



Medical

Brochure

Navigate Waterborne Outbreaks With Point-of-Use Water Filters

Waterborne outbreaks are an important concern within healthcare facilities. Our Pall-Aquasafe™ and QPoint® faucet and shower head filters provide an immediate barrier against waterborne pathogens such as *Legionella* spp. which are critical contaminants in water systems.



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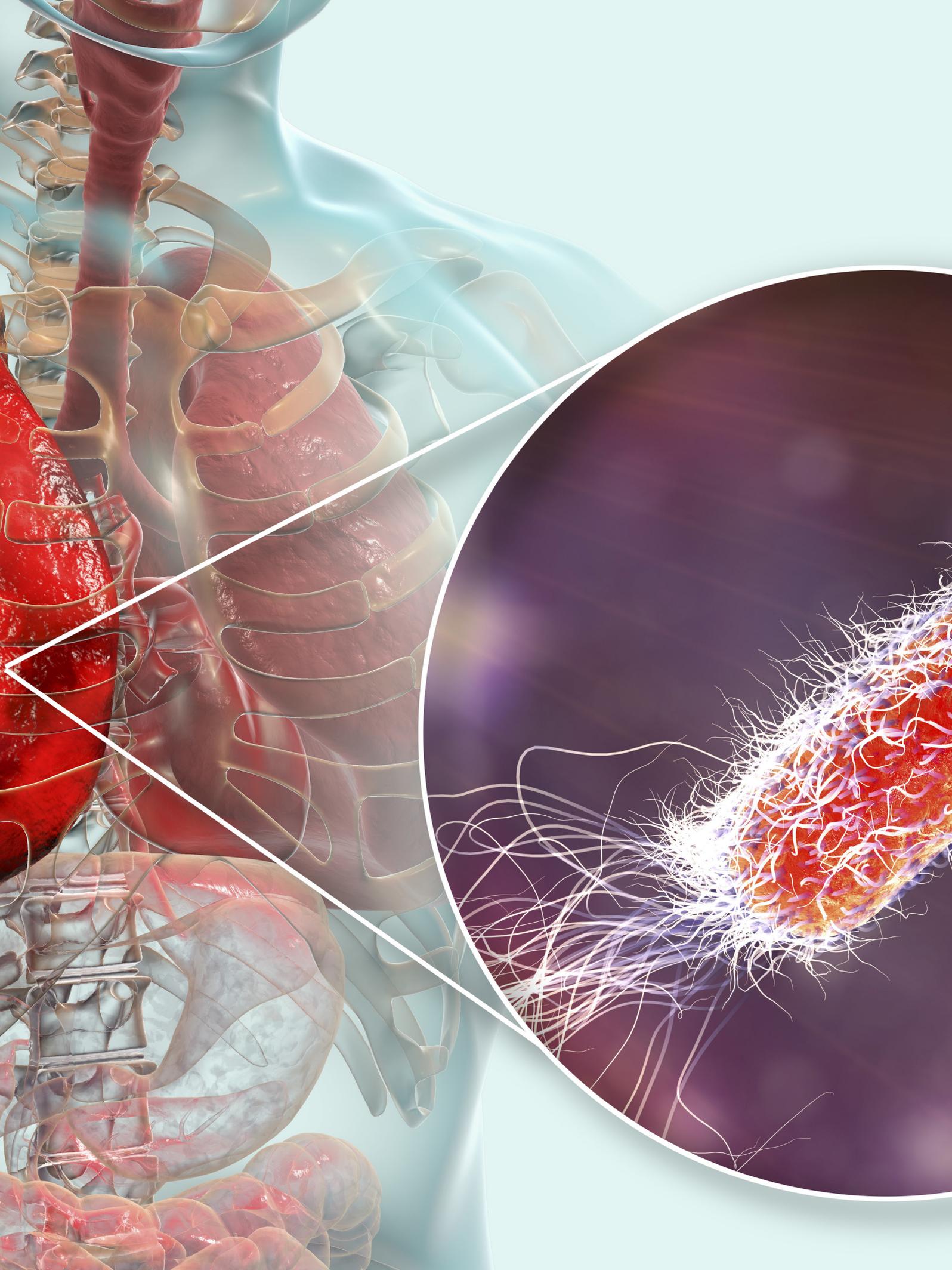


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I. Introduction

Waterborne pathogens such as *Legionella*, *Pseudomonas*, or non-tuberculous mycobacteria can cause outbreaks in clinical and non-clinical settings, posing a threat to the well-being of patients and staff. Hygiene and water quality play a crucial role in preventing outbreaks. This brochure aims to help understand the measures to prevent outbreaks and respond appropriately in case of an emergency.

II. Water Quality and Pathogens

Some of the typical waterborne pathogens that can occur in clinical settings include *Legionella*, *Pseudomonas aeruginosa*, *Acinetobacter*, and non-tuberculous mycobacteria. The risk areas include water pipes, showers, and hot water heaters. The impact of pathogens on patients and staff can range from mild symptoms to severe conditions such as pneumonia. Regular monitoring of water quality and implementing measures to prevent outbreaks is essential.

Legionella spp.

Legionella can cause diseases, including the most serious, Legionnaires' disease, which is accompanied by pneumonia, or Pontiac fever, which can cause classic cold symptoms such as fever, cough or muscle aches. Legionnaires' disease occurs in adults, and the incidence increases with age (Figure 1).

Immunocompromised and elderly persons in particular, as well as smokers and people with chronic diseases, are among the risk groups in whom Legionnaires' disease can often lead to severe to fatal progression of the disease¹.

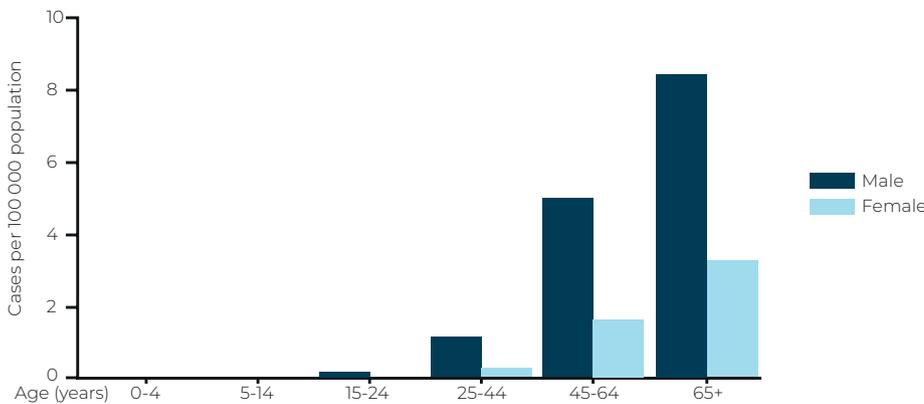


Figure 1. Distribution of Legionnaires' disease cases per 100 000 population by age and gender, EU/EEA, 2018. Source²: Legionnaires' disease Annual Epidemiological Report for 2018

Pseudomonas aeruginosa (PA)

This bacterium can be present in water pipes, showerheads, and hot water heaters. PA is common in hospitalized patients, especially in elderly and immunocompromised people. PA is one of the most common causes of nosocomial pneumonia and sepsis, which are associated with high mortality rate. Urinary tract and wound infections are also among the common diseases caused by PA.

PA is also increasingly recognized as a problematic water pathogen outside of hospital settings.

***Escherichia coli* (E. coli)**



Certain strains of *E. coli* can be present in water systems, especially when there are contaminations from sewage or animal feces. Certain strains can cause severe gastrointestinal infections such as diarrhea and Hemolytic Uremic Syndrome (HUS).

Klebsiella pneumoniae

This bacterium can be found in water pipes, hot water tanks, and faucets. It is a common cause of hospital-acquired infections and can lead to various infections, including urinary tract infections, respiratory infections, and bloodstream infections.

Enterococcus faecalis

Enterococcus faecalis is a natural component of the intestinal flora in humans and animals. It can be present in water supply systems, particularly when there are fecal contaminations. *Enterococcus faecalis* can cause urinary tract infections and bloodstream infections.

Non-tuberculous mycobacteria (NTM)

This is another group of bacteria that can be found in water distribution systems. NTM are widespread in the environment and can colonize water sources, including plumbing systems. While NTM are generally considered opportunistic pathogens, meaning they primarily affect individuals with compromised immune systems or underlying respiratory conditions, they can cause diseases in otherwise healthy individuals as well.

Some common species of NTM found in water distribution systems include:

***Mycobacterium avium* complex (MAC):** MAC is one of the most prevalent NTM species and is associated with pulmonary infections, lymphadenitis, and disseminated infections. It primarily affects individuals with impaired immune function.

Mycobacterium abscessus: *M. abscessus* is a rapidly growing NTM that can cause a range of infections, including pulmonary infections, skin and soft tissue infections, and disseminated infections. It can be particularly problematic in individuals with cystic fibrosis or other chronic lung diseases.

Mycobacterium kansasii: *M. kansasii* can cause pulmonary infections that resemble tuberculosis, including chronic cough, fatigue, and weight loss. It primarily affects individuals with underlying lung conditions or compromised immune systems.

It's worth noting that NTM infections are generally not transmitted from person to person and are usually acquired through environmental exposure, such as inhalation or ingestion of contaminated water or aerosols. The severity of NTM infections can vary, and treatment often requires a tailored approach based on the specific species and the individual's health status.



III. Measures to Prevent Outbreaks

A Water Safety Plan is a systematic approach to monitoring, assessing, and controlling water quality. It can help identify potential risks and take measures to prevent outbreaks. Checklists can be used to facilitate regular monitoring of water quality. Training for staff and patients can help raise awareness of the importance of hygiene and water quality.

Outbreak Checklist

- Immediate reporting: In case of suspected water contamination with bacteria, the medical staff should immediately inform the relevant authorities and the hospital administration.
- Patient safety: The safety and well-being of patients should be the top priority. Affected patients should be isolated and appropriately cared for to avoid further exposure.
- Water analysis: Engage an accredited laboratory to conduct a comprehensive analysis of the water to determine the type of bacteria and their concentration.
- Source identification: Thoroughly investigate the water supply system to identify the potential source of bacterial contamination. This may involve inspections, sampling, and flushing of pipes.
- Communication: Inform all relevant parties, including hospital staff, patients, families, and the public about the situation, the measures taken, and any precautions that need to be followed.
- Treatment protocols: Review and update clinical protocols and treatment guidelines for affected patients to ensure appropriate measures for the prevention and treatment of bacterial infections.
- Water disinfection: Take immediate actions to disinfect the water system to eliminate the bacteria. This may involve chlorination, UV irradiation, or other suitable disinfection methods.
- Water quality monitoring: Implement a regular monitoring program to ensure that the water system remains free from bacteria after disinfection. This may include regular sampling and testing.
- Point-of-Use Water Filters:** Consider installing Point-of-Use Water Filters as an immediate physical barrier against waterborne pathogens and an additional protective measure to reduce the risk of recontamination with bacteria. Consult professionals and experts to determine the appropriate filter types and installation locations.
- Staff training: Ensure that hospital staff has appropriate knowledge and training to recognize, handle, and prevent the risks of bacterial contamination.

In conclusion, it is important to customize such a checklist to the specific circumstances and regulations of the hospital. Consult appropriate professionals, including water and hygiene experts, to ensure that the measures implemented comply with existing guidelines and recommendations.



IV. Immediate Measures in Case of an Outbreak

In case of an outbreak, immediate measures should be taken to prevent the spread of pathogens. This includes the use of point-of-use water filters as a first step. It is important to know how to act in an emergency to respond quickly and effectively. When selecting filters, it should also be considered to ensure that point-of-use water filters meet the required standards.

Point-of-Use (POU) water filters are designed to reduce or remove waterborne contaminants, including pathogens, right at the end of the water system at the faucet or shower. Studies suggest these filters can reduce infections and healthcare costs by preventing waterborne pathogens from reaching the patient.²

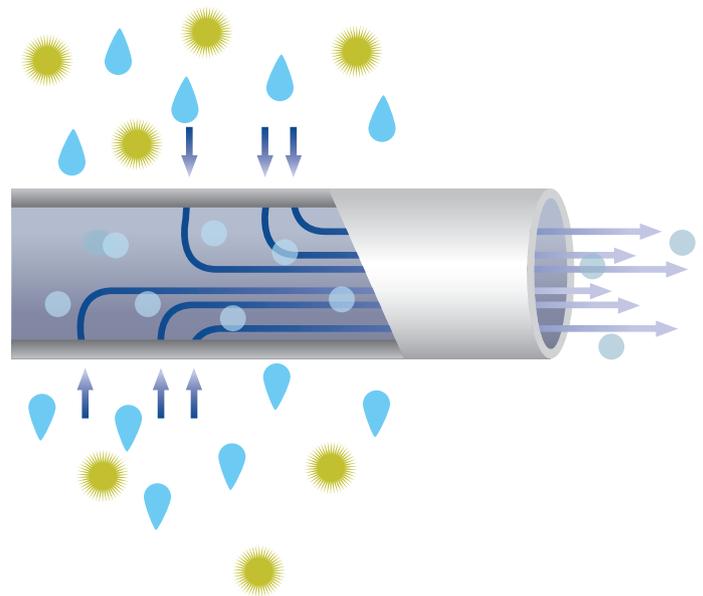
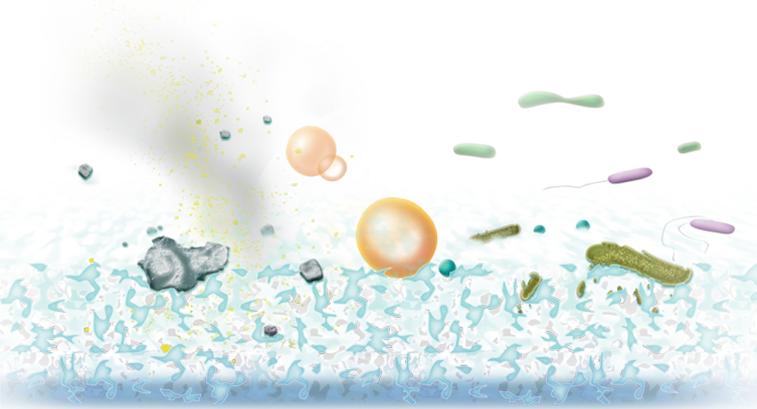
What POU Technologies are available?

Membrane

Membrane POU water filters are made of a pleated media membrane in which the stated pore size is often uniform throughout. The media could be arranged in a single layer or multiple layers.

Hollow Fiber

Hollow fiber POU water filters are made of long, hollow tubes, much like a straw. These tubes have pores in their walls and the water typically passes from outside to inside the tubes.



Performance Differences: The Research

Comparison of these technologies has been the focus of several recent studies:

In Yetiş *et al.*, bacteria was found in 32% of water samples taken from the hollow fiber filters:

“In this study setting, the use of hollow-fibre shower filters did not provide assurance of safety for patients in the shower environment...exposing some patients to high levels of organisms, with a risk of serious subsequent infection in immunosuppressed individuals.”⁴

In Totaro *et al.*, hollow fiber filters showed growth of bacteria just after installation in water samples but the sterilizing-grade membrane filters showed no bacteria during the study in water samples.⁵

What to consider when comparing options

- **Microbial:** the filter has retained some bacteria and is expressed as a log reduction
- **Sterilizing-Grade:** the filter has retained 100% of the bacteria.

Example: If using a filter to reduce risk from the taps in a Neonatal ICU, consider this:

A sterilizing-grade filter removes 100% of bacteria and a microbial filter with a log 7 reduction removes 99.99999% of bacteria.

You might think that these reductions are almost the same.

If during its life, one filter is exposed to
>10,000,000,000
bacteria (10^{10})

A filter with a log 7 reduction
would allow
>1,000
to pass through

A sterilizing-grade filter that has been
validated for its stated life would let
0 bacteria
through

If just one of those bacteria are transmitted to an infant, whether from bathing, hand washing, or another route, it could cause an infection,

Keep in mind: it does not matter if a filter is rated at 0.2, 0.1, or 0.05 microns. What is most important is how it performs on the ASTM F838 test and its supporting validation.

A smaller pore size does not indicate better performance when it comes to reducing bacteria.



V. Point-of-Use Water Filters

Point-of-use water filters are a quick and effective way to prevent the spread of pathogens in water. They are directly connected to faucets or included in showerheads and remove bacteria and other contaminants. They can be used in clinical and non-clinical settings to improve water quality. Maintenance and replacement are important factors when using point-of-use water filters.

VI. Conclusion

Hygiene and water quality are crucial factors in clinical and non-clinical facilities. Point-of-use water filters can be used as a first measure to prevent the spread of waterborne pathogens. A Water Safety Plan, employee training, and regular monitoring of water quality are also important measures to prevent outbreaks. When selecting a Point-of-Use Water Filter it is important to consider the filter technology and its performance in removing waterborne pathogens.

A proactive and systematic approach can reduce the risk of outbreaks and protect the health of patients and staff.



The Pall-Aquasafe™ Filter Family

Pall-Aquasafe™ Disposable Water Filters Sterile Products

Membrane Rating:

Sterilizing grade membrane 0.2 µm Supor® with integrated pre-filtration layer (approx 1.0 µm)

Maximum Upstream Operating Pressure:

5 bar (approx. 75 psi) at 60 °C (140 °F)

Normal Upstream Operating Pressure:

2–4 bar (approx. 30–60 psi)

Maximum continuous influent Water Temperature:

60 °C (140 °F)

Maximum Temperature Exposure:

70 °C (158 °F) for a total cumulative period of 30 mins over the life of the Filter

Sanitization:

Compatible with common surface and systemic disinfection programs (i.e. Chlorine, Chlorine Dioxide, Peracetic Acid and Monochloramine)



The QPoint® Filter Family

QPoint® Filter Capsule

Membrane Rating:

Sterilizing grade membrane 0.2 µm Supor® with integrated pre-filtration layer

Temperature:

Continuous influent temperature 60 °C (140 °F)
Maximum influent temperature 75 °C (167 °F) for a total cumulative period of 90 mins over the life of each Filter Capsule

Maximum operating pressure:

5 bar (approx. 75 psi) at continuous 60 °C (140 °F) influent temperature

Sanitisation:

Compatible and complementary to common surface and systemic disinfection programs

QPoint® Docking Station - Tap Assembly (QDTC)

Diameter (nominal): 88 mm (3.5 in)

Weight (nominal): 84 g (5.1 oz)

Temperature:

Continuous influent temperature 60 °C (140 °F)
Maximum influent temperature 75 °C (167 °F) for a total cumulative period of 90 mins over the life of each Filter Capsule

Maximum operating pressure:

5 bar (approx. 75 psi) at continuous 60 °C (140 °F) influent temperature

Cleansing and Disinfection:

External surfaces may be cleaned using common/chrome-compatible sanitising agents. During routine water system disinfection the Docking Station with attached Filter Capsule may be left in place to enable the outlet to be flushed

Main Materials of Construction:

Polycarbonate/Acrylonitrile Butadiene Styrene (51 %), Glass Filled Nylon (22%), Polyester (20%), Stainless Steel (4%)

Packaging:

Outer packaging: recycled Cardboard

QPoint® Docking Stations - Shower
(QDSW - white)

Diameter (nominal): 88 mm (3.5 in)

Weight (nominal): 156 g (5.5 oz)

Temperature:

Continuous influent temperature 60 °C (140 °F)

Maximum influent temperature 75 °C (167 °F) for a total cumulative period of 90 mins over the life of each Filter Capsule

Autoclavability:

Compatible with commonly used autoclaving conditions: 121 °C (250 °F) for 15 mins for 36 cycles or 134 °C (273 F) for 5 mins for 36 cycles

Maximum operating pressure:

5 bar (approx. 75 psi) at continuous 60 °C (140 °F) influent temperature

Cleansing and Disinfection:

External surfaces may be cleaned using common/chrome-compatible sanitising agents. During routine water system disinfection the Docking Station with attached Filter Capsule may be left in place to enable the outlet to be flushed

Main Materials of Construction:

Polyester (96%), Stainless Steel (2%), EPDM (1%), Silicone Rubber (< 1 %), Brass (< 1%)

Packaging:

Outer packaging: Cardboard, Inner packaging: LDPE. Materials maybe recycled according to local guidelines and facilities





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