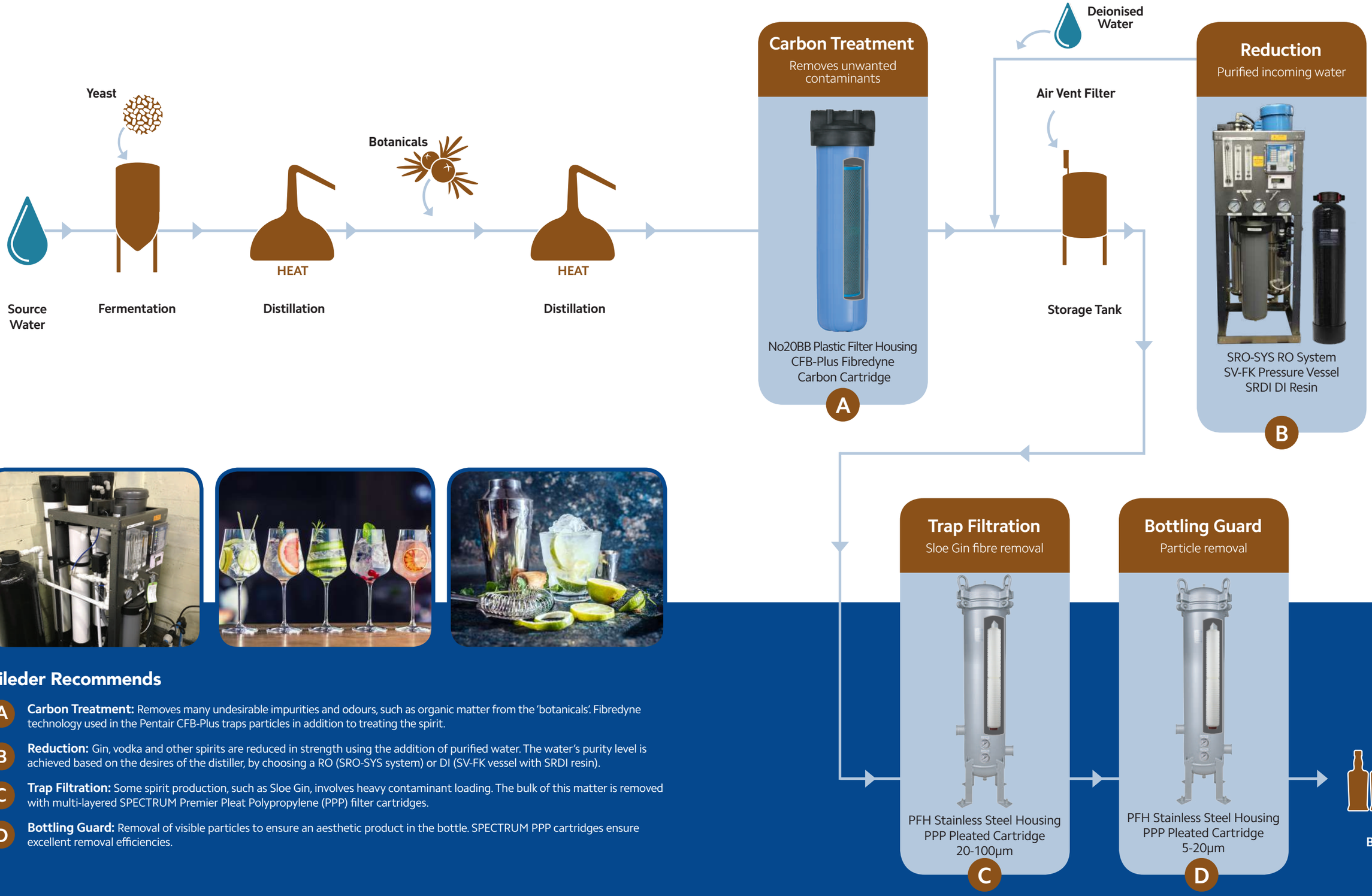
B **Vatting:** Removal of large solids such as char from the inside of the scorched barrels, requires economic, high dirt-holding technologies and typically SPECTRUM bag filters or depth cartridges are used.

C **Reduction:** Whisky is reduced in strength with pure water via reverse osmosis (RO) or deionisation.

D **Chill Filtering:** By reducing the temperature of the whisky, fatty esters can be removed as solids using high efficiency Premier Pleat Polypropylene (PPP) cartridges due to their sharp cut-off characteristics and dirt holding capabilities.

E **Bottling Guard:** Removal of visible particles to ensure an aesthetic product in the bottle. SPECTRUM PPP polypropylene media multi-layered pleated cartridges allow for excellent removal efficiency.

Gin and Vodka Production - Filtration Solutions



Fileder Recommends

- **A** **Carbon Treatment:** Removes many undesirable impurities and odours, such as organic matter from the 'botanicals'. Fibredyne technology used in the Pentair CFB-Plus traps particles in addition to treating the spirit.
- **B** **Reduction:** Gin, vodka and other spirits are reduced in strength using the addition of purified water. The water's purity level is achieved based on the desires of the distiller, by choosing a RO (SRO-SYS system) or DI (SV-FK vessel with SRDI resin).
- **C** **Trap Filtration:** Some spirit production, such as Sloe Gin, involves heavy contaminant loading. The bulk of this matter is removed with multi-layered SPECTRUM Premier Pleat Polypropylene (PPP) filter cartridges.
- **D** **Bottling Guard:** Removal of visible particles to ensure an aesthetic product in the bottle. SPECTRUM PPP cartridges ensure excellent removal efficiencies.

Benefits for the Distiller

Disgorging

After whisky has matured for the desired time it is disgorged from the casks and filtered, removing any debris from the cask (principally char). Rough filtration is most suited to this application due to the need for economic removal of bulk solids.

PBH Premier Bag Housing

Easy Filter Change

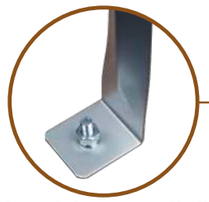
The securely fixed lid with eye-bolt fastenings make filter changes clean, quick and easy for the operator

Port Options

Wide range of port options available including BSPT-M and DN flanges

Filter Performance Indication

Two gauges can be fitted to give readings of pressure differential indicating when filter change is due



Industrial Compatibility

The height-adjustable mounting legs can be bolted to the floor to improve stability

Drain

Efficient drainage system aids housing cleaning

Reduction

The whisky, gin or other spirit is typically reduced in strength before storage or bottling. Purified reverse osmosis (RO) water is commonly used, with some distillers opting for the even purer deionised (DI) water quality.

SRO-SYS Reverse Osmosis System

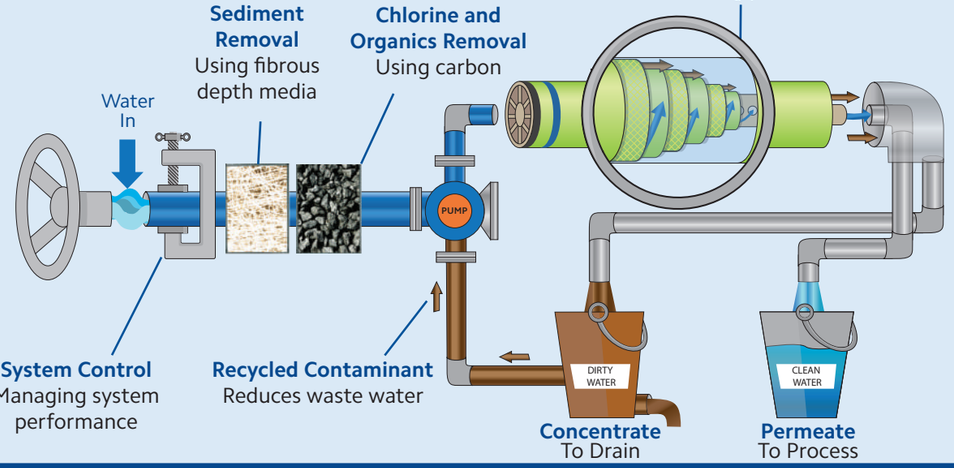
Reliable
All components are built to high quality

Easy to Use and Install
Pre-built RO system with ergonomic design

Economic Solution
Low ongoing running cost

Reverse Osmosis System Theory

RO Membrane
The water is forced through the semi-permeable membrane which rejects the salt molecules leaving pure water on the other side.



Benefits for the Distiller

Chill and Trap Filtering

If the spirit is to be below 46% ABV then it would be chill filtered using filter sheets protected by cartridge filtration to remove fatty esters which cause clouding when water or ice is added. After the sheets and pre-bottling, Trap Filtration is used as the final guard filter to remove any visible particles or remaining fatty esters.

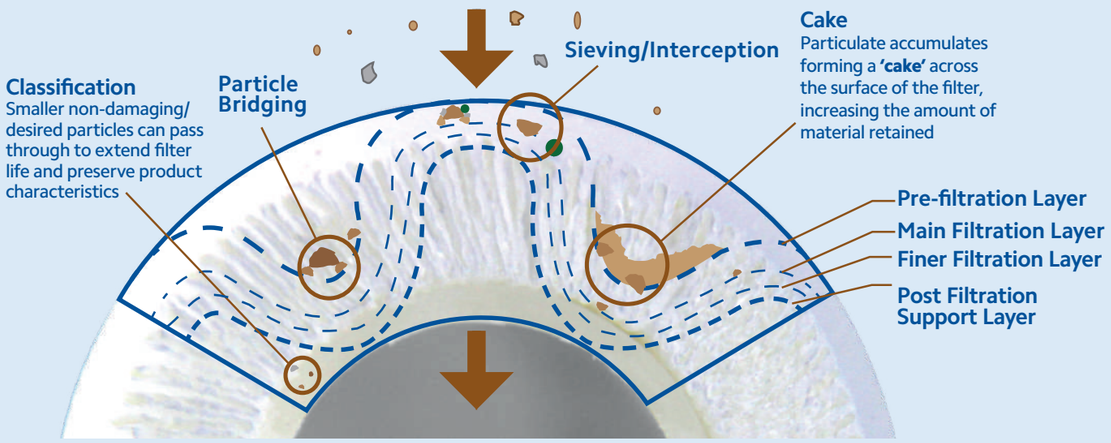
PPP Pleated Polypropylene Cartridge

98% Efficiency
High classification media allows for controllability

4 Layers of Media
High dirt holding capability increases economic value

Particle Classification Options
Wide range of micron ratings and end-caps available

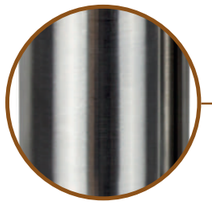
Pleated Filtration Theory



SFHS Inox Stainless Steel Triple Housing Systems

Brackets
Easy to mount to a wall or trolley system

Closure Tool
Simple maintenance and cartridge change



316L Stainless Steel
Durable and easy to clean

Drain
Aids maintenance and product recovery

Secure Fittings
Housing accepts 222 and 226 end-caps for security of seal which prevents bypass

“I am **really impressed** with Fileder, the service they provide and also the **availability of technical assistance**, should it be required.”

Redhill Farm Estate Vineyard
Henry Boorman
Wine Maker

WINERY: The Challenges

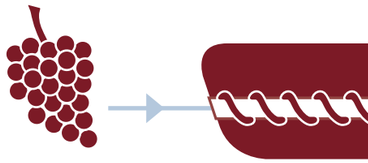
Bio-burden Reduction
Clarity
Stability
Contamination Prevention

Wine Production

The method used to produce white, red or sparkling wine is similar although the winemaker will adapt the process to suit the variety of grape and/or the desired final result. The various processes often include Harvest, Crush & Macerate, Press, Cold Stabilisation, Fermentation, Racking, Aging, Clarification, Stabilisation and Bottling.

Filtration is used mainly during the clarification and stabilisation stages to ensure a good appearance, flavour and quality for a long shelf life for the product. The wine is processed through rough filtration before fermentation and during the clarification stage to improve the visual appearance where large particles and suspended solids are removed reducing turbidity or haze. Bio-burden reduction and then ‘Sterile’ filtration stages are used to remove remaining yeast and other spoilage organisms that can affect the wine in the bottle.

Wine Production Filtration Solutions



Harvest

Crush & Macerate

Press

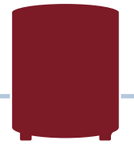
Rough Filtration
Bulk solids removal

PBH Stainless Steel Bag Housing
EB Filter Bag
50-600µm

A

Fermentation

Racking



Aging

Clarification
Particle removal

PFH Stainless Steel Housing
PPP Pleated Cartridge
1-10µm

B

Fileder Recommends

- **A** **Rough Filtration:** Removal of large amounts of solids such as bulk yeast and grape skin, requires economic, high dirt holding technologies and typically SPECTRUM bag filters are used, reducing oxidation risk, cost and downtime.
- **B** **Clarification:** Occasionally, the winemaker needs to remove bulk solids at this stage and a rough filtration stage as above, is added. The removal of visible particles improves aesthetics and protects filtration stages downstream. High efficiency Premier Pleated Polypropylene cartridges are typically used due to their sharp cut-off media and dirt holding capabilities.
- **C** **Bio-burden Reduction:** An essential stage for product clarity, removing suspended solids and some microorganisms to reduce turbidity or haze as well as protection of the final stabilisation membrane cartridge. SPECTRUM PPG glass fibre media pleated cartridges allow for high flow and excellent removal efficiency.
- **D** **Stabilisation:** Known as 'Sterile' filtration, this final polishing stage removes yeast and spoilage organisms to prevent refermentation and extend shelf life. SPECTRUM Bubble Point cartridges are certified for beverage polishing before packaging.
- **E** **Integrity Testing:** Monitoring the cartridge filter media's ability to function within tolerances set, involves using this device to measure a defined pressure decay.

Bio-burden Reduction
Microorganism removal

PSFH Stainless Steel Housing
PPG Pleated Cartridge
0.45-1µm

C

Stabilisation
Yeast & spoilage organisms removal

PSFH Stainless Steel Housing
'Bubble Point' Pleated Cartridge
0.45µm

D

Integrity Testing
Monitors cartridge performance

PES-IT Integrity Tester

E

Bottling

Benefits for the Wine Maker

Stabilisation Filtration

The consistent appearance, flavour and quality of the wine are long-term requirements. In wine-making, wine is stabilised by using filtration to remove harmful microorganisms that can cause unwanted chemical changes and yeast that can cause re-fermentation after bottling.

PPG Premier Pleat Glass Fibre Cartridge

Glass Fibre Media
Gives exceptional flow rate to pressure drop ratio

Absolute Rated
Very high efficiency cartridge

Pre and Post-filtration Layers
Maximise dirt retention capability

'Bubble Point' Validated Cartridge

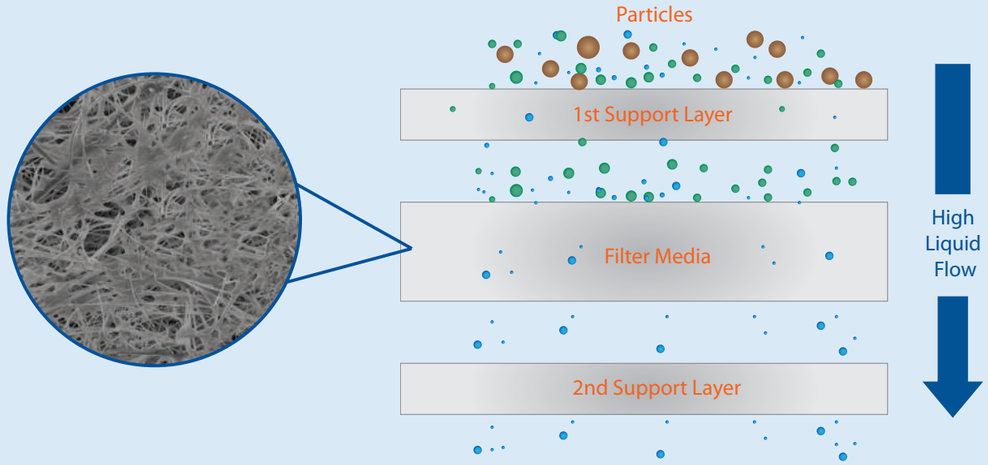
3 Layers of Media
High dirt holding capacity and longer life

Highly Asymmetric Pore Structure Designed for Beverage Applications
Gives longer service life through higher dirt holding capabilities

Certified to log7 Reduction
Guard cartridge filter for reliable quality

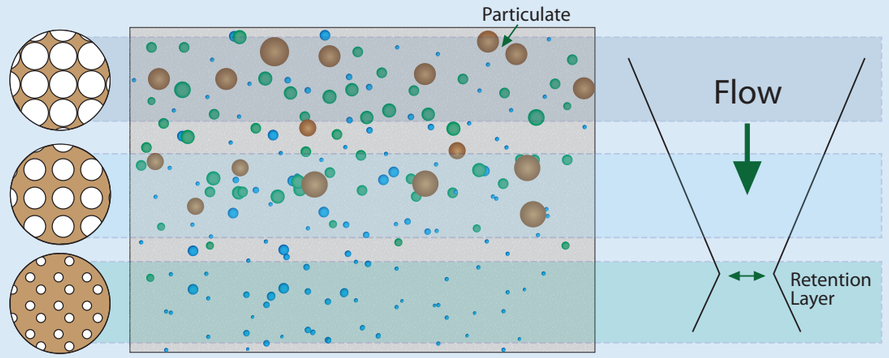
Particulate Retention Efficiency %

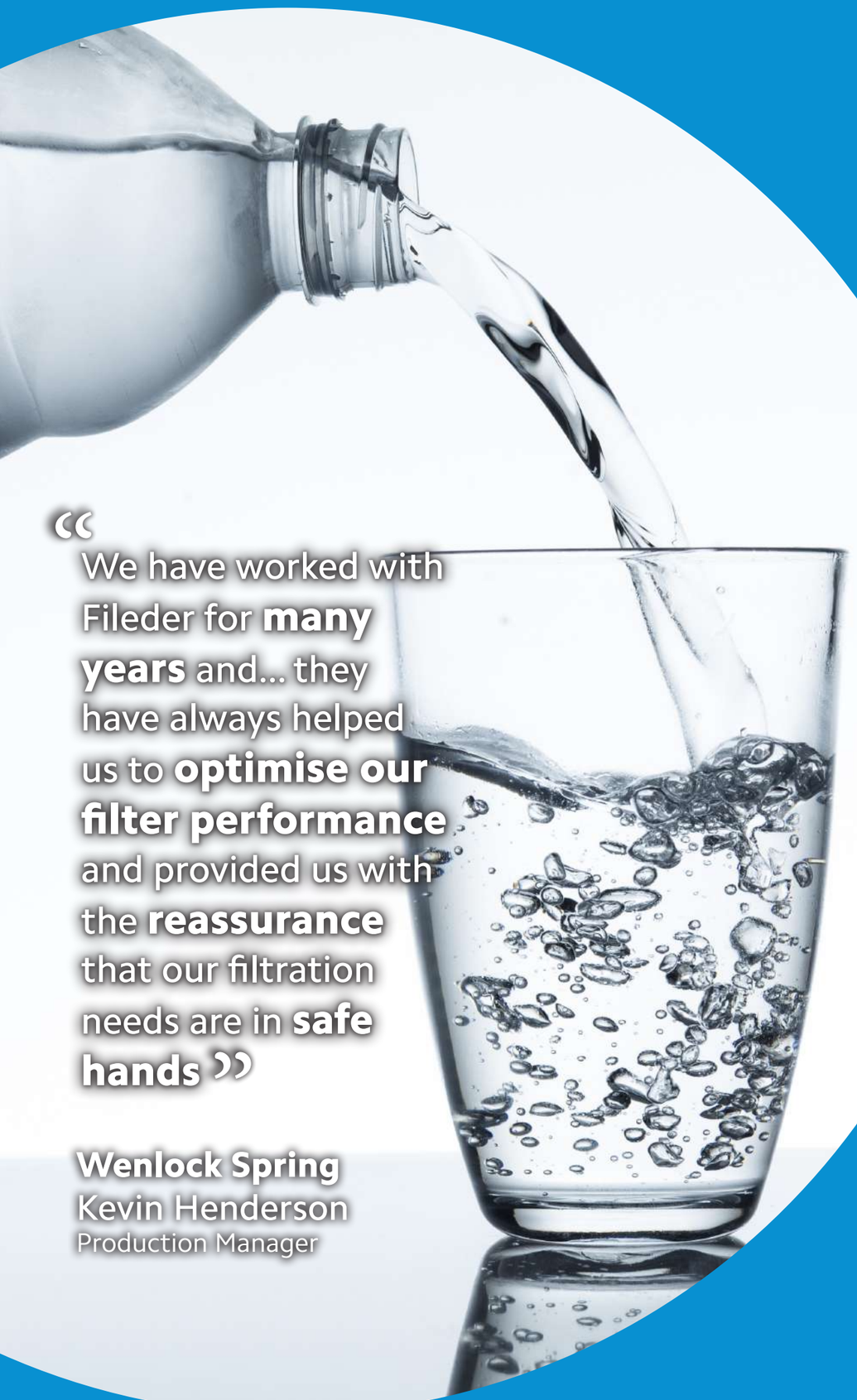
Particle removal efficiencies are determined using AC fine test dust dispersed in water at a constant flow rate.



Highly Asymmetric Pore Structure

Cross section of the Bubble Point membrane surface, highlighting its graded density that enables the Bubble Point to achieve its 99.99999% (log7) bacteria retention rates.





“We have worked with Fileder for **many years** and... they have always helped us to **optimise our filter performance** and provided us with the **reassurance** that our filtration needs are in **safe hands**”

Wenlock Spring
Kevin Henderson
Production Manager

BOTTLED WATER: The Challenges

Particle Removal
Bacteria
Cryptosporidium
Contamination Prevention

Bottled Water Production

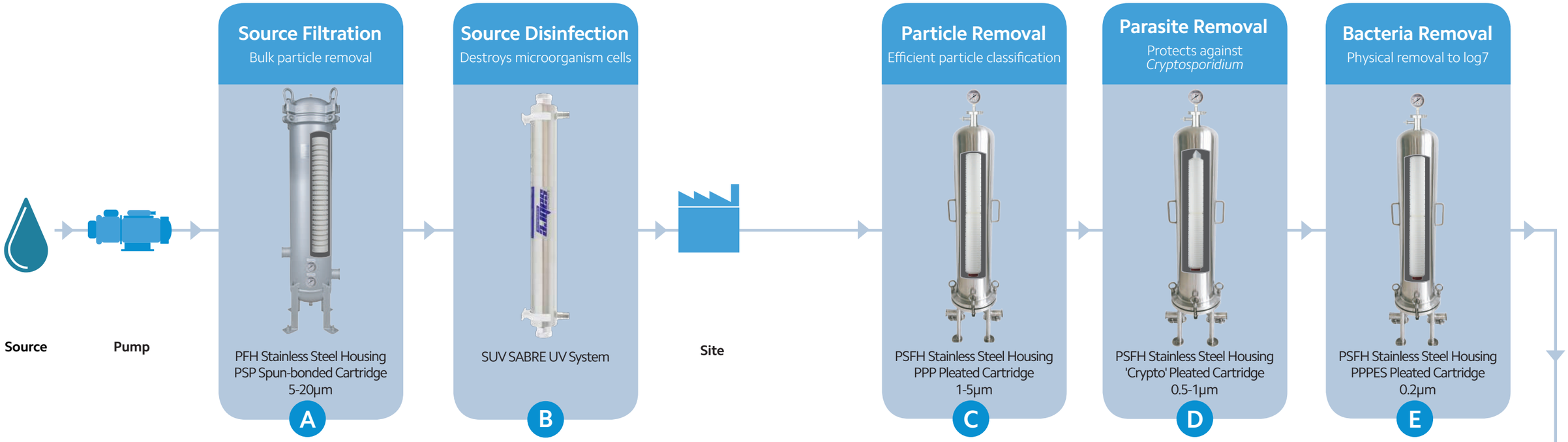
Mineral, spring and table water have regulations governing what can be applied in processing the water before bottling. These regulations have regional variations and need investigation before filtration and water treatment recommendations are applied.

Producers of bottled water protect against microorganisms of bacteria and parasites from their source and site that can cause issues with product quality, safety, appearance and shelf life.

Filtration is used to physically remove these microorganisms without affecting the mineral content of the water. Ultraviolet light disinfection systems that suppress bacteria development are sometimes used to supplement filtration stages.

The challenges of poor appearance, short shelf life and potential sickness from the product caused by bacteria, such as *Pseudomonas aeruginosa* or parasites such as *Cryptosporidium*, are solved using Fileder’s filtration recommendations.

Bottled Water Filtration Solutions



Fileder Recommends

- **A** **Source Filtration :** Removal of larger solids such as sediment and dirt requires economic, high dirt holding technologies. Polypropylene depth media used in SPECTRUM PSP traps a wide range of particles.
- **B** **Source Disinfection:** SABRE UV systems disinfect at source, protecting the water network from bacteria growth.
- **C** **Particle Removal:** Removal of fine particles protects pipework, systems and filtration from clogging. Polypropylene media used in SPECTRUM PPP traps a specific range of particles due to the sharp cut-off characteristics of the media used.
- **D** **Parasite Removal:** *Cryptosporidium* and cyst removal using Crypto cartridges, protect from disease causing parasites.
- **E** **Bacteria Removal:** Membrane cartridges reduce bacteria levels. The SPECTRUM PPPES range is certified to log7 bacteria removal.
- **F** **Tank Venting:** Protecting stored water from contamination requires airborne microorganisms to be removed. SPECTRUM PPPTFE cartridges allow good air flow, remove airborne contaminants and resist moisture.
- **G** **Ultraviolet Disinfection:** SABRE UV disinfection systems deliver high doses of UV at this final stage before bottling.

Benefits for the Water Bottler

Source Filtration

Water sources are often a significant distance from the bottling site so filtration and disinfection systems protect pipework and storage tanks downstream. Depth cartridges are used to remove sediment prior to a UV system to prevent 'shadowing'. The UV system suppresses bacteria growth by sterilising microorganisms that pass the UV light.

SUV SABRE UV System

Durable
Stainless steel construction

Easy to Use
Simple to install, operate and maintain

Alarm and LEDs
Offer audible and visual indicators of operation

Water Storage

Water is pumped into a storage tank to protect it from airborne bacteria (there is more bacteria in air than in water). The tank vent filter is made from a hydrophobic polytetrafluroethylene (PTFE) media, repelling water, preventing sealing and allowing the air to circulate.

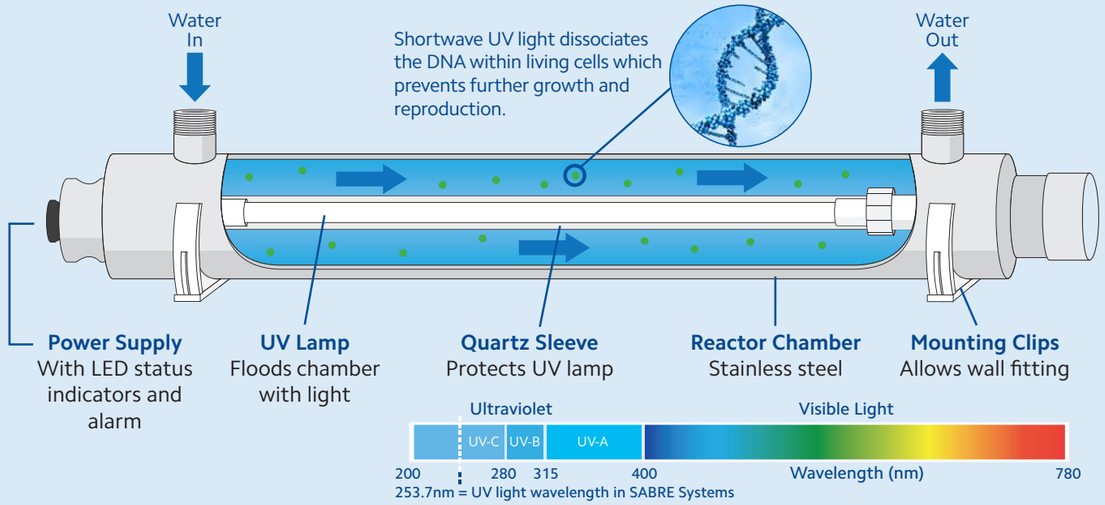
PPPTFE Premier Pleat PTFE Cartridge

Highly Hydrophobic
Media resists absorption of airborne liquids

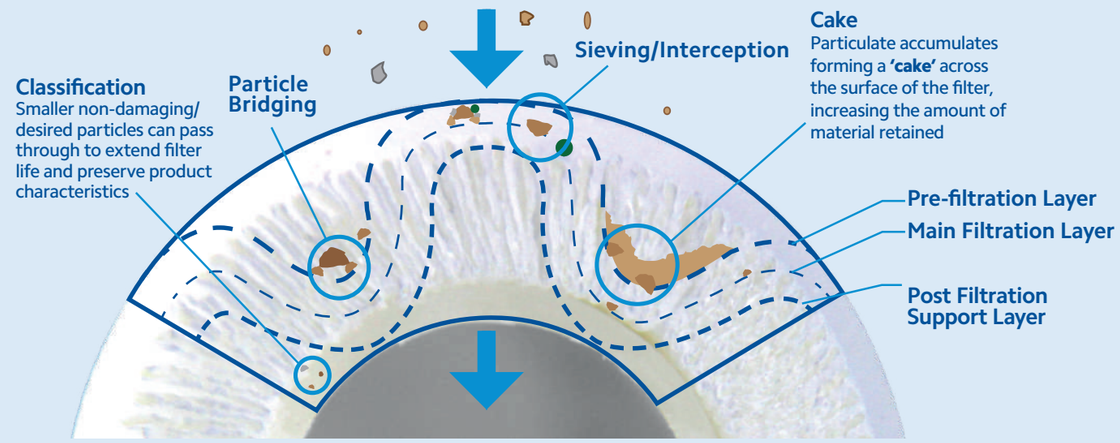
Absolute Rated
High efficiency media for bacteria protection

Certified
Compatible with most integrity testing procedures

UV Disinfection Theory



Pleated Filtration Theory



Benefits for the Water Bottler

Bottling Filtration

Depending on the regional legislation, various treatments can be applied. At the last moment before carbonation and bottling, filtration is used to remove particles, parasites and bacteria that can cause health and aesthetic issues. Common challenges are with the *Cryptosporidium* parasite and *Pseudomonas* and other bacteria.

CP+ Crypto Cartridge

Glass Fibre Media
Gives exceptional flow rate to pressure drop ratio

Absolute Rated
Very high efficiency cartridge

Pre and Post-filtration Layers
Maximise dirt retention capability

'Bubble Point' Validated Cartridge

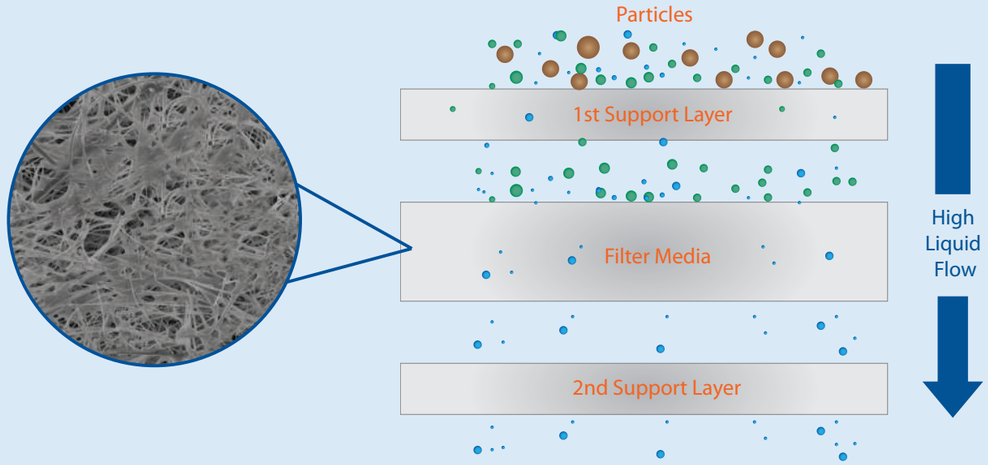
3 Layers of Media
High dirt holding capacity and longer life

Highly Asymmetric Pore Structure Designed for Beverage Applications
Gives longer service life through higher dirt holding capabilities

Certified to log7 Reduction
Guard cartridge filter for reliable quality

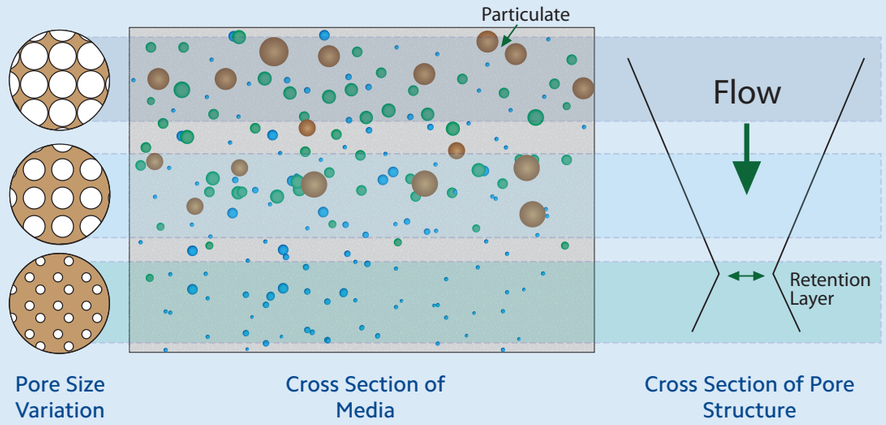
Particulate Retention Efficiency %

Particle removal efficiencies are determined using AC fine test dust dispersed in water at a constant flow rate.



Highly Asymmetric Pore Structure

Cross section of the Bubble Point membrane surface, highlighting its graded density that enables the Bubble Point to achieve its 99.99999% (log7) bacteria retention rates.



“Fileder offers **high quality membranes** backed with **specialist technical expertise**. Membrane performance is particularly important to our application. Fileder is **committed** to helping us achieve the **best possible performance** from our banks of membranes.”

Britvic
Kevin Manning
Team Leader

SOFT DRINKS: The Challenges

Appearance
Shelf life Flavour
Contamination Prevention

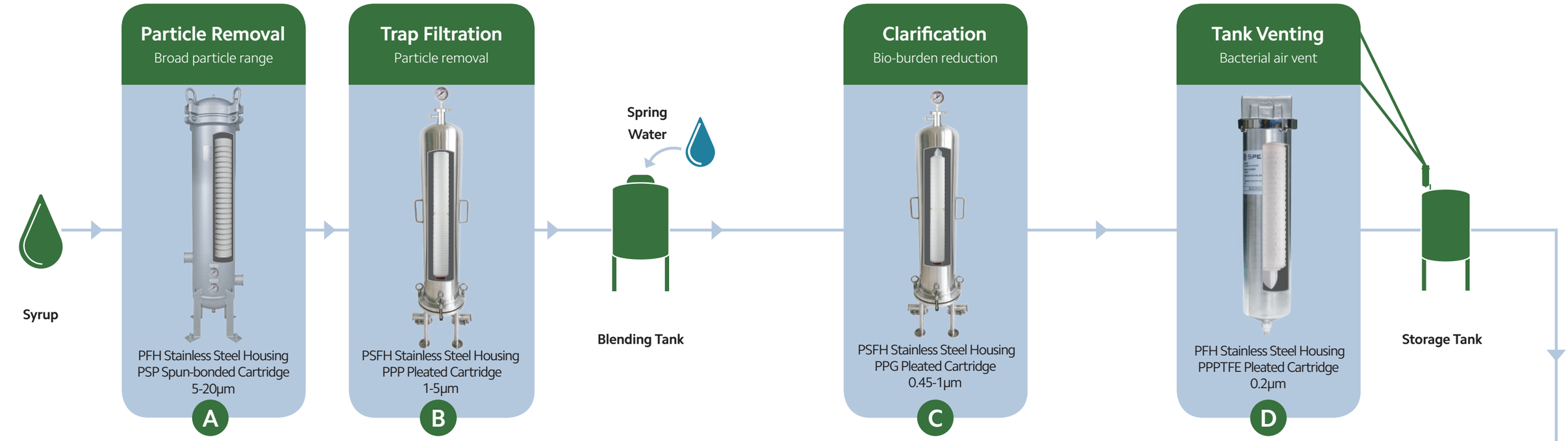
Soft Drinks Production

A wide range of soft drinks are produced, including flavoured waters, carbonated drinks and clear fruit juices. Filtration is used in the manufacture of these drinks to ensure high product quality in appearance, flavour, customer safety and shelf life.

Removal of fibrous organics, gelatinous particles and sediment is typically required for processing fruit juices and syrups before dilution. The majority of soft drinks are also processed through, 'Sterile' filtration to remove parasites and bacteria before packaging. This same level of protection is also applied to airborne contaminants, meaning storage tanks include bacteria protection air vents and gases such as CO_2, used for carbonation, are filtered.

Solutions to the issues of site protection from parasites, unwanted tastes and effects on active ingredients from chemicals in the water, high particle levels in product ingredients, hazing and visual purity of the final product and spoilage organism removal, are all offered with Fileder’s filtration recommendations.

Soft Drinks Filtration Solutions



Fileder Recommends

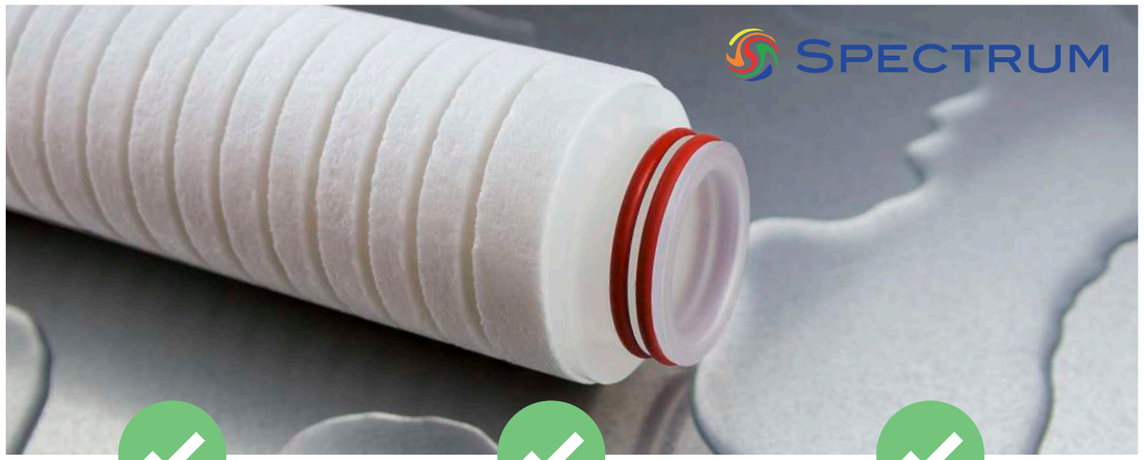
- **A** **Particle Removal :** Removal of bulk visible contaminants such as fruit fibres, sediment and gels protects downstream filtration from premature clogging. Polypropylene depth media used in SPECTRUM PSP catches a wide range of particles.
- **B** **Trap Filtration :** The removal of fine particles improves aesthetics and protects tanks and filtration stages downstream. High efficiency Premier Pleated Polypropylene cartridges are best suited due to their sharp cut-off media and dirt holding capabilities.
- **C** **Clarification:** Bio-burden reduction is required to reduce contamination levels from microorganisms before blending and storage. SPECTRUM PPG glass fibre media pleated cartridges allow for high flow and excellent removal efficiency.
- **D** **Tank Venting:** SPECTRUM PPPTFE cartridges remove airborne microorganisms, allow good flow and resist moisture.
- **E** **Bioburden Reduction:** Bio-burden reduction is essential for product clarity and protection of final membrane cartridge stage. SPECTRUM PPG glass fibre media pleated cartridges allow for high flow and excellent removal efficiency.
- **F** **Stabilisation:** This final polishing stage removes bacteria and spoilage organisms to extend shelf life. SPECTRUM Bubble Point cartridges are certified to log7 reduction of bacteria and ideal for beverage polishing before packaging.

Benefits for the Soft Drinks Maker

Syrups and Juice Filtration

Due to the viscosity of syrups and natural juices (higher than water), combined with the high levels of fibrous and gelatinous particulate, filtration methods such as depth filtration are used with high flow characteristics and dirt-holding capacity.

PSP Spun-bonded Cartridge



Compliance
WRAS approved and FDA compliant for foodstuffs

Grooved Surface
Enhanced dirt holding capacity and longer filter life

End-cap Options
Range of end-caps for better application compatibility

Storage Tank Venting and Gas Filtration

Storage tanks and gases used to carbonate and blanket drinks, can contain unwanted bacteria. Cartridges made with PTFE media are chosen due to their high level of hydrophobic performance, meaning they repel water, which prevents sealing and allows air to flow.

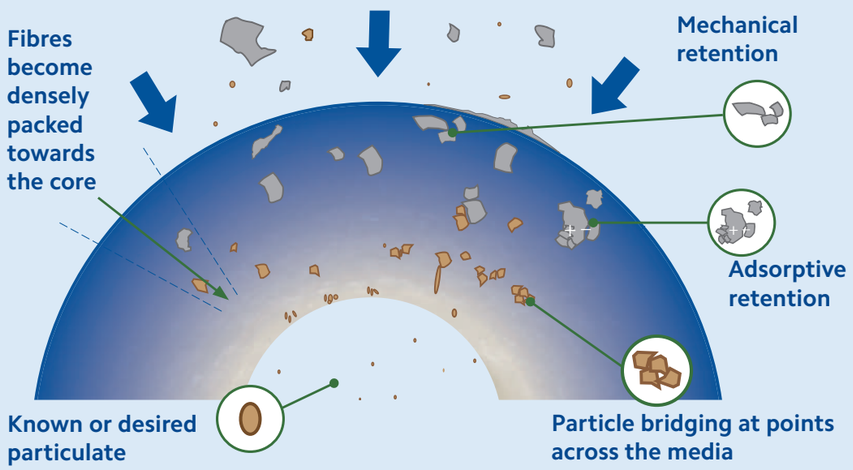
PPPTFE Premier Pleat PTFE Cartridge

Highly Hydrophobic
Media resists absorption of airborne liquids

Absolute Rated
High efficiency media for bacteria protection

Certified
Compatible with most integrity testing procedures

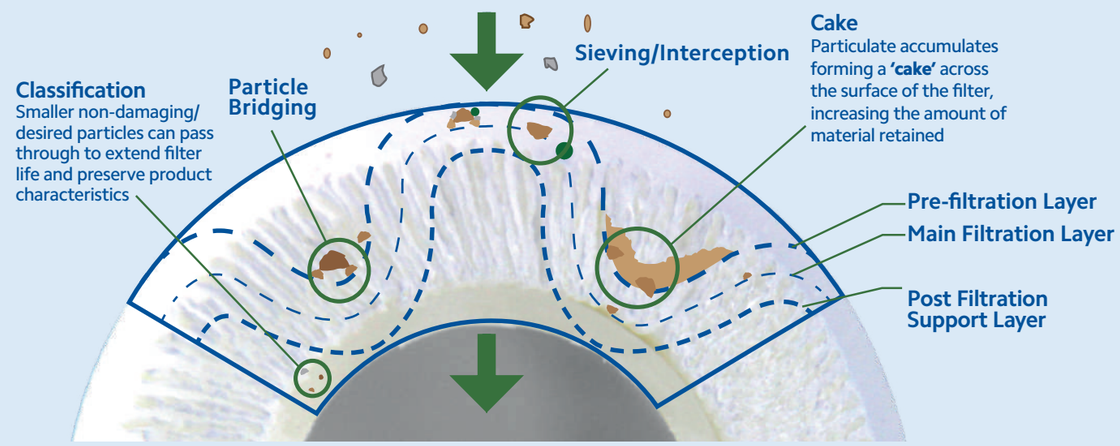
Spun-bonded Depth Filtration Theory



Grooved design:

Promoting:
- Increased dirt-holding
- Earlier removal of larger contaminants
- Longer service life

Pleated Filtration Theory



Benefits for the Soft Drinks Maker

Blending and Bottling

Syrups, product make-up water and other ingredients are mixed together in a blending tank to produce the desired drink. Some guard filtration is used prior to storage to remove visible particles and reduce bacteria. 'Sterile' filtration removes haze, parasites and bacteria before carbonation and bottling, in washed bottles, prior to capping.

CP+ Crypto Cartridge

Glass Fibre Media
Gives exceptional flow rate to pressure drop ratio

Absolute Rated
Very high efficiency cartridge

Pre and Post-filtration Layers
Maximise dirt retention capability

'Bubble Point' Validated Cartridge

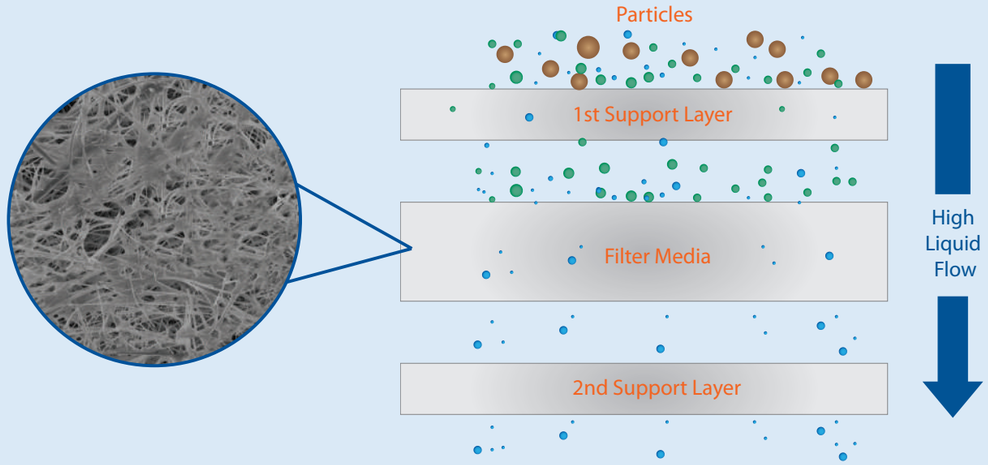
Steam Sterilisation
Stainless steel insert prevents cartridge deformation

Highly Asymmetric Pore Structure Designed for Beverage Applications
Gives longer service life through higher dirt holding capabilities

Certified to log7 Reduction
Guard cartridge filter for reliable quality

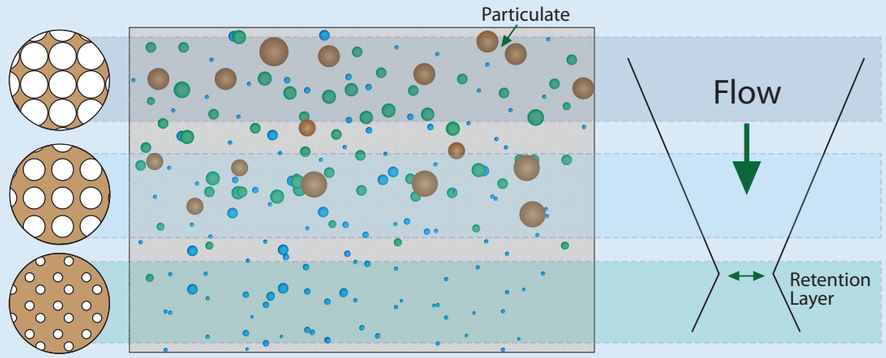
Particulate Retention Efficiency %

Particle removal efficiencies are determined using AC fine test dust dispersed in water at a constant flow rate.



Highly Asymmetric Pore Structure

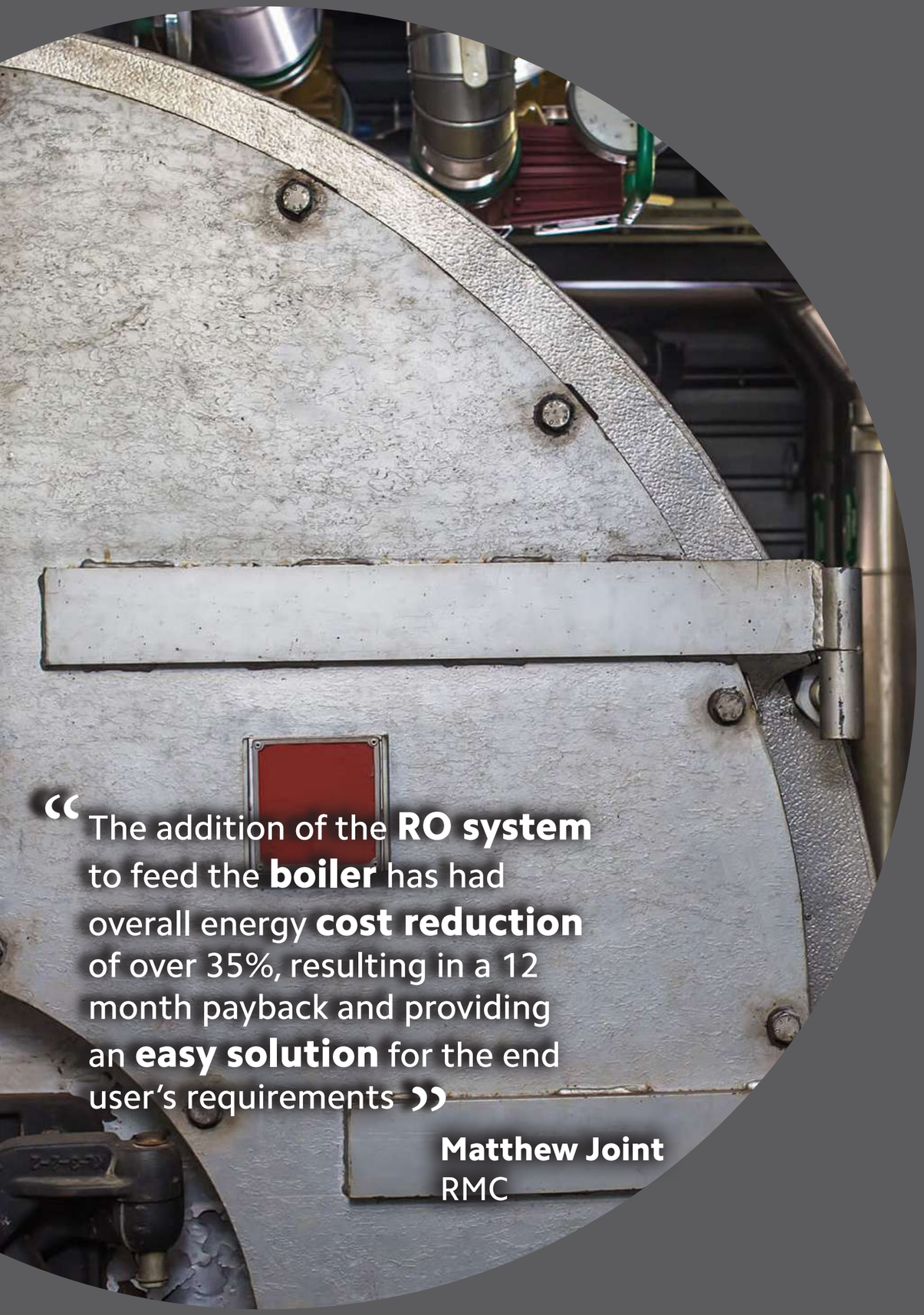
Cross section of the Bubble Point membrane surface, highlighting its graded density that enables the Bubble Point to achieve its 99.99999% (log7) bacteria retention rates.



Pore Size Variation

Cross Section of Media

Cross Section of Pore Structure



“The addition of the **RO system** to feed the **boiler** has had overall energy **cost reduction** of over 35%, resulting in a 12 month payback and providing an **easy solution** for the end user’s requirements”

Matthew Joint
RMC

UTILITIES: The Challenges

Pure Water Production
Parasites
Chemical Tastes
Bacteria

Process Water, Air and Gas

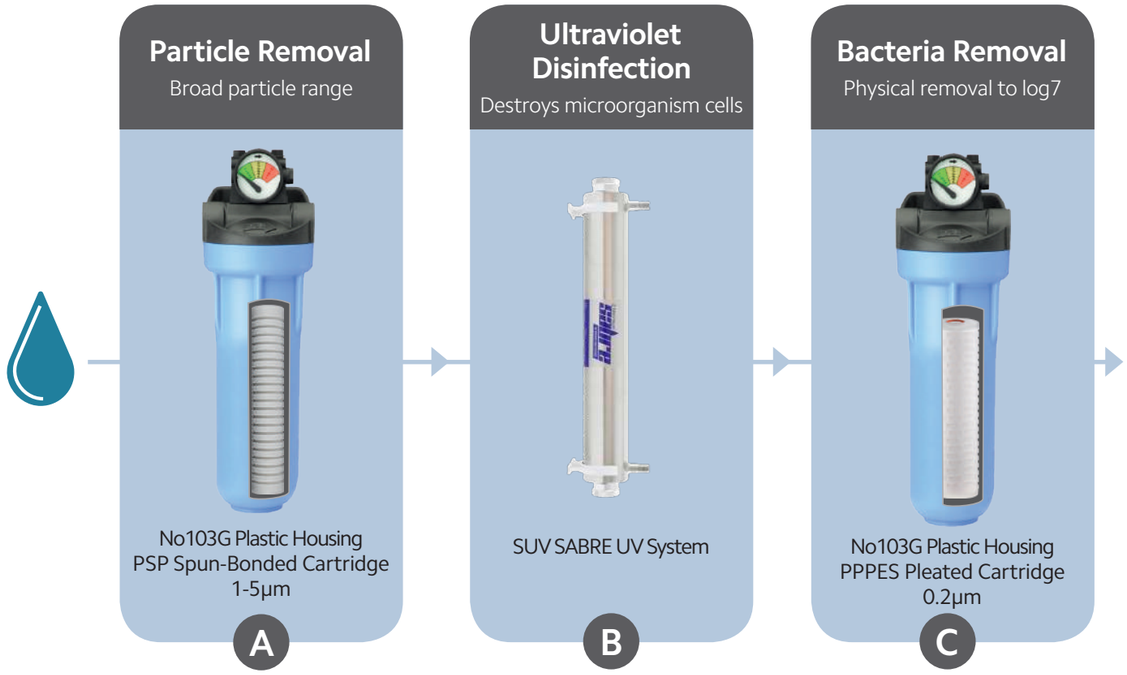
All beverage production facilities require filtration and water treatment to produce water, air and gas with specific properties suited to the various applications supporting the processes. Applications such as wash down water, bottle washing, product make-up water, bacterial air venting of tanks and process gases, often have different requirements for treatment. Quality control of these fluids is paramount to keep the process variations to a minimum, protecting the final packaged beverage from bacterial, parasitic and unwanted particulate contamination.

The production of purified, reverse osmosis or demineralised water for product dilution, laboratory use, boiler feed and forklift truck batteries is also covered in this section. Applying pure water systems from Fileder to the process achieves significant efficiencies that benefit applications across the whole plant.

Applications in this section:

- Bottle washing
- Storage tank venting and gas filtration
- Boiler feed, laboratory, dilution and battery top-up

Bottle Washing Filtration Solutions



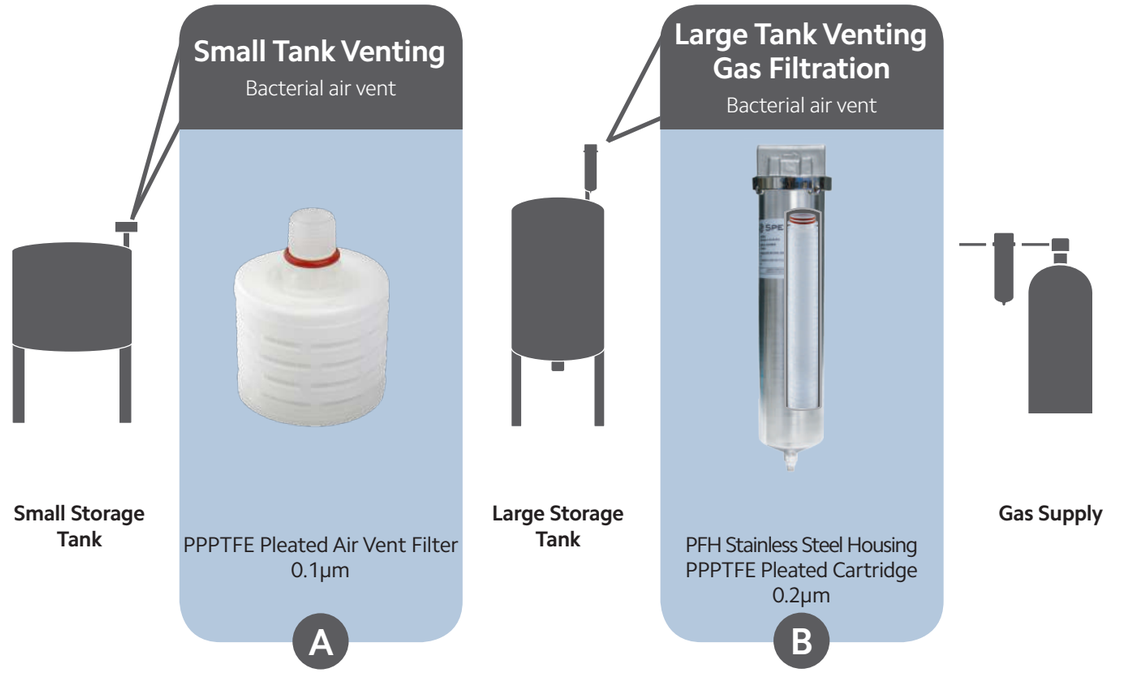
Fileder Recommends

A **Particle Removal:** Removal of particulate that would guard bacteria against the ultraviolet rays, known as 'shadowing'. Additional benefit of protecting cartridge filtration from clogging. Polypropylene depth media used in SPECTRUM PSP traps a wide range of particles.

B **Ultraviolet Disinfection:** UV light impedes bacterial growth by sterilising the DNA of microorganisms. SPECTRUM SABRE UV disinfection systems deliver high dosages to microorganisms to prevent replication.

C **Bacteria Removal:** Membrane cartridges are used to reduce bacteria levels. The SPECTRUM PPPES range is certified to log7 reduction of bacteria.

Tank Venting & Process Gas Filtration Solutions



Fileder Recommends

A **Small Tank Venting:** Physical removal of airborne contaminants targeted at bacteria removal with PTFE media. This media also allows for tank venting up to 30m³/hr.

B **Large Tank Venting & Gas Filtration:** Venting of larger tanks requires more surface area and 10,20 and 30" PTFE cartridges are used to allow flow and remove airborne contaminants including bacteria. This PTFE media is also used to protect against ingress of contaminants from gas supplies such as CO_2.

Benefits for the Utilities Engineer

Bottle Washing

For applications in the spirits industry, bottles are typically rinsed with the spirit to reduce microbial, and other contamination. For other beverage producers, bacteria-free water is used. Polyethersulfone membrane media removes bacteria from water at absolute micron ratings of 0.2µm and below.

PPPES Premier Pleat Polyethersulfone cartridge

3 Layers of Media
High dirt holding capacity and longer life

Hygiene and Traceability
100% integrity tested and manufactured in a clean room environment

Certified to log7 Reduction
Guard cartridge filter for reliable quality

Storage Tank Venting and Gas Filtration

Storage tanks and gases used to carbonate and blanket drinks can contain unwanted bacteria. Cartridges made with PTFE media are chosen due to their high level of hydrophobic performance, meaning they repel water, which prevents sealing and allows air to flow.

PPPTFE Premier Pleat PTFE Cartridge

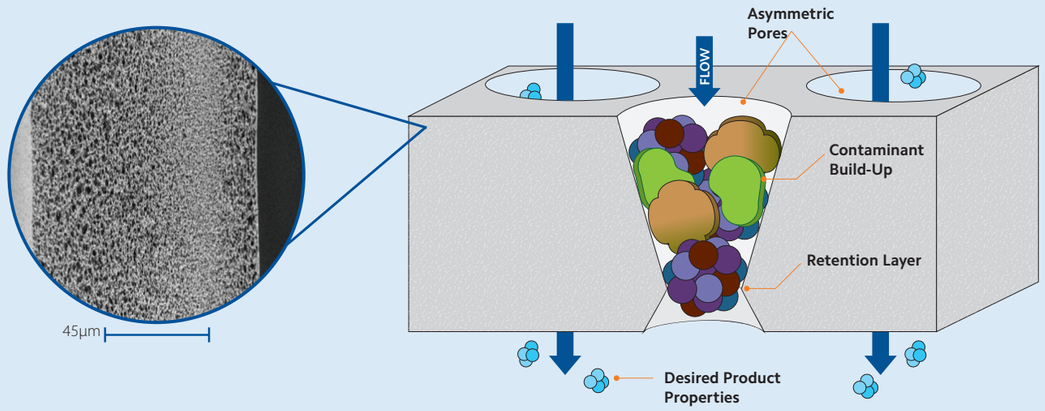
Highly Hydrophobic
Media resists absorption of airborne liquids

Absolute Rated
High efficiency media for bacteria protection

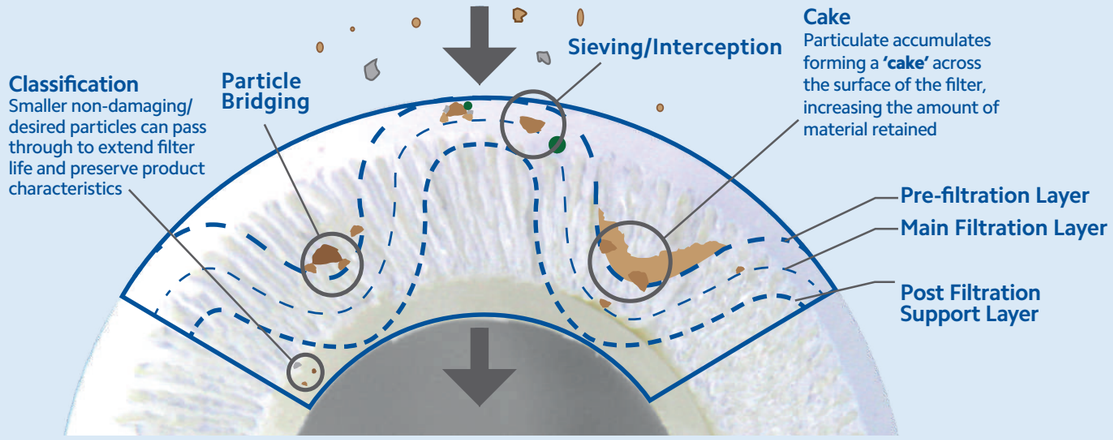
Certified
Compatible with most integrity testing procedures

Polyethersulfone Membrane Structure

Cross section of the PPPES membrane surface, highlighting its graded density that ensures the PPPES achieves its 99.99999% (log7) bacteria retention rates.



Pleated Filtration Theory



Quality Assurance Certification

SPECTRUM 'Bubble Point' Example

SPECTRUM®

Quality Assurance Certificate

The SPECTRUM Bubble Point range of 100% integrity tested cartridges have been manufactured in a purpose built, clean room environment, under strict quality ISO 9001 quality control procedures.

Product Information	
Brand	SPECTRUM
Range Name	Bubble Point
Lot Code	190217108
Micron Rating	0.45 µm
Materials	
Media	Polyethersulfone
Cage/Core/Support Layers	Polypropylene
End-Cap	Polypropylene Encapsulated Stainless Steel
O-ring	Silicone
Bacteria Retention	
Test bacteria	*Serratia marcescens*
Retention of bacteria	Log 7 (99.99999%) reduction value
Thermal & Hydraulic Stress	
Maximum forward differential pressure	5 bar @ 25°C
Maximum operating temperature	2 bar @ 80°C

Lot Release Criteria

Length (")	Bubble Point	Diffusional Flow Rate	Flow Rate/Pressure Drop
10	≥2.1 bar	≤25 ml/min @ 1.7 bar	≥12.1 LPM @ 0.04 bar 25°C
20	≥2.1 bar	≤50 ml/min @ 1.7 bar	≥19.3 LPM @ 0.04 bar 25°C
30	≥2.1 bar	≤75 ml/min @ 1.7 bar	≥30.2 LPM @ 0.04 bar 25°C
40	≥2.1 bar	≤100 ml/min @ 1.7 bar	≥39.3 LPM @ 0.04 bar 25°C

Quality Assurance Audit Criteria

Non-Fibre Releasing - The fibre meets with the criteria 21 CFR 210.2 (b)6 of 'no-fibre releasing'

Indirect Food Additive - The membrane used in the filter meets the FDA Indirect Food Additive requirement cited in 21 CFR 177.2910

(All other component materials also meet the FDA Indirect Food Additive requirements cited in 21 CFR 177-182)

J. Holloway

Jack Holloway
Technical Manager

Bubble Point Literature

SPECTRUM 'Crypto' Example

SPECTRUM®

Quality Assurance Certificate

The SPECTRUM Specialist Crypto Pleated (Glass Fibre) validated cartridges have been manufactured in a purpose built, clean room environment, under strict quality ISO 9001 quality control procedures.

Product Information	
Brand	SPECTRUM
Range Name	Specialist Crypto
Lot Code	190217108
Materials	
Media	Borosilicate Glass Fibre
Cage / Core / Support Layers	Polypropylene
End-Cap	Polypropylene
O-ring	Silicone
Thermal & Hydraulic Stress	
Maximum forward differential pressure	4 bar @ 25°C
Maximum operating pressure	2 bar @ 80°C

CP *Cryptosporidium* Retention

Challenge Analysis - 3.0 µm Fluorescent Latex Microspheres as *Cryptosporidium* parvum Oocyst Surrogate				
Water Sample	Units/ml			Average removal
	Filter Influent	Filter Effluent A – BCS 1306062	Filter Effluent B – BCS 1306065	
Initial filter performance (following 163 litres GTW)	2.1×10^3	None detected <0.001	None detected <0.001	>99.99996%
Following 3 Cycles (following 486 litres GTW)		None detected <0.001	None detected <0.001	>99.99996%
Following 8 Cycles (following 1513 litres GTW)		None detected <0.001	None detected <0.001	>99.99996%

Test Standard - NSF 53-2011 section 7. Mechanical Filtration using General Test Water (GTW) Challenge (< 1.0 NTU water)

CP+ *Cryptosporidium* Retention

Challenge Analysis – 1.0 µm Fluorescent Latex Microspheres as *Cryptosporidium* parvum Oocyst Surrogate				
Water Sample	Units/ml			Average removal
	Filter Influent	Filter Effluent A – BCS 1306062	Filter Effluent B – BCS 1306065	
Initial filter performance (following 163 litres GTW)	4.8×10^4	0.221	0.243	99.9995%
Following 3 Cycles (following 486 litres GTW)		0.258	0.234	99.9995%
Following 8 Cycles (following 1513 litres GTW)		0.357	0.352	99.9993%

Test Standard - NSF 53-2011 section 7. Mechanical Filtration using General Test Water (GTW) Challenge (< 1.0 NTU water)

Quality Assurance Audit Criteria

Non-Fibre Releasing - The fibre meets with the criteria 21 CFR 210.2 (b)6 of 'no-fibre releasing'

Indirect Food Additive - The membrane used in the filter meets the FDA Indirect Food Additive requirement cited in 21 CFR 177.2910

(All other component materials also meet the FDA Indirect Food Additive requirements cited in 21 CFR 177-182)

J. Holloway

Jack Holloway
Technical Manager

CP+ & CP Literature

Client Feedback

John Taylor said, "The previous attitude towards our product water was, 'well that's just the way it is so let's just get on with it'. The basis of 90% of our end product had become an afterthought."

Dean McFarlane said, "We have a strong relationship with Fileder who provide a fast and cost-effective service. The filters provided are long lasting and ensure our beers meet our high standards for quality and long shelf life."

Graham Spence said, "I am really pleased with the quality of the housings and the bags which do their job well and are long lasting. The plate heat exchanger no longer blocks and clean downs of the mash tun are much easier and quicker. Filtering the whisky before the tankers means the tankers do not get clogged up with char. Fileder provide excellent customer service and a speedy delivery when placing orders."

Henry Boreman said, "I am really impressed with Fileder, the service they provide and also the availability of technical assistance, should it be required."

Kevin Manning said, "Fileder offers high quality membranes backed with specialist technical expertise. Membrane performance is particularly important to our application. Fileder is committed to helping us achieve the best possible performance from our banks of membranes."

Kevin Henderson said,"We have worked with Fileder for many years and... they have always helped us to optimise our filter performance and provided us with the reassurance that our filtration needs are in safe hands"

Matthew Joint said, "The addition of the RO system to feed the boiler has had overall energy cost reduction of over 35%, resulting in a 12 month payback and providing an easy solution for the end user's requirements."

System Selection Guide

Incoming Water

Water Treatment

Flow Rate		Particle Removal		Organics & Taste Treatment		Ultraviolet Disinfection
lpm	m³/h	Filter Housing	5µm Depth Cartridge	Filter Housing	Carbon Cartridge	UV system
5	0.3	No103G	PSP-5-97/8	No103G	CFB-Plus-10	SUV-S-4-1/4
10	0.6	No103G	PSP-5-97/8	No203G	CFB-Plus-20	SUV-S-8-1/2
15	0.9	No203G	PSP-5-20	BB20	CFB-Plus-20BB	SUV-S-30-3/4
20	1.2	PFH-SPC-5-10-2-GP-MT	5 x PSP-5-97/8	PFH-SPC-3-30-2-GP-MT	3 x CFB-Plus-30	SUV-S-30-3/4
50	3.0	PFH-SPC-5-10-2-GP-MT	5 x PSP-5-30	PFH-SPC-5-30-2-GP-MT	5 x CFB-Plus-30	SUV-S-57-1
100	6.0	PFH-SPC-5-20-2-GP-MT	5 x PSP-5-20	PFH-SPC-12-30-3-GP-MT	12 x CFB-Plus-30	SUV-S-132-2
150	9.0	PFH-SPC-5-30-2-GP-MT	5 x PSP-5-30	PFH-SPC-12-30-3-GP-MT	12 x CFB-Plus-30	SUV-S-132-2
200	12.0	PFH-SPC-5-40-2-GP-MT	5 x PSP-5-40	PFH-SPC-22-30-4-GP-MT	22 x CFB-Plus-30	SUV-S-250-2
280	16.8	PFH-SPC-7-30-2-GP-MT	7 x PSP-5-30	PFH-SPC-22-30-4-GP-MT	22 x CFB-Plus-30	SUV-S-250-2
360	21.6	PFH-SPC-7-40-2-GP-MT	7 x PSP-5-40	PFH-SPC-36-30-6-GP-MT	36 x CFB-Plus-30	2 x SUV-S-132-2
480	28.8	PFH-SPC-12-30-3-GP-MT	12 x PSP-5-30	2 x PFH-SPC-22-30-4-GP-MT	44 x CFB-Plus-30	2 x SUV-S-250-2
660	39.6	PFH-SPC-12-40-2-GP-MT	12 x PSP-5-40	2 x PFH-SPC-22-30-4-GP-MT	44 x CFB-Plus-30	2 x SUV-S-250-2

Incoming Water

RO Water Production

Flow Rate Lpm	m3/hr	RO System
1	0.06	LP-500
2	0.1	SRO-SYS-2.6
5	0.3	SRO-SYS-5.2
10	0.6	SRO-SYS-10
15	0.9	SRO-SYS-16
20	1.2	SRO-SYS-21
50	3.0	R1-12140

Process Filtration

Flow Rate		Rough Filtration		Trap Filtration	
lpm	m³/h	Bag Housing	50µm Felt Bag Filter	Sanitary Filter Housing	10µm Polypropylene Cartridge
5	0.30	PBH-410-1	BP-410-50	PSFH-SEP-1-10-1-GP-MT	PPP-10-97/8EHS
10	0.6	PBH-420-1	BP-420-50	PSFH-SEP-1-10-1-GP-MT	PPP-10-97/8EHS
20	1.2	SBH-SPC-1-3-1.5-GP-ML	EBEP-50-3	PSFH-SEP-1-20-1-GP-MT	PPP-10-20EHS
50	3.0	SBH-SPC-1-3-1.5-GP-ML	EBEP-50-3	PSFH-SEP-1-40-2-GP-MT	1 x PPP-10-40EHS
100	6.0	SBH-SPC-1-4-1.5-GP-ML	EBEP-50-4	PSFH-SEP-3-30-2-GP-MT	3 x PPP-10-30EHS
150	9.0	SBH-SPC-1-1-2-GP-ML	EBEP-50-1	PSFH-SEP-5-30-2-GP-MT	5 x PPP-10-30EHS
200	12.0	SBH-SPC-1-1-2-GP-ML	EBEP-50-1	PSFH-SEP-5-30-2-GP-MT	5 x PPP-10-30EHS
280	16.8	SBH-SPC-1-2-2-GP-ML	EBEP-50-2	PSFH-SEP-7-30-2-GP-MT	7 x PPP-10-30EHS
360	21.6	SBH-SPC-1-2-2-GP-ML	EBEP-50-2	PSFH-SEP-10-30-2-GP-MT	10 x PPP-10-30EHS
480	28.8	SBH-SPC-1-2-2-GP-ML	EBEP-50-2	PSFH-SEP-12-30-3-GP-MT	12 x PPP-10-30EHS
660	39.6	PBH-SPC-2-2-3-GP-ML	2 x EBEP-50-2	PSFH-SEP-12-40-3-GP-MT	12 x PPP-10-40EHS

Flow Rate		Clarification		Stabilisation	
lpm	m³/h	Sanitary Filter Housing	1µm Glass Fibre Cartridge	Sanitary Filter Housing	0.45µm PES Membrane Cartridge
5	0.30	PSFH-SEP-1-10-1-GP-MT	CP10FHS	PSFH-SEP-1-10-1-GP-MT	SM10FHS
10	0.6	PSFH-SEP-1-10-1-GP-MT	CP10FHS	PSFH-SEP-1-10-1-GP-MT	SM10FHS
20	1.2	PSFH-SEP-1-20-1-GP-MT	CP20FHS	PSFH-SEP-1-20-1-GP-MT	SM20FHS
50	3.0	PSFH-SEP-1-40-2-GP-MT	1 x CP40FHS	PSFH-SEP-1-40-2-GP-MT	1 x SM40FHS
100	6.0	PSFH-SEP-3-30-2-GP-MT	3 x CP30FHS	PSFH-SEP-3-30-2-GP-MT	3 x SM30FHS
150	9.0	PSFH-SEP-5-30-2-GP-MT	5 x CP30FHS	PSFH-SEP-5-30-2-GP-MT	5 x SM30FHS
200	12.0	PSFH-SEP-5-30-2-GP-MT	5 x CP30FHS	PSFH-SEP-5-30-2-GP-MT	5 x SM30FHS
280	16.8	PSFH-SEP-7-30-2-GP-MT	7 x CP30FHS	PSFH-SEP-7-30-2-GP-MT	7 x SM30FHS
360	21.6	PSFH-SEP-10-30-2-GP-MT	10 x CP30FHS	PSFH-SEP-10-30-2-GP-MT	10 x SM30FHS
480	28.8	PSFH-SEP-12-30-3-GP-MT	12 x CP30FHS	PSFH-SEP-12-30-3-GP-MT	12 x SM30FHS
660	39.6	PSFH-SEP-12-40-3-GP-MT	12 x CP40FHS	PSFH-SEP-12-40-3-GP-MT	12 x SM40FHS

Related Products

Surface Filtration

Premier Pleat Polypropylene PPP

Premier Pleat Glass Fibre PPG

Bubble Point SM

Integrity Tester PES-IT

Pleat² SPE

Crypto+ Pleated CP+

Premier Pleat Polyethersulfone PPPES

Premier Pleat PTFE Vent Filter PPPTFE

Depth Filtration

Standard Spun Polypropylene SSP

Premier Spun Polypropylene PSP

Bag Filtration

Economic Bag Filter EB

Standard Bag Filter SB

Premier Bag Filter PB

Housings

Single | Multi

Sanitary Stainless Steel Cartridge Housings PSFH

Premier Filter Housing PFH

Filter Housing System SFHS

Premier Bag Housing PBH

Carbon

Fibredyne Carbon Block CFB-Plus

Standard Carbon Block SCB

Water Conditioning

Water Softener System WTP

Softening Resin SRSO

DI Resin SRDI

UV Disinfection

UV Disinfection System 8lpm SUV

UV Disinfection System 250lpm SUV

Reverse Osmosis

RO System 2.5-20lpm SRO-SYS

RO System 1-2lpm LP-Series

RO System 2lpm PRF-750-System

Pure Water Storage Tank Air Vent Filter PPPTFE

Housings

Big Blue Plastic Housing BB20BL

Pressure Vessel SV-FK

Certification

We only supply products from reputable, traceable and tested brands. Fileder's portfolio offers peace of mind, providing solutions that meet the stringent requirements of varying industry and legal standards. Please refer to product information found on our website, or contact us directly, for clarification of individual product certification.

WRAS APPROVED PRODUCT · dwi · Water Quality Association · CE · NSF · PED 2014/68/EU

Product Brochures

- Reverse Osmosis Components
- Stainless Steel Filter Housings
- Plastic Filter Housings
- Water Treatment, Carbon & Media Cartridges
- Depth Filtration
- Reverse Osmosis Systems
- Pressure Vessels & Media
- High Flow Filtration
- Water Softeners
- Stainless Steel Cartridges
- UV Systems
- Bag Filtration
- Large Diameter Filtration
- Filtration & Water Treatment Rental
- Installation & Servicing

Application Brochures

- Solutions for Cosmetics and Toiletries
- Solutions for Hospitals
- Solutions for Food & Dairy Production
- Solutions for Surface Finishing
- Solutions for Microelectronics
- Solutions for Buildings & Facilities Management

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