Filter Options for Bottled Water Production

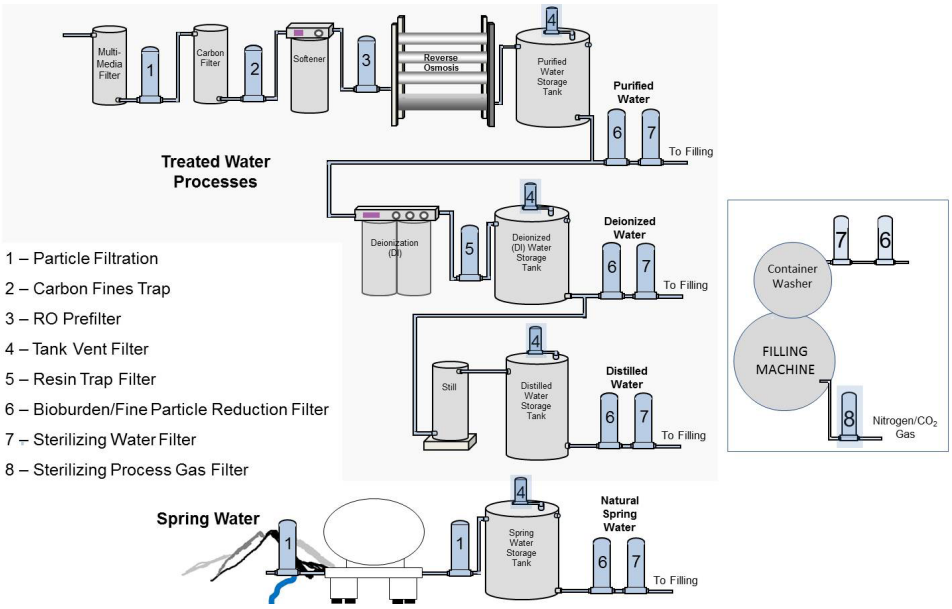
CRITICAL PROCESS FILTRATION, INC.

Filters are used to protect bottled water treatment processes and final product quality. They prevent possible contaminants from source water entering the production system and remove bacteria and other organisms that might enter the system from a variety of sources.

Source water entering a facility can carry both inorganic particles and microorganisms. Cartridge filters are a cost effective method of controlling these contaminants both as the water enters a facility and as it is processed.

Bacteria, yeasts, molds and other organisms can be found everywhere. They can find their way into the process through raw water, the facility environment, even on packaging materials. Cleaning and operating procedures might reduce the number of organisms, but no cleaning method can prevent environmental organisms from re-entering equipment as soon as the cleaning process is done.

Figure 1 - Filtration in Bottled Water Production



Particle Removal and Prefiltration

The housings marked 1, 2, 3 and 5 in the figure all remove unwanted particles from water as it enters or after treatment steps that might contribute particles to the water stream. Larger particles, those larger than 1 to 5 microns, are easily removed using depth filtration.

Depth media in cartridge filters is found in two forms. Standard depth filters are self-supporting tubes made using a polymer, most often polypropylene. They capture a range of particle sizes through the thickness of the media. Pleated depth filters are made with a pleated flat sheet media, most often made with polypropylene or fiberglass. Polypropylene is the most widely used material for water and water-based fluids. Pleated filters have a large surface area that holds more particles on the surface than standard depth filters.

Bacteria Reduction/Removal

The most critical filters in Figure 1 are those used for bacteria control for both product and container cleaning water (housings marked 6 and 7). Those filters remove microorganisms, with the first filter removing most and the second the remaining organisms. The most commonly used filters are membrane-based. The first filter may have a pore size of 0.45 or 0.65 microns to protect the final filter with its 0.22 micron pores. Using 0.22 micron filters assures removal of all bacteria.

Tank Vent and Process Gas Filtration

Tank vent and process gas filters (housing marked 4 and 8) are also critical to the quality of the final product. Tank vent filters keep particles and bacteria in the facility environment from entering tanks and contaminating products during storage. If process air or gas is used for either carbonation or to dry containers after washing, filters are used to prevent particles and bacteria being carried into the containers. Almost all process gas filters and tank vent filters are hydrophobic membrane with 0.22 micron pore size ratings.

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Process Area	Filter Application	Filtration Function	Grade*	Media**
Particle Removal and Prefiltration	Sediment/Particle Removal	Protect downstream processes and filters from fouling by large particles	G	MB, NS, PD or GF
			F	PD or GF
	Prefiltration	Remove smaller particles and some larger organisms liolds	G	MB or NS
			F	PD or GF
Final Filtration and Filling/ Packaging	Bacteria Reduction	Remove most bacteria and other organisms	F	CWPS, PS or PVWL
	Bacteria Removal	Remove all bacteria and oher organisms	F	PS
Product Storage and Filling/ Packaging	Tank Vent and Process Gas Filtration	Prevent particles or bacteria from the environment from entering storage tanks and remove contaminants from process gases like CO_2	G, F	PVWB or TM

*Grade Codes
F = Food & Beverage grade G = General Service Grade

**Media Codes
GD = Pleated Fiberglass Depth Media MB = Melt Blown Polypropylene Depth Media NS = Nano-Spun Polypropylene Depth Media
PD = Pleated Polypropylene Depth Media CWPS = High Capacity PES Membrane PS = Polyethersulfone Membrane
PVWL = High Capacity Hydrophilic PVDF Membrane PVWB = High Capacity Hydrophobic PVDF Membrane TM – PTFE Membrane

Contact Critical Process Filtration for help determining the best filter options for you.

Cartridge order numbers have several variables from grade to media and pore size to end cap type. For example, Food & Beverage Grade, Polyethersulfone Membrane, 0.22 Micron Rating, with SS Support Ring, 20" Length, Silicone O-Rings, 2-226 O-Ring/Spear End Cap Configuration = FPS-20S00002S9.

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Filter Grade
F = Food & Beverage
G = Service
blank = Melt Blown or Nano-Spun

316 SS Ring
S = Ring
N = No Ring

Membrane/Depth Media
CWPS = High Capacity PES
PS = PES
PVWB = Hydrophobic High Capacity PVDF
PVWL = Hydrophilic High Capacity PVDF
TM = PTFE
GD = Pleated Fiberglass
PD = Pleated Polypropylene
GDMB = Melt-Blown Polypropylene
NSPD = Nano-Spun Polypropylene

Pore Size Code

-03 = 0.03 µm	5-0 = 5.0 µm
-10 = 0.10 µm	10- = 10 µm
-20 = 0.22 µm	20- = 20 µm
-40 = 0.45 µm	30- = 30 µm
-60 = 0.65 µm	40- = 40 µm
-80 = 0.80 µm	50- = 50 µm
1-0 = 1.0 µm	60- = 60 µm
1-2 = 1.2 µm	75- = 75 µm
2-0 = 2.0 µm	999 = 100 µm
3-0 = 3.0 µm	

Cartridge Length Code
05 = 4.875 in. (12.4 cm)
97 = 9.75 in. (24.8 cm)
01 = 10 in. (25.4 cm)
19 = 19.5 in. (49.5 cm)
02 = 20 in. (50.8 cm)
29 = 29.25 in. (74.3 cm)
03 = 30 in. (76.2 cm)
04 = 40 in. (101.6 cm)

O-ring/Gasket Code
S = Silicone
B = Buna
V = Viton (or FKM)
T = FEP Encapsulated Viton (or FKM)
E = EP
R = FEP Encapsulated Silicone

End Cap Code
0 = Flat Gasket, DOE
1 = Flat Gasket/Plug
2 = 2-222 O-ring/Plug
3 = 213/119 Internal O-ring DOE
4 = 213/119 Internal O-ring/Plug
5 = 2-222 O-ring/Flat
6 = 2-226 O-ring/Flat
7 = 020 O-ring/Plug
8 = 2-222 O-ring/Spear
9 = 2-226 O-ring/Spear
21 = 2-223 O-ring/Flat
22 = 2-223 O-ring/Spear
23 = 2-222 O-ring 3 Tab/Flat
24 = 2-222 O-ring 3 Tab/Spear
25 = Short 2-222/Plug

Visit our website or contact us for more application information and to access data sheets on all of our products.

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