

Filter Options for Juice Drink Production



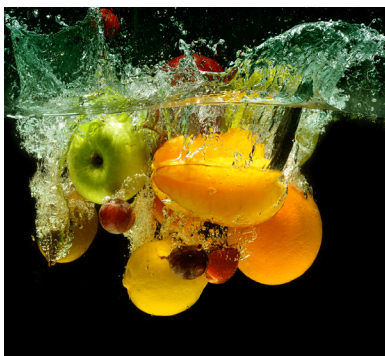
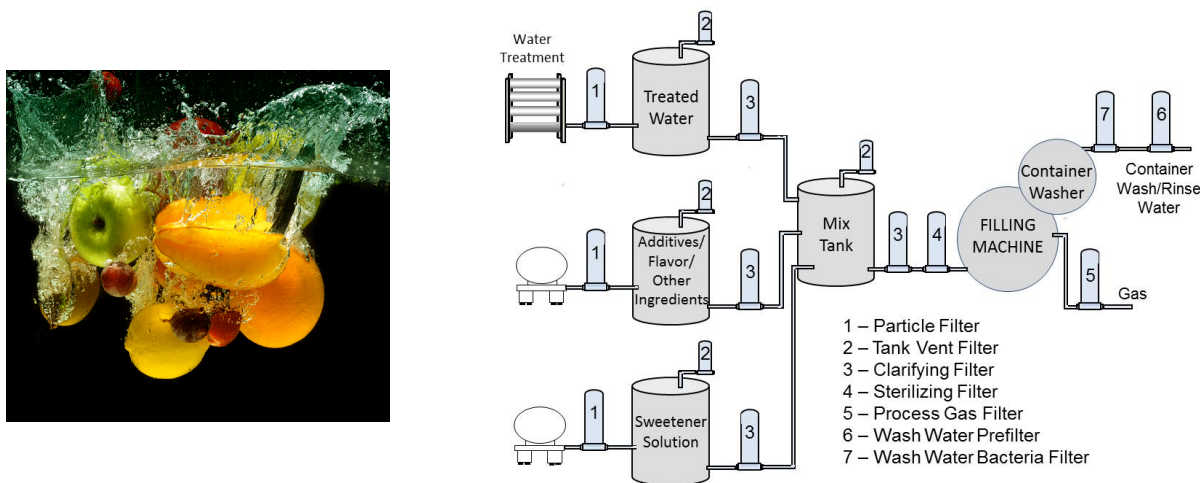
Raw juice has a very high load of particles and organisms, even after bulk filtration. The cartridge filters shown in Figure 1 are used to progressively remove the particles and organisms that may adversely affect the quality and safety of clear juice drinks.

There are many filtration steps, and all are important to juice drink quality. Filters are used for removing sediment, clarifying the juice, reducing or removing spoilage organisms, protecting product while it is in tank storage, and even filtering process gases used in production. The figure shows a fruit juice drink process with multiple potential sources of particles and organisms and possible locations for filters to help control or remove them.

Of particular concern are organisms that are known to survive heat treatment and are common in some juice drink processes. Organisms such as “thermo-acidophilic bacteria”, or TAB, especially *Alicyclobacillus* species, occur naturally in fruits and are resistant to pasteurization. Other heat-resistant, “flat sour” organisms can enter the process with outside ingredients. Sugar, for example, can be a carrier of the spores of *Bacillus* and other bacteria and mold species.

Below are brief descriptions of the applications shown in the schematic. Filters that may be used for each application are listed in the table on the next page. Visit our [website](#) for more information on all of these filter applications.

Figure 1 - Filtration in Juice Production



Clarification & Prefiltration

Raw fruit juices are usually clarified immediately after the bulk removal of the fruit pulp. Small particles not captured by the bulk filtration process are removed as the raw juice and other ingredients enter the production process for mixing (housings marked 1 in the figure). Removing particles helps prevent adverse flavors from being introduced to the product.

Once larger particles are removed, clarification steps (housings marked 3 in the figure) are used to reduce the number of smaller particles and improve product clarity.

Bacteria Reduction/Removal

Filtration may be used to remove organisms, including those that are heat stable and capable of surviving a pasteurization process (housings 3 and 4 in the figure). For non-pasteurized products, additional filtration may be needed due to a possibly higher bacteria load.

Heat-resistant organisms can enter the process system with outside ingredients. Sugar, for example, can be a carrier of the spores of *Bacillus* and other species. Molds and yeasts are found almost everywhere in the environment and can be carried in by ingredients or enter the process somewhere in the plant.

Tank Vent & Process Gas Filtration

Tank vent filters (housings marked 2 in the figure) keep airborne bacteria in the environment from entering tanks as they are emptied. The air in juice processing facilities may contain bacteria and spores, so preventing them from entering the tanks further protects product quality.

Process gas filters (housing marked 5) are also critical to the quality of the packaged juice. These keep particles and bacteria that may be carried by process gas from being deposited in containers as they are filled. Some plants may also use process gas as a blanket in storage tanks, and it will also be filtered to prevent potential contaminants from reaching the product in the tank. Almost all process gas filters and tank vent filters have 0.22 micron pore size ratings.

Filter Options for Juice Drink Production

Process Area†	Filter Application	Filtration Function	Grade*	Media**
Ingredient Receiving, Product Mixing	Pretreatment	Protect downstream processes and filters from fouling by large particles	G	MB
			F	PD or GF
	Clarification	Improve visual clarity of product by removing fine particles and sediment from ingredients	G	MB or NS
			F	PD or GF
Post-Mix, Filling/ Packaging	Bacteria/Bioburden Reduction	Remove most bacteria and molds	F	CWPS, PS or PVWL
	Bacteria Removal/ Product Sterilizing	Remove all bacteria and molds	F	PS
Storage Tanks and Container Cleaning/Filling	Tank Air/Gas Filtration	Prevent bacteria from entering tanks when liquid is drawn from them and air/gas is drawn into the tank to replace the liquid volume	G, F	PVWB or TM
	Process Gas Filtration	Prevent bacteria from gases like CO ₂ and Nitrogen from entering product or containers during filling	G, F	PVWB or TM

†Note: See the Selection Guide "Filter Options for Process Water Treatment" for applications in process water and ingredient water treatment systems.

*Grade Codes

F = Food & Beverage grade G = General Service Grade

**Media Codes

MB = Melt Blown Polypropylene Depth Media

NS = Nano-Spun Polypropylene Depth Media

GD = Pleated Fiberglass Depth Media

PD = Pleated Polypropylene Depth Media

CWPS = High Capacity PES Membrane

PS = Polyethersulfone Membrane

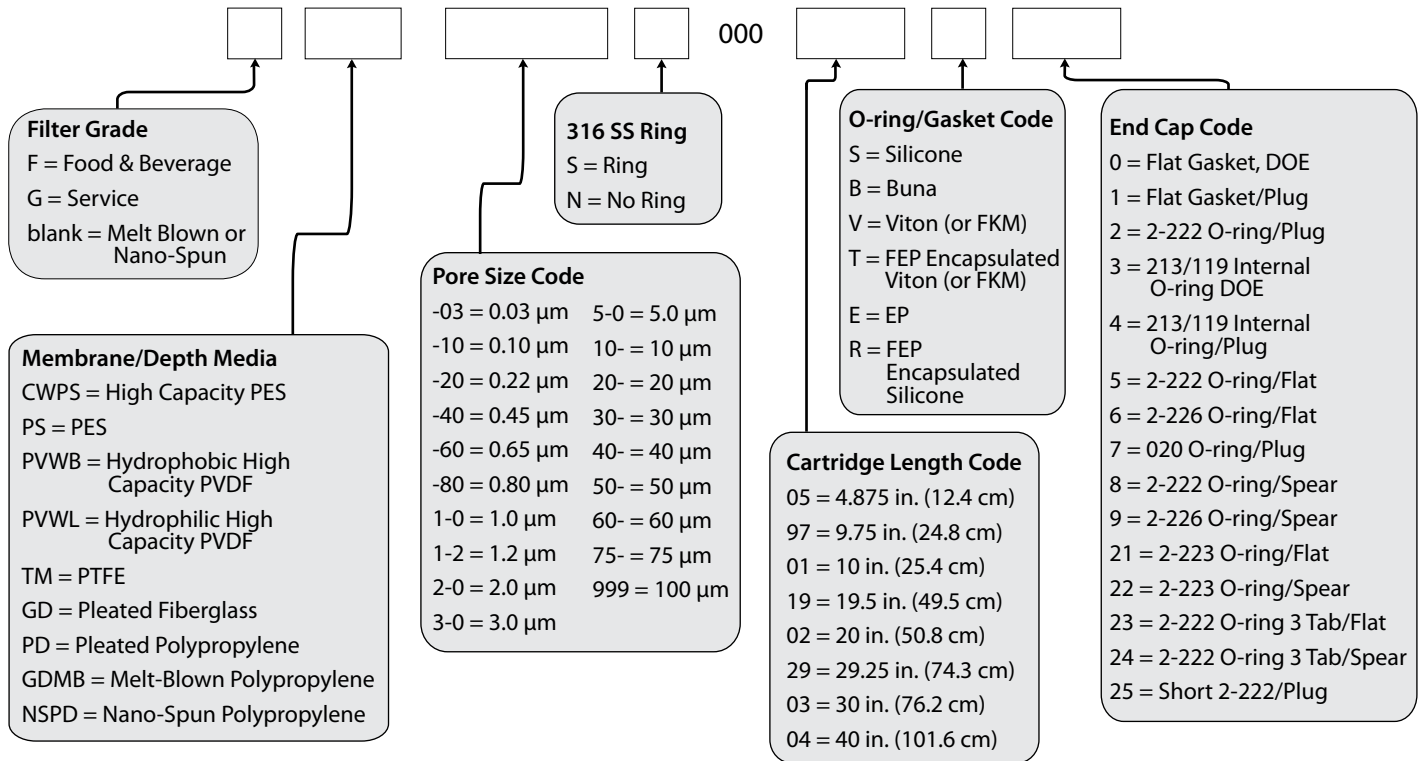
PVWL = High Capacity Hydrophilic PVDF Membrane

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.



Visit our [website](#) or [contact us](#) for more information and to access data sheets on all of our products.



Critical Process Filtration, Inc.

One Chestnut Street • Nashua, NH 03060

Tel: 603.880.4420 • Fax: 603.880.4536

criticalprocess.com • sales@criticalprocess.com

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