Process Filtration & Water Treatment

Solutions for Bacteria & Parasites

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EXPERTS IN FILTRATION

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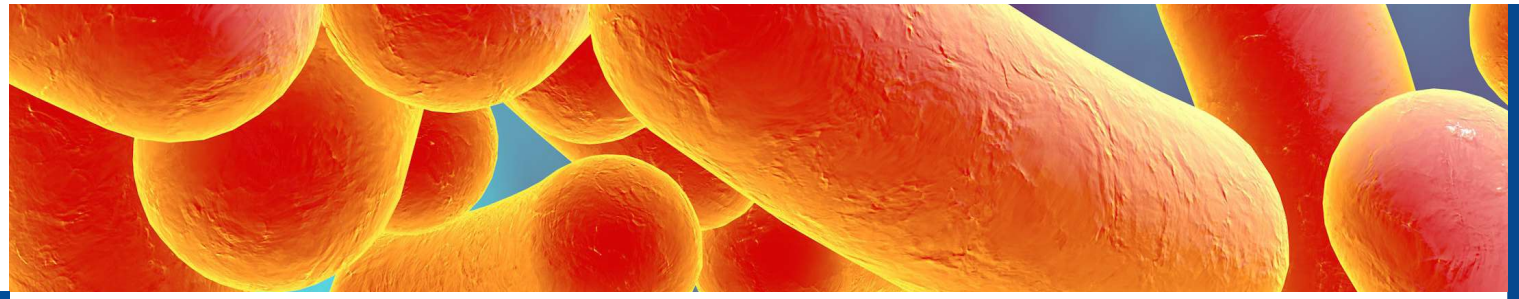


Fileder supply the industries of healthcare, engineering and food and beverage with certified high quality filtration and water treatment products.

Fileder believes in building relationships by exceeding expectation. This is achieved by providing excellent advice, outstanding customer service and high quality products.

Fileder has formulated appropriate strategies for clients for over 40 years, tackling the problems of pathogens, such as bacteria and protozoan parasites, in the following markets:

- **Food and Beverage**
- **Industrial Engineering**
- **Cooling Towers**
- **Care Homes and Hotels**
- **Schools and Universities**
- **Facilities Management**
- **Residential Private Supply**
- **Hospitals and Healthcare**
- **Pharmaceutical and Medical**

WRAS™ dwi Water Quality Association

Protect against microorganisms in water

Water contains harmful microorganisms including bacteria such as *Legionella*, *Pseudomonas*, *E. coli* and *Salmonella*; parasites such as *Cryptosporidium* and *Giardia*; and contaminants including mould spores, algae, amoebae and more.

When people are exposed to these contaminants, there is an increased risk of life threatening sicknesses, diseases, severe health problems.

Legionella

Type
Bacteria

Disease
Legionnaires' disease, Legionellosis

Size
0.3-0.9µm width; 1-3µm length

Giardia

Type
Parasite

Disease
Giardiasis

Size
8-14µm as cyst

Pseudomonas

Type
Bacteria

Disease
Urinary tract infections, soft tissue infections

Size
0.5-0.8µm width, 1.5-3µm length

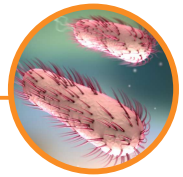
What's in your water?

Cryptosporidium

Type
Parasite

Disease
Cryptosporidiosis

Size
3-6µm in egg stage Oocysts



E.coli

Type
Bacteria

Disease
Gastroenteritis, Neonatal Meningitis

Size
0.25-1µm width, 2µm length

Salmonella

Type
Bacteria

Disease
Salmonellosis

Size
0.7-1.5µm width, 2-5µm length

Amoebae

Type
Parasite

Disease
Amoebiasis, Naegleriasis, Amoebic liver abscesses, Amoebic Keratitis

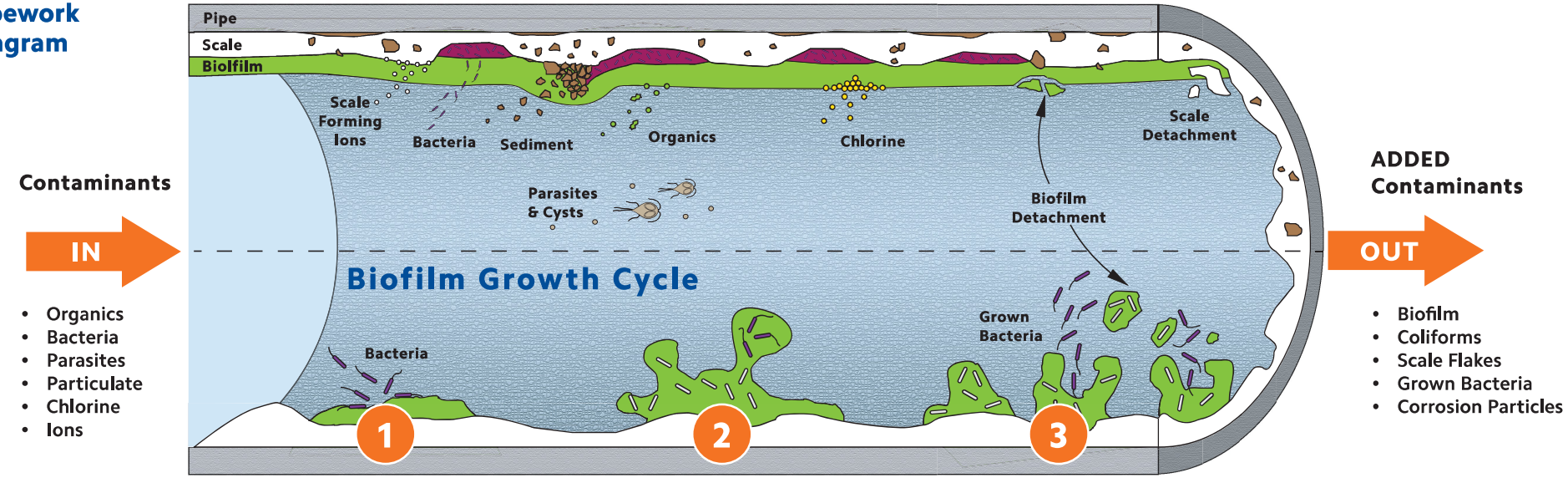
Size
10-800µm

Bacteria Growth in Water Systems

Sediment, scale, organics and other material present in water systems play an important role in providing favourable conditions for bacteria to thrive and must be controlled.

Biofilm build-up on pipework and systems increases the likelihood of infection by protecting bacteria from temperatures and biocides that are designed to kill or inhibit organisms freely suspended in the water. Bacteria can live and propagate behind the biofilm. When the biofilm becomes detached, a huge amount of bacteria is released into the water stream.

Pipework Diagram



- Organics
- Bacteria
- Parasites
- Particulate
- Chlorine
- Ions

- Biofilm
- Coliforms
- Scale Flakes
- Grown Bacteria
- Corrosion Particles

Contaminants Explained

Sediment

- Sticks to pipe and scale - increasing area for bacteria growth
- Creates walled barriers to protect bacteria

Scale

- Formed from calcium & magnesium ions
- Creates pockets for bacteria to thrive

Parasites

- Suspended in water
- Can bind to biofilm
- Can be protected from chemical/ heat treatment by biofilm

Organics

- Provide nutrients for bacteria
- Aid biofilm formation

Bacteria

- Reproduces to form colonies
- Protected from chemicals/heat by biofilm and own secretions

Chlorine

- Chlorine attacks the outer layers of biofilm

Biofilm Growth Cycle

Biofilm is a robust coating formed in layers from groups of microorganisms adhering to a surface. Microorganism excretions are often referred to as 'slime'.

1 Attachment
Bacteria enters the water system and sticks to nutritional biofilm.

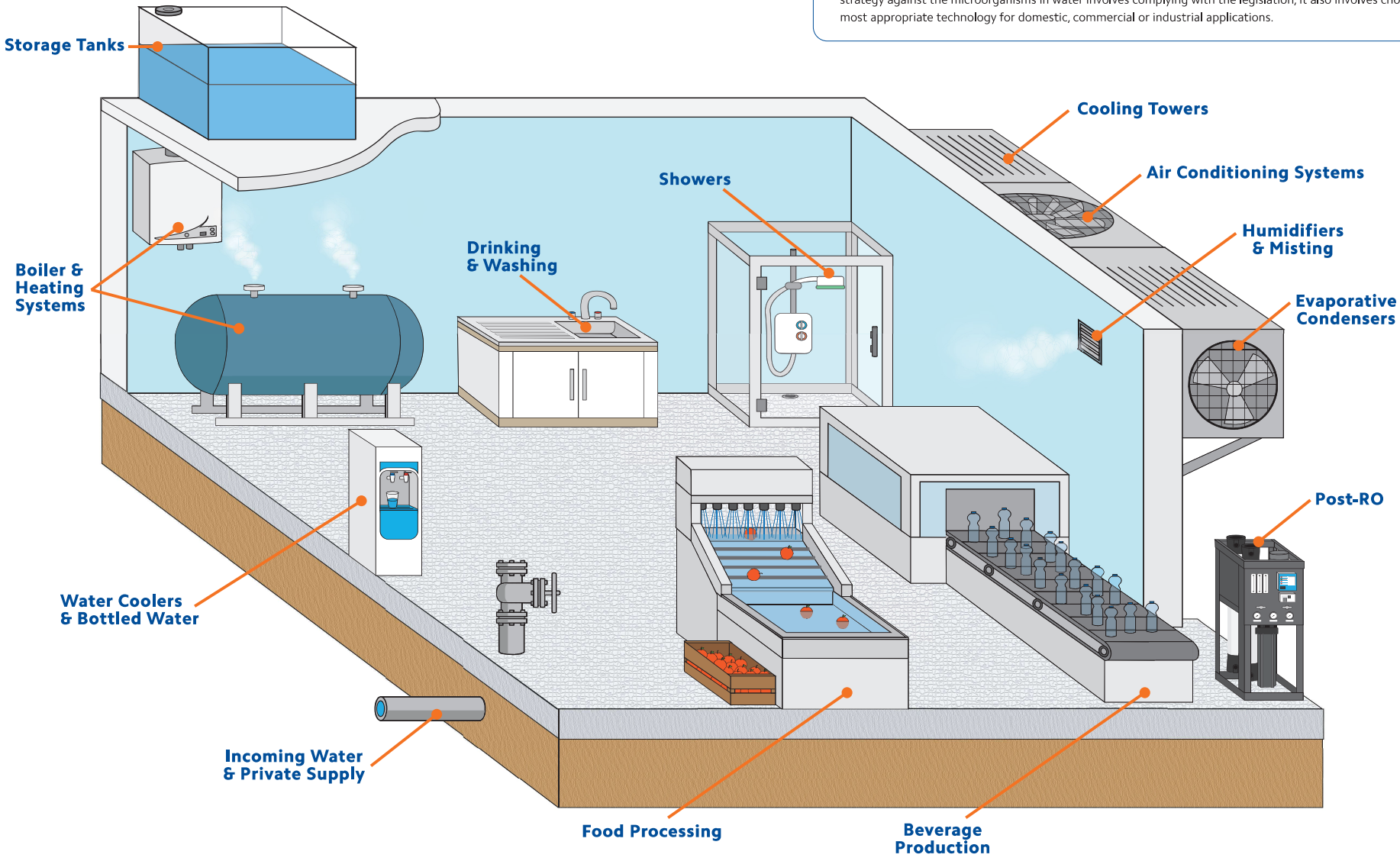
2 Growth
The cells grow and divide, forming dense colonies of bacteria, feeding on organic nutrients in the biofilm and secreting a glue-like substance that increases protection from chemicals and heat treatments.

3 Dispersal
Once fully matured the grown bacteria breaks free into the water stream to attach downstream and repeat the cycle.

Water System Applications

Your Water Defence Strategy

The health and safety of water users is paramount. Legislation is in place to help support correct practice and ensure the safety of users. ACoP L8, BS8580, BS8558, BS EN 806, HSG 274, HTM04-01 are all available for guidance on control and prevention of microorganisms in water supplies and systems. Deciding the most appropriate water defence strategy against the microorganisms in water involves complying with the legislation, it also involves choosing the most appropriate technology for domestic, commercial or industrial applications.



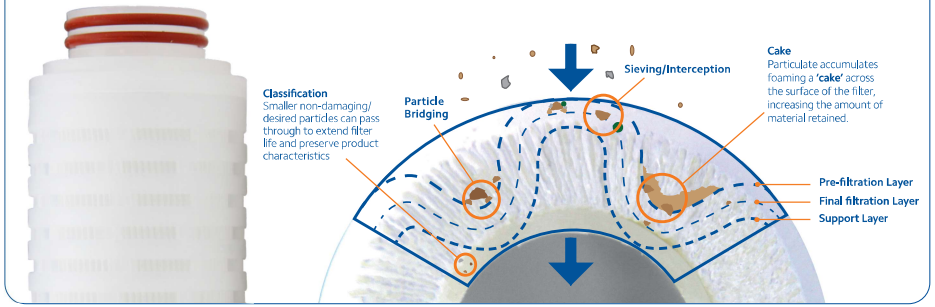
Controlling Microorganisms - Filtration & Water Treatment

Filtration

The technologies Fileder works with include many grades of physical barrier filtration media that trap and remove the contaminants contained in water. These contaminants are then completely removed from the water system by means of cartridge replacement.

Filtration is the best way to ensure removal of pathogens at the last possible moment before use, including membrane sheets or hollow fibre strands. Replacing cartridges is the only method for completely removing contaminants from infected systems.

- **Absolute rated removal of bacteria, parasites, fungi, endotoxins and other contaminants**
- **The only way to remove contaminants from water systems**
- **Use consistently high quality SPECTRUM cartridges**

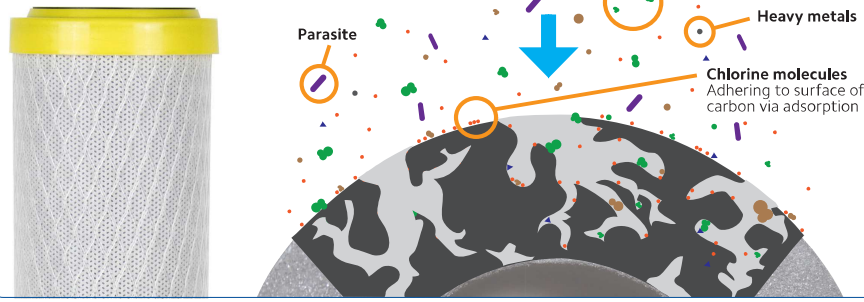


Carbon

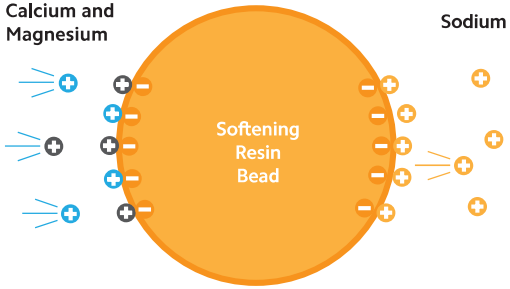
Activated carbon is super-heated with steam at 870°C which opens cracks and pores to massively increase the surface area and enable the removal of a whole host of impurities from organics to solvents, sediment to heavy metal ions.

The carbon matrix can also be used to remove parasites. The resulting water has improved taste and odour as well as contaminant reduction.

- **Taste, odour, parasite control and other contaminants**
- **Removes organics, heavy metals and chlorine tastes**
- **A huge range of SPECTRUM cartridges cover all requirements**



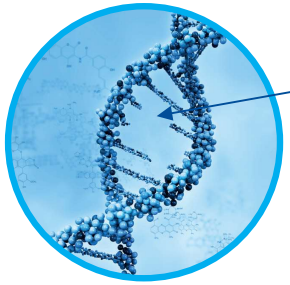
Softening



Scale formation always causes trouble in water systems, from reducing pipe diameter, increasing pump energy and heating costs to roughening of the surface to make areas for bacteria colonies to take hold. Softening the water prevents scale formation and is seen as an essential step in microorganism environment control.

- **Prevent scale formation to reduce areas for bacteria growth in pipework systems**
- **No scale formation on taps, showers and in systems, reduction in detergent usage, less scum formation and reduced cleaning of watermarks**
- **Supply constant soft water using a SPECTRUM SWS or PWS water softening system**

Ultraviolet Light (UV)



Shortwave UV light disrupts the DNA within living cells which prevents further growth and reproduction.

Fileder also recommends UV light as an additional option for suppressing bacteria growth and as a 'belt and braces' approach to microorganism control. Bacterial growth is suppressed by UV light which dissociates the DNA of microorganisms preventing reproduction. The higher the dose of UV light, the better the result.

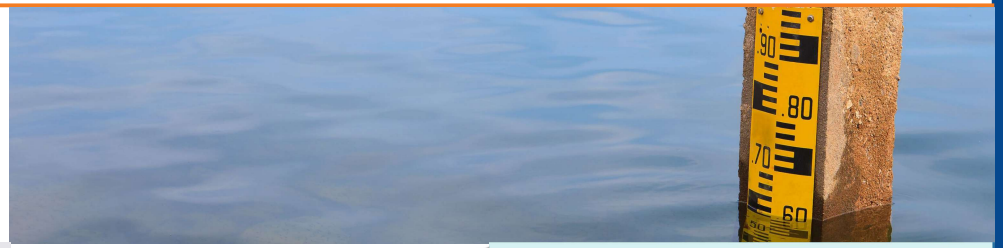
Microorganisms can hide from UV rays behind sediment, this is known as 'shadowing'. Prefiltration at 5µm is recommended to prevent this from occurring. Sub-micron post-filtration should be used to remove bacteria.

- **Dose with ultraviolet light to suppress growth of bacteria contained in water**
- **Adds nothing, removes nothing, no chemical usage, impossible to overdose**
- **High dosage lamps used in WRAS approved, SPECTRUM SABRE UV disinfection systems**

System Solutions - Incoming Water

The most effective strategies for defence often involve the use of more than one technology. They take into account the environmental conditions to prevent colonies of bacteria from thriving in water systems by reducing scale, sediment and biofilm build-up and also reduce the exposure risks of the user to the harmful bacteria and parasites. A combination of physical filtration, ultraviolet light, biocides, ion-exchange and flushing regimes can be included.

Fileder's strategies are tried and tested solutions; systems that are proven in effectiveness, using components from certified high quality manufacturers and delivered via our ISO 9001 accredited organisation.



Incoming Bacteria Removal Challenges

- Compliance with legislation, such as ACoP L8 and HSG 274
- Protection of users from disease and infection
- Protection of manufactured products from contamination
- Creating a water system environment that reduces the risk of bacteria growth
- Recommendation of WRAS approved products and materials
- Choice of appropriate technology for bacteria control
- Equipment efficiency in the system and the effect of the water quality on it
- Contamination from airborne bacteria

Incoming Parasite Removal Challenges

- Protection of users from disease and infection
- Protection of food and beverage products from contamination
- Recommendation of WRAS approved products and materials
- Choice of appropriate technology for parasite control
- Meeting customer demand for safeguarded process
- Protection of site during a boil-water advisory (BWA) notice

Bacteria Removal Solutions (See page 14 for further product details)

1. **Scale Reduction** — Softener and brine tank system
2. **Sediment Removal** — Depth cartridges in housing
3. **Disinfection** — Ultraviolet system
4. **Bacteria Removal** — Pleated catridges in Sanitary housing

System: SPECTRUM SWS

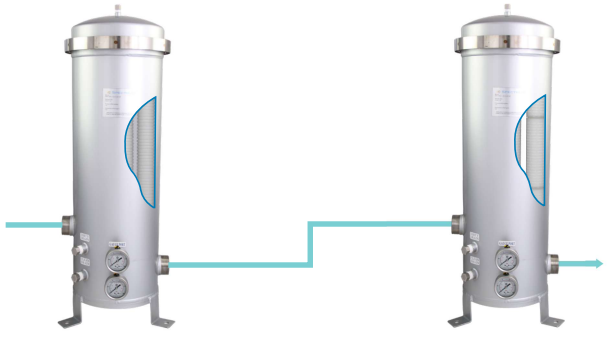
Housing: SPECTRUM SFH (316SS)
Cartridge: SPECTRUM PSP (5µm nominal)

System: SPECTRUM SABRE SUV Disinfection System

Housing: SPECTRUM PSFH (316SS)
Cartridge: SPECTRUM PPPES (0.2µm absolute)

Parasite Removal Solutions (See page 15 for further product details)

1. **Sediment Removal** — Depth cartridges in housing
2. **Parasite Removal** — Pleated cartridges in housing



Housing: SPECTRUM SFH (316SS)
Cartridge: SPECTRUM PSP (5µm nominal)

Housing: SPECTRUM SFH (316SS)
Cartridge: SPECTRUM PPG (0.45µm absolute)

System Solutions - Outlet Water

Complete removal of targeted contaminants at the outlet (point-of-use) ensures the safety of users. By filtering parasites and bacteria at the last possible moment before use, concerns of contamination in the water system are removed. These filtration treatment systems are also smaller, easier to manage and are more economical.

With technical support, laboratory facilities and a service that is 'easy to deal with', Fileder is here to support your water defence strategy.

Outlet Bacteria Removal Challenges

- Protection of water users from all bacterial and fungal disease infection
- Compliance with legislation, such as ACoP L8
- Protection of manufactured products from contamination
- Recommendation of WRAS approved products and materials
- Simplicity of solution
- Delivery speed of solution and consumables
- Choice of appropriate technology for bacteria control
- Air-locking of shower filters
- Reduced effect of biocide on bacteria at outlet

Incoming Parasite Removal Challenges

- Protection of users from chronic sickness in the young, elderly and immunocompromised
- Continuously provide water during outbreaks and Boil-Water Advisory (BWA) notices
- Compliance with water safety legislation
- Adhering to customer specifications
- Recommendation of WRAS approved products and materials
- Difficulty in detecting protozoa, such as *Cryptosporidium* and *Giardia* oocysts
- Long life cycle, can remain dormant for up to 18 months until suitable host found
- Resilience of the oocyst shell protecting these organisms from most treatment methods
- Sourcing independently certified *Cryptosporidium* removal cartridges

Bacteria Removal Solutions (See page 14 for further product details)

Quick change hollow fibre cartridge system

Head: SPECTRUM PTL-FH2
Cartridges: SPECTRUM PTL-S (5µm nominal)
SPECTRUM PTL-HF (0.2µm absolute)

PES membrane cartridge in housing

Housing: SPECTRUM EFHS
Cartridge: SPECTRUM PPPES (0.2µm absolute)

Validated medical hollow fibre filters for taps and showers

Tap: PENTAIR MTF (0.2µm absolute)
Shower: PENTAIR MSF (0.2µm absolute)

Air vent filter for storage tanks

Air Vent: SPECTRUM PPPTFE (0.01µm)

Parasite Removal Solutions (See page 15 for further product details)

Inline carbon block for watercoolers

Inline: SPECTRUM SCIB

Pleated or carbon cartridge system

Housing: SPECTRUM EFHS
Cartridge: SPECTRUM PSP tp PPG or FibreOnyx SFBC

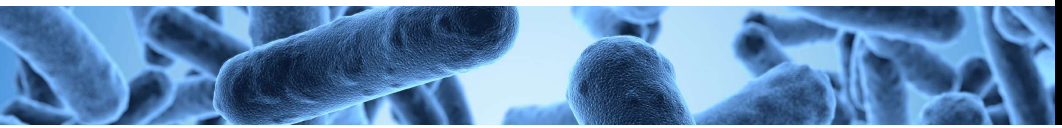
Food service system for beverage vending

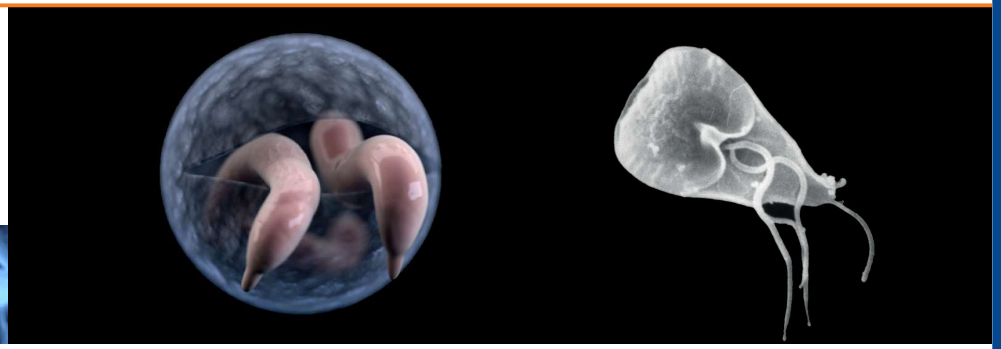
Housing: SPECTRUM ACH-FH1-3/8
Cartridge: SPECTRUM AOW2

System Selection Guide

It is important to apply the correct water defence strategy for each different application. This involves using equipment of the correct size to ensure best practice and longevity of replacement items, such as filter cartridges. Oversizing of water treatment and filtration is always recommended to ensure higher consumable life, effective control and 'future proofing' of the application. Undersizing equipment to save on capital expenditure generally costs more in the long term and reduces effectiveness of systems.

Below are tables providing system solutions for Bacteria and Parasite removal over a broad range of flow rates from domestic to industrial applications. For additional assistance, Fileder will be happy to discuss your application requirements.





Incoming Bacteria Removal

Flow Rate		STAGE					
		1. Scale Reduction	2. Sediment Removal		3. Disinfection	4. Bacteria Removal	
lpm	m³/hr	System	Housing	Cartridge	UV System	Housing	Cartridge
5	0.3	SWS-0.5M	EFHS-PK-10-1/4	PSP-5-97/8	SUV-S-4-1/4	PSFH-SEP-1-10-1-226E	PPPES-0.2-10FHS
10	0.6	SWS-0.5M	EFHS-PK-10-3/4	PSP-5-97/8	SUV-S-8-1/2	PSFH-SEP-1-10-1-226E	PPPES-0.2-10FHS
20	1.2	SWS-0.5M	EFHS-PK-20-3/4	PSP-5-20	SUV-S-30-3/4	PSFH-SEP-1-20-1-226E	PPPES-0.2-20FHS
50	3.0	SWS-1.7M	SFH-SPC-5-10-2-GP-ML	PSP-5-97/8	SUV-S-30-3/4	PSFH-SEP-1-30-1-226E	PPPES-0.2-30FHS
100	6.0	SWS-1.7M	SFH-SPC-3-30-2-GP-ML	PSP-5-30	SUV-S-57-1	PSFH-SEP-3-30-2-226E	PPPES-0.2-30FHS
150	9.0	SWS-2.2M	SFH-SPC-5-20-2-GP-ML	PSP-5-20	SUV-S-132-2	PSFH-SEP-3-30-2-226E	PPPES-0.2-30FHS
200	12.0	SWS-5.0M	SFH-SPC-7-20-2-GP-ML	PSP-5-20	SUV-S-132-2	PSFH-SEP-5-30-2-226E	PPPES-0.2-30FHS
280	16.8	SWS-5.0M	SFH-SPC-5-40-2-GP-ML	PSP-5-40	SUV-S-250-2	PSFH-SEP-5-30-2-226E	PPPES-0.2-30FHS
360	21.6	SWS-12.5M	SFH-SPC-7-40-2-GP-ML	PSP-5-40	SUV-S-250-2	PSFH-SEP-5-40-2-226E	PPPES-0.2-40FHS
480	28.8	SWS-12.5M	PFH-SGB-1HF-40-3-GP-ML	PPP-HF-5-40-E	2 x SUV-S-132-2	PSFH-SEP-7-40-2-226E	PPPES-0.2-40FHS
660	39.6	2x SWS-5.0M	PFH-SGB-1HF-40-3-GP-ML	PPP-HF-5-40-E	2 x SUV-S-250-2	PSFH-SEP-5-40-2-226E x2	PPPES-0.2-40FHS
880	52.8	2x SWS-12.5M	PFH-SGB-1HF-40-3-GP-ML	PPP-HF-5-40-E	2 x SUV-S-250-2	PSFH-SEP-7-40-2-226E x2	PPPES-0.2-40FHS
1440	86.4	2x SWS-12.5M	PFH-SGB-2HF-40-4F-GP-ML	PPP-HF-5-40-E	4 x SUV-S-250-2	PSFH-SEP-7-40-2-226E x3	PPPES-0.2-40FHS

Outlet Bacteria Removal

Flow Rate						
lpm	m³/hr	Cartridge	Description	Technology	Housing	Connection
3.8	0.2	PTL-HF	Premier Twist-Lock Cartridge	Hollow Fibre Strand	PTL-FH1	¼" push-fit
6	0.3	MTF-WSCSS	Medical Tap Filter	Hollow Fibre Strand	-	Various
6	0.3	MSF-SCSS	Medical Shower Filter	Hollow Fibre Strand	-	½" BSP
10	0.6	PPPES-0.2-10CGS	Premier Pleat Cartridge	PES Membrane Pleat	EFHS-PK-10-1/4	¼" BSP
500*	30*	PPPTFE-0.1-3-1/2	Air Vent Filter	PTFE Membrane Pleat	-	½" BSP

* Flow rate of air through vent filter.

Incoming Parasite Removal

Flow Rate		STAGE			
		1. Sediment Removal		2. Parasite Removal	
lpm	m³/hr	Housing	Cartridge	Housing	Cartridge
5	0.3	EFHS-PK/PK-10-1/4	PSP-5-97/8	-	PPG-0.45-10CGS
10	0.6	EFHS-PK/PK-10-3/4	PSP-5-97/8	-	PPG-0.45-10CGS
20	1.2	EFHS-PK/PK-20-3/4	PSP-5-20	-	PPG-0.45-20AAS
50	3.0	SFH-SPC-5-10-2-GP-ML	PSP-5-97/8	SFH-SPC-5-10-2-GP-ML	PPG-0.45-10EHS
100	6.0	SFH-SPC-3-30-2-GP-ML	PSP-5-30	SFH-SPC-3-30-2-GP-ML	PPG-0.45-30EHS
150	9.0	SFH-SPC-5-20-2-GP-ML	PSP-5-20	SFH-SPC-5-20-2-GP-ML	PPG-0.45-20EHS
200	12.0	SFH-SPC-7-20-2-GP-ML	PSP-5-20	SFH-SPC-7-20-2-GP-ML	PPG-0.45-20EHS
280	16.8	SFH-SPC-5-40-2-GP-ML	PSP-5-40	SFH-SPC-5-40-2-GP-ML	PPG-0.45-40EHS
360	21.6	SFH-SPC-7-40-2-GP-ML	PSP-5-40	SFH-SPC-7-40-2-GP-ML	PPG-0.45-40EHS
480	28.8	PFH-SPC-12-30-2-GP-ML	PSP-5-30	PFH-SPC-12-30-2-GP-ML	PPG-0.45-30EHS
660	39.6	PFH-SPC-12-40-2-GP-ML	PSP-5-40	PFH-SPC-12-40-2-GP-ML	PPG-0.45-40EHS
880	52.8	PFH-SPC-22-30-2-GP-ML	PSP-5-30	PFH-SPC-22-30-2-GP-ML	PPG-0.45-30EHS
1440	86.4	PFH-SPC-36-30-2-GP-ML	PSP-5-30	PFH-SPC-36-30-2-GP-ML	PPG-0.45-30EHS

Outlet Parasite Removal

Flow Rate						
lpm	m³/hr	Cartridge	Description	Technology	Housing	Connection
1.9	0.1	AOW2	Food Service Cartridge	Carbon/Media Hybrid	ACH-FH1-3/8	⅜" push-fit
3.8	0.2	SCIB-1-10	Inline Carbon Block	Carbon Block	-	¼" push-fit
3.8	0.2	SFBC-PB-10	FibreOnyx Carbon Cartridge	Carbon Fibre	EFHS-PK-10-1/2	½" BSP
15	0.9	SFBC-10	FibreOnyx Carbon Cartridge	Carbon Fibre	EFHS-PK-10-1/2	½" BSP

Note: Flow rates given are based on pressure drop of <0.1 bar.

Product Brochures

- Pleated Filtration
- Depth Filtration
- Stainless Steel Cartridges
- High Flow Filtration
- Water Treatment - Carbon & Media Cartridges
- Filter Housings
- Bag Filtration
- Pure Water Membranes
- Pressure Vessels & Media
- Water Softening & Conditioning
- UV Systems
- Food Service
- Filtration & Water Treatment Rental
- Installation & Servicing

Application Brochures

- Solutions for Surface Finishing
- Solutions for Hospitals
- Solutions for Beverage Production
- Solutions for the Coatings Industry
- Solutions for Bacteria and Parasites
- Solutions for Cosmetics and Toiletries
- Filtration for Municipal Water with DWI
- Solutions for Cryptosporidium Protection
- Solutions for Chemical Production

Contact us

Fileder Filter Systems Ltd
20/20 Business Park
Maidstone, Kent
ME16 0LS

Phone: 01622 691886
Fax: 01622 621932
Email: info@fileder.co.uk
Website: www.fileder.co.uk