



# **WATER FILTRATION APPLICATIONS FOR FOOD & BEVERAGE**

Process Filtration



# A SUCCESSFUL PARTNERSHIP

## FOR THE FOOD & BEVERAGE INDUSTRY

### WATER FILTRATION - WHY?

Regardless of how simple or complex a food or beverage manufacturing process is, every process owner needs to make sure his product complies with relevant standards and requirements as well as consumer expectations.

Therefore the quality of any water - from CIP solutions to process water and even ingredient water - needs to be ensured. Donaldson's best-in-class filtration solutions help to achieve this.

Filtration usually begins upstream with the retention of suspended solids such as sediments and particulates\*. It is needed at the start of the process to protect downstream treatment steps and at the end of the process to remove any surviving contaminants and prevent the pickup of harmful bacteria\* just prior to packaging.

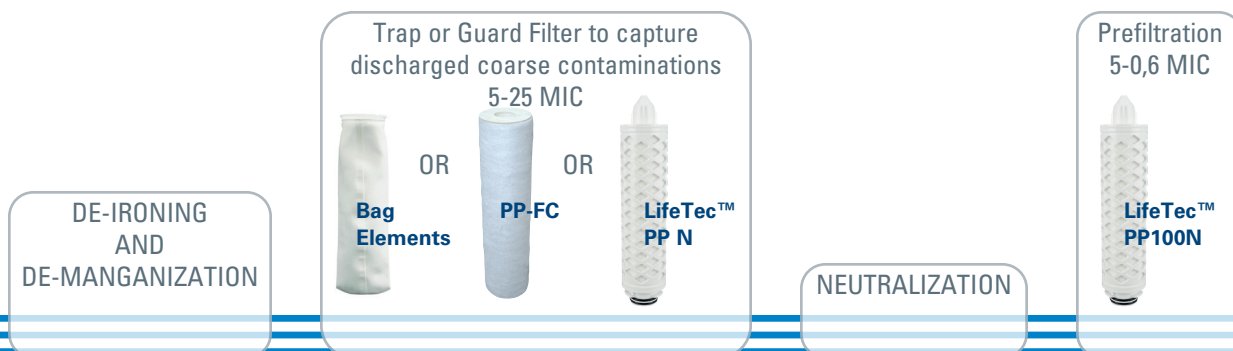
With LifeTec™ Liquid filter elements, Donaldson delivers best-in-class filtration solutions for the food & beverage industry. The filters are developed to support manufacturers' process and product integrity:

- 1 Strength:** Robust polypropylene filter liner (rhombus structure), that improves the static and flow conditions. Improved pressure stability and torsional stiffness, preventing damage to the filter element during filter replacement
- 2 Performance:** Excellent flow rate and low pressure drop reducing total cost of ownership
- 3 Availability:** Single piece flow manufacturing guarantees product availability of large batches and single item lots.

### HOW TO TREAT NATURAL MINERAL WATER AND SPRING WATER

Natural mineral water is characterized by its high and consistent level of minerals and a source naturally protected from contamination. Spring water differs from mineral water because of its varied and typically lower mineral content.

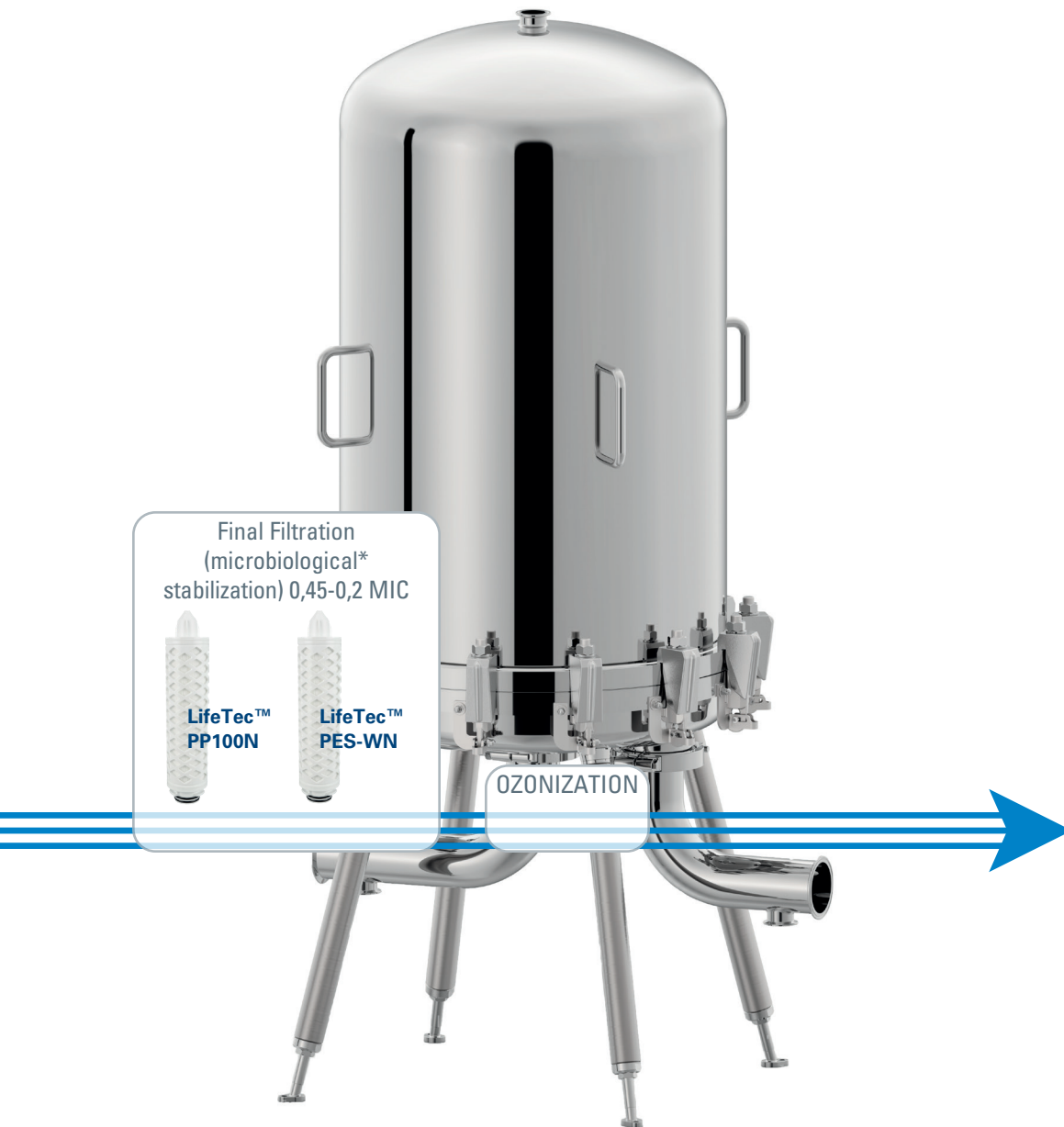
Regulations only allow limited treatment of both kinds of water, including filtration to remove unstable elements and undesired components. The filtration starts with the removal of large contaminants and ends right before bottling with the removal of micro-organisms\*. The aim of the filtration is bacterial\* stabilization and particulate\* removal.



In this brochure, we cover best practice examples for water filtration applications within the food and beverage industry. Filtration needs vary depending on various factors.

Feel free to contact us on [CAP-europe@donaldson.com](mailto:CAP-europe@donaldson.com) so we can discuss your specific needs.





\*Microorganism testing not certified by NSF

## HOW TO TREAT TABLE WATER AND BOTTLED TAP WATER

Table water as well as bottled water comes from large wells, lakes, rivers or reservoirs and can be treated to meet local or national drinking water regulations and standards.

The natural mineral content found in these water sources is usually low, therefore artificial mineralization is possible.

There are several options to treat table and bottled water. Very common treatment methods include reverse osmosis, softening steps, UV-disinfection or ozonization. All of these methods can be supported using Donaldson filtration products.

Prefiltration  
2,4-0,6 MIC



Trap or Guard Filter to capture  
discharged coarse contaminations  
5-25 MIC



OR



SOFTENER

Protection of RO-Membrane  
~5-MIC



OR



OR



REVERSE OSMOSIS

Protection of UV-System for better efficiency  
~ 5 MIC (or lower)



OR



OR



UV-DISINFECTION

Guard Filter in case  
of malfunction of UV lamp ~  
1 MIC

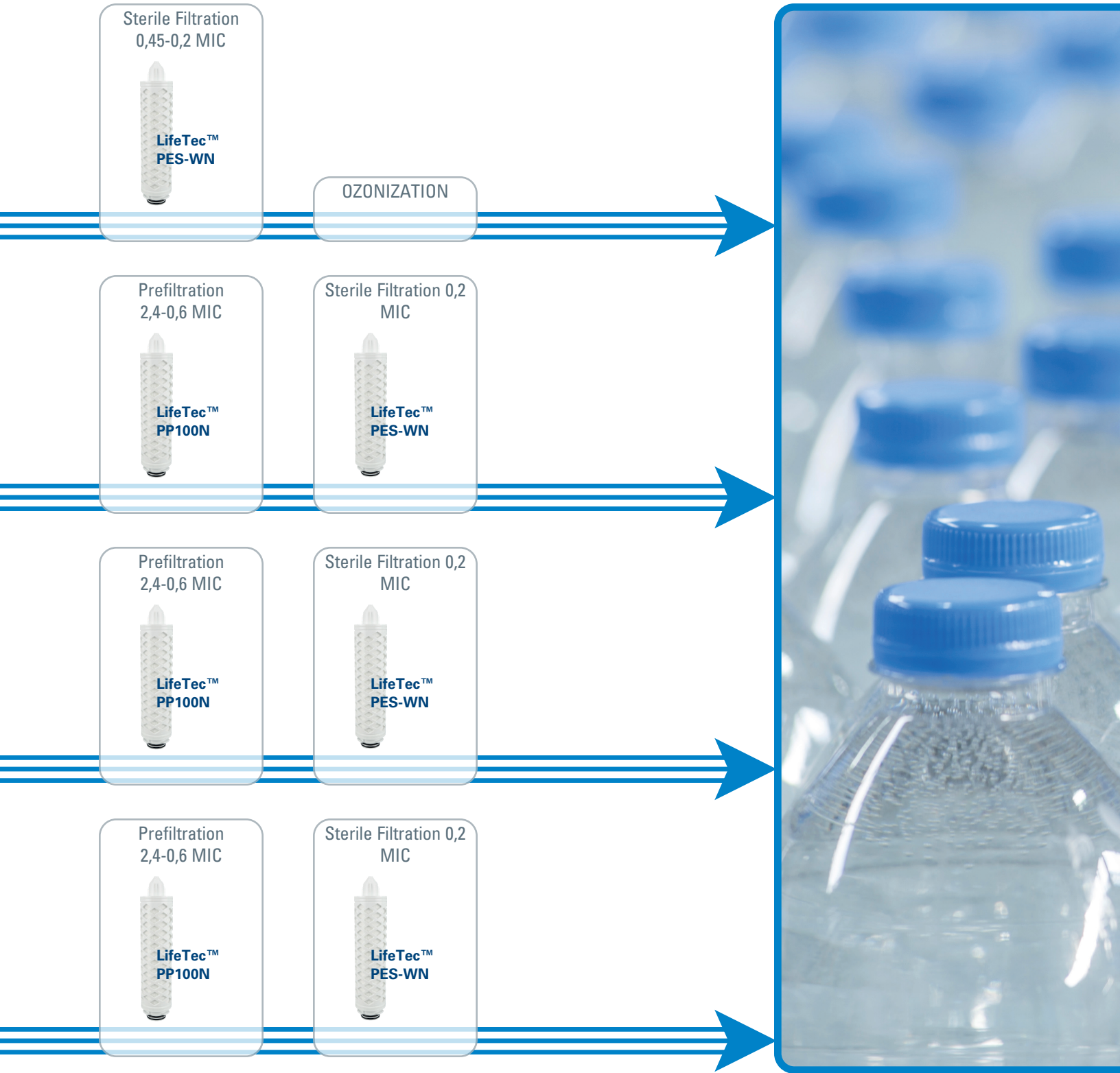


OR





Donaldson LifeTec™ elements serve many processing steps - from protecting fragile RO membrane from particulate\* to removing microorganisms\* from the final product.



\*Testing not certified by NSF

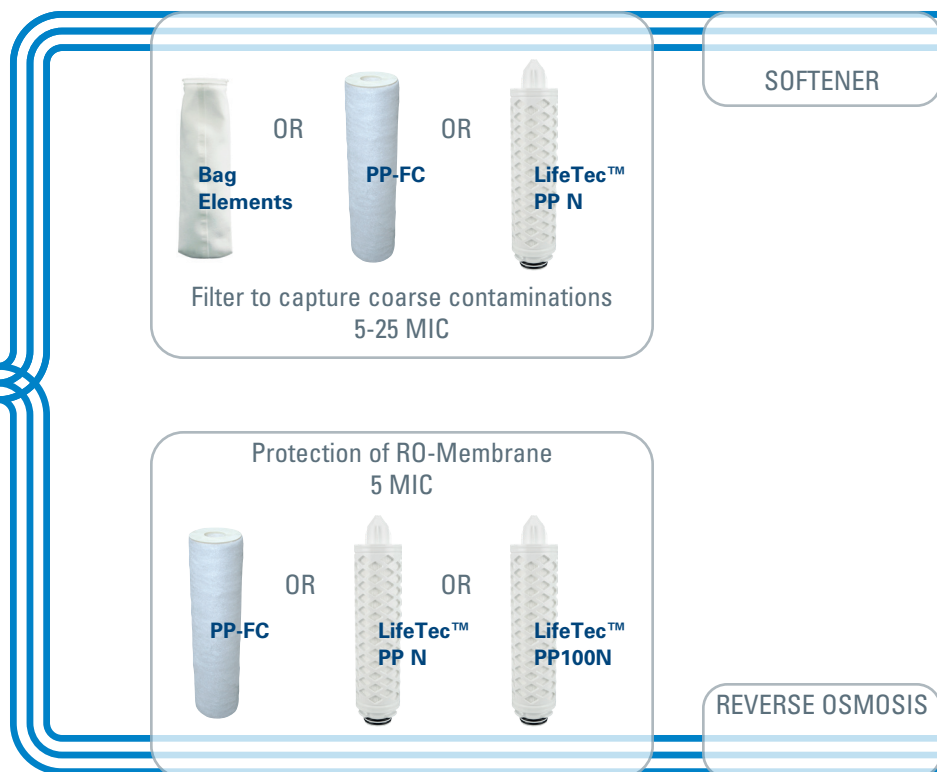
## HOW TO TREAT SOFT DRINK WATER

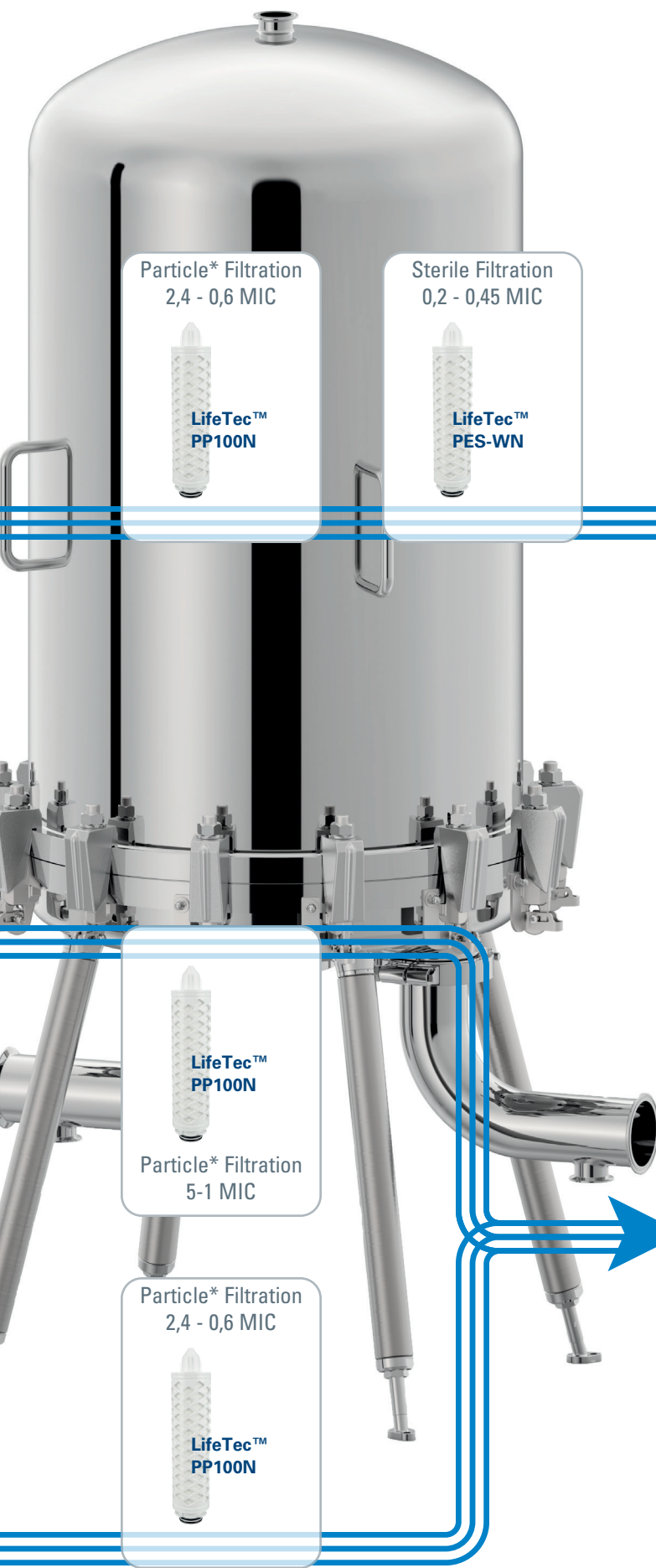
Water for soft drink production such as soda or juice needs to meet hygienic purity according to drinking water regulations and must be treated accordingly. Reverse osmosis treatment is considered the industry standard and disinfection treatment methods are commonly used.



## HOW TO TREAT BREWING WATER

Filtration is necessary at several different points in the beer brewing process. Depending on the water source and the beer type different treatment steps are possible. Residual alkalinity, carbonate hardness and total hardness (°dH) are important parameters to define the correct treatment steps. Decarbonization and desalination are commonly used.






\*Testing not certified by NSF



## HOW TO TREAT PROCESS WATER

Process water can indirectly come in contact with the final product, such as recovery of product residues, water used for rinsing bottles, rinsing after chemical disinfectants or for sterilization in place (SIP). The main source for process water regularly used in the food and beverage production is municipal water, but it can also be regained from internal production steps. 

The hygienic requirements for process water are typically identical to the regulations for drinking water, thus, any treatment methods to meet drinking water regulations can be used.



Protection of RO-Membrane  
~5-MIC



OR



OR



REVERSE OSMOSIS

Prefiltration depending of the particle\* load  
~20 - 5 MIC



OR



OR



Prefiltration protection of  
the membrane down stream  
~5-1 MIC



OR



## HOW TO TREAT CIP WATER

Clean in place (CIP) water can be monitored for pH, filtered and re-used in many applications rather than sourcing new water. Many production sites have water fed CIP systems to clean and sanitize the equipment in line. Filtered water is essential to avoid contamination and equipment downtime.

The filtration aims for particle\* free water quality.

Particle\* Filtration  
~20-10 MIC



OR



OR



Particle\* Filtration  
5-1 MIC



## HOW TO TREAT PRODUCT INGREDIENT WATER

Sterile grade water is typically sourced from a municipal water supply and can be used as an ingredient in many food and beverage production processes. Ingredient water comes in direct contact with the final product, such as water that becomes part of the final product. This water can be filtered down to sterile grade using Donaldson PES membrane elements.

Particle\* Filtration  
2,4 - 0,6 MIC



LifeTec™  
PP100N

Sterile Filtration  
0,2 MIC



LifeTec™  
PES-WN

Sterile Filtration  
0,2 MIC



LifeTec™  
PES-WN



## LIQUID FILTRATION SOLUTIONS

### LifeTec™ PP N



Donaldson LifeTec™ PP N filters deliver outstanding flow rates and high throughput, with nominal submicron retention and high dirt holding capacity.

#### Features

- Highly robust polypropylene construction protects against deformation
- Outstanding flow rate
- Extremely high dirt holding capacity
- Asymmetrical filter matrix for longer service life
- Approved for Food Contact Use according to US CFR Title 21 & EC/1935/2004

\*Microorganism testing not certified by NSF

### LifeTec™ PP100 N



Donaldson LifeTec™ PP100 N filters are absolute rated depth type filters constructed of 100% polypropylene deliver superior flow rates and high throughput.

#### Features

- Absolute particle\* removal
- Asymmetrical pore structure for longer service life
- Highly robust polypropylene construction protects against deformation
- Excellent flow rate
- Approved for Food Contact Use according to US CFR Title 21 & EC/1935/2004

\*Microorganism testing not certified by NSF

### LifeTec™ PP100 CN



Donaldson LifeTec™ PP100 CN filters are specifically developed for maximum safety, performance and economics in protecting bottled water and soft drinks from Cryptosporidium and Giardia contamination\*

#### Features

- Absolute removal of Cryptosporidium and Giardia\*
- Tapered pore structure for longer service life
- Highly robust polypropylene construction protects against deformation
- Excellent flow rate
- Approved for Food Contact use according to US CFR Title 21 & EC/1935/2004



## STERILE FILTRATION OF WATER

### LifeTec™ PES-WN



Donaldson LifeTec™ PES-WN filters are sterile grade, pleated high-performance polyethersulfone membrane filters for liquid filtration of processed foods and beverages

#### Features

- Sterile grade membrane filters with a log reduction value of 7 for 0.2, 0.45 & 0.6 micron
- Excellent flow rate
- Highly robust polypropylene construction protects against deformation
- Extremely low adsorption of proteins
- High thermal stability, permanently hydrophilic

## WHAT IS STERILE FILTRATION AND WHY IS IT IMPORTANT?

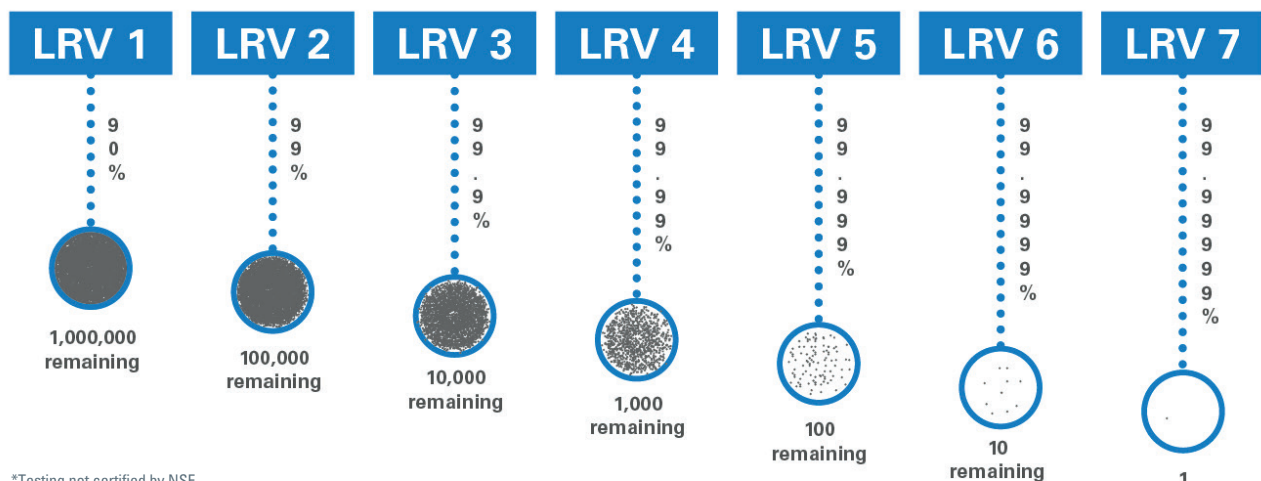
For many products it is crucial to use sterile grade microfilters that keep harmful bacteria from processes. Bacteria sizes reach from 0.2 micron up to 30 micron. The membrane filter needs to be capable of retaining all of those bacteria sizes\*.

Sterile filters for water are validated by using a special microorganism as a measuring standard, the *Brevundimonas diminuta*\*. This microorganism has a typical size of 0.2 to 0.3 micron, which makes it the perfect size to validate sterile filters.

Per definition, a sterile filter holds back all *Brevundimonas diminuta*\* except for one out of 10 million organisms which are applied to one square centimeter of filter surface. This calculates to retaining 99.99999 % of all bacteria. This 99.99999 % can be calculated into a so called LRV value, which stands for logarithmic reduction value. A retention rate of 99.99999 % equals a LRV 7.

### REMAINING MICROORGANISMS

OUT OF **10,000,000**



\*Testing not certified by NSF

# SUPPORTING PROCESS AND PRODUCT INTEGRITY

## Extensive Product Portfolio

- Process air, steam and liquid filtration products
- Performance engineered to sanitary guidelines
- Wide range of filtration media for any application
- Housings, elements, and parts in-stock, ready to ship

## Advanced Technology

- Optimized filtration performance and efficiency
- Extensive research and development capabilities
- Advanced design and testing capabilities
- Over 1,000 engineers and scientists worldwide

## Unrivalled Support and Expertise

- Expert technical specialists available as resource
- Comprehensive pre- and post-sale support
- Extensive filter analysis and trouble-shooting
- 100 years of successful global manufacturing



Registered



Standard No. 10-04\*



Member of



Member of



Member of



### Important Notice

Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, specifications, availability and data are subject to change without notice, and may vary by region or country.



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