



Engineered Filtration, Inc.

Filtration Of Liquids & Gases - Intelligent Solutions



Wine originates back to 3000 BC



- Grapes - One grape contains all the ingredients necessary for making wine.
- Natural process of converting a grapes sugar into alcohol
- Methods vary from winery to winery - Winemaker practices
- Still Wines - letting carbon dioxide gas escape from the fermentation container
- Champagne - keep all carbon dioxide inside the fermentation tank



Steps in Process

- A) Harvest
- B) Crush - De-stem
- C) Press
- D) Fermentation
- E) Malolactic - Secondary Fermentation (softening agent)
- F) Aging - Vessel - Time
- G) Sur lie Aging - has to do with mouth feel Creamy” consistency of the wine, stirring the lees
- H) Filter - pulling out residuals left in wine
- I) Bottling - binning



Red Wine

- A) Harvest
- B) Crush
- C) Fermentation
- D) Secondary Fermentation (option)
- E) Press - Separate Juice
- F) Aging
- G) Filter
- H) Bottling

*Taste factors - Barrels, Malolactic, Surlie & Region of growth



White Wine

- A) Harvest
- B) Crush
- C) Press - Remove Skins
- E) Fermentation
- F) Secondary (optional)
- G) Aging
- H) Filter
- I) Bottling

*Taste Factors - Barrels, Malolactic, Surlie & Region of growth



Basic Wine Terms

- **Vintage** - Year grapes are grown and harvested
- **Tannin** - Extracts from seeds, skins, and stems
- **Dry** - Wine with no sugar after fermentation
- **Sweet** - Wine with a small amount of sugar left over
- **Body** - The weight of the wine
- **Style** - Overall impression of the wine
- **Bouquet** - A wine scent that comes from winemaking process
- **Aromatic** - Elements of wine scent that comes from the grape itself



Common White Wines

- **Chardonnay** - Typical green apple, citrus, somewhat fruity

Origin - Burgundy region of France

- **Sauvignon Blanc** - Fig, Melon sometimes grassy, lighter bodied than Chardonnay

Origin - Bordeaux region of France

- **Pinot Grigio** - Very light style, easy to drink, melon and citrus overtones

Origin - Alto - region of Italy

- **Riesling** - Light wine, sweet with hints of Apricot, Peach and Honeysuckle

Origin - Germany



Common Red Wines

- **Cabernet Sauvignon** - Very dry full bodied wine with pronounced tannins. Fruit flavors of dark cherry, and cassis
Origin - Bordeaux region of France
- **Merlot** - Softer than Cabernet - less tannins, dark cherry, herbs and black berry
Origin - Bordeaux region of France
- **Pinot Noir** - Raspberry and herbal. Sometimes earthy(winemaker)
Origin - Burgundy region of France
- **Syrah or Shiraz** - Rich and robust medium tannins, dark fruit, black pepper and spices
Origin - Rhone region of France



Champagne / Sparking Wine

- Storage in tanks is call Charmat Bulk process
- Carsten's Transfer Process: The secondary fermentation is taken from bottle and transferred to bulk glass container and put back in bottle.
- Fermenting in the bottle while being stored is called Methode Champanoise (more expensive process)



Fermentation

- a) **Stainless Steel**
 - * Imparts no extra flavors to the wine
 - * Preserves intensity of fruit and true varietal character
 - * Least expensive method
- b) **Barrel Fermentation (used mostly for white wines)**
 - * Adds flavors of butterscotch, toast and vanilla in whites
 - * French Oak is most desirable (subtle influence)
 - * Cost factor (French = \$650, American = \$250)
- c) **Combinations**
 - * Partial Barrel / partial stainless
 - * All new oak or partial new (1yr old or 2yr old oak may also be used)
- d) **Secondary Fermentation (Malolactic)**
 - * Non-alcoholic fermentation
 - * Converts harsh malic acid (apples) to soft lactic acid (milk)
 - * Adds a creamy, rich mouthfeel to the wine
 - * Identifiable in the wine as a texture



Oak Aging

a) Sur Lie Aging

- * Usually done for Chardonnay
- * Means “on the lees” (Lees are the spent yeast cells that fall to the bottom of the fermentation vessel)
- * Adds a creamy, toasty dough-like flavor to the wine
- * Wine can age on the lees for 3-6 months
- * Lees are stirred every other week or so to improve their exposure to the wine and make the flavor more pronounced

b) Whites

- * After wine is fermented in the barrel, the wine is left in the barrel to age sur lie
- * After sur lie aging, the wine is “racked” off of the lees into a clean barrel and allowed to age for 3 -6 more months

c) Reds

- * Reds are usually not fermented in new oak barrels, but in stainless steel or old wooden vats
- * After fermentation and pressing, the wine is put into small oak barrels to age
- * Aging takes anywhere from 8 months to 2 years (soften Tannins)



Blending

a) Blending wines from different grape varieties (examples)

- * Cabernet Sauvignon with Merlot, Cabernet Franc, Petite or Malbec
- * Sauvignon Blanc with Semillon
- * US laws requires 75% to be labeled a certain varietal

b) Blending wines from different types of fermentation / aging (examples)

- * 1/2 stainless with 1/2 barrel
- * 1/3 new oak, 1/3 1-yr. old oak, 1/3 2 - yr. old oak
- * 1/2 French oak aged, 1/2 American oak aged
- * No laws

c) Blending wines from different vintages

- * Mostly done with port, Champagne, and less expensive wines



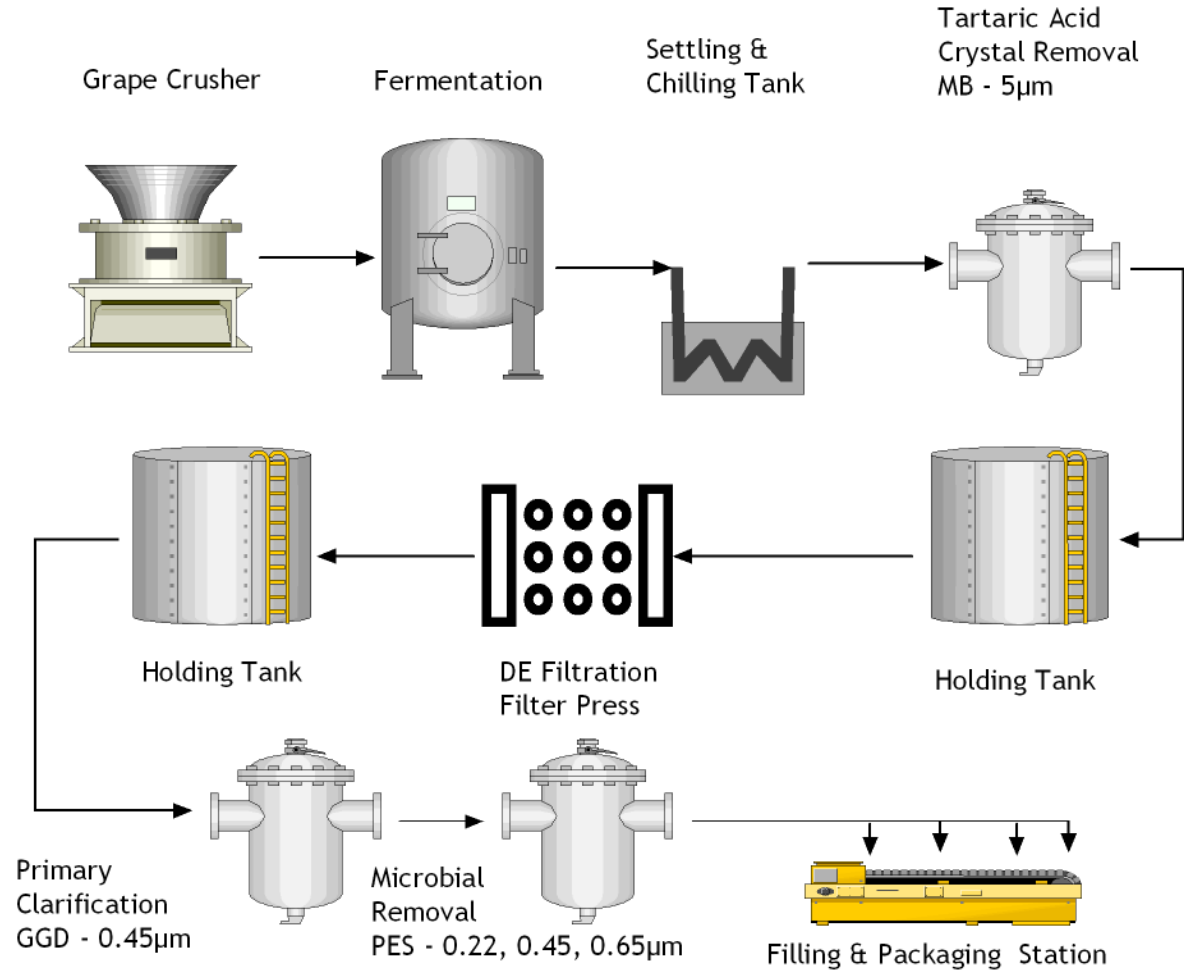
Why Filtration in Wine Processing?



- *Tartaric Acid Crystals* -remove precipitated colloids and crystals.
- *Primary Clarification*- removal yeasts and solids.
- *Intermediate Stabilization*- sterilizing and removing impurities while in storage or transport.
- *Final Filtration*- Removal of organisms that can cause spoilage.



Wine Filtration



Function Of Filters

In Food Bio-Processing

- *Clarification*- remove entrained solids and cell debris from fermentation and maturation process.
- *Particle Removal*- remove organic & inorganic materials which are sources of contamination and turbidity.
- *Micro-organism Removal*- Bacteria, yeasts, and other micro-organisms can cause spoilage, sickness, and product recall.
- *Final Filtration*- goal is to provide consistent product runs with stable and aesthetically pleasing food product.



Prefilter Products

- **GPD** - Polypropylene Depth Media
- **GGD** - Glass Fiber Depth Media
- **NSPD** - Nano Spun Polypropylene Media

Available in:

General Grade

Food & Beverage Grade

Electronics Grade

Pharmaceutical Grade



Engineered Filtration, Inc.

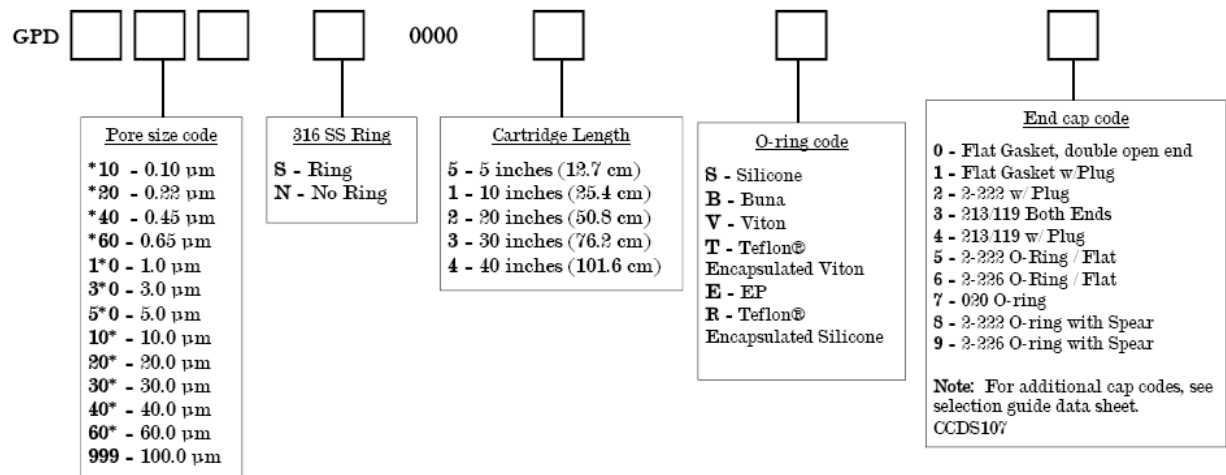
GPD Prefilter Products

- GPD grade Polypropylene cartridges are designed for general purpose use
- Rated at 99.9% efficiencies at the rated pore size
- Designed to hold the maximum amount of filter media that can be completely and effectively utilized in a cartridge.
- GPD filters lower the cost of filtration
- GPD cartridges are flushed with 17+ megohm-cm water to remove potential extraneous manufacturing debris.



Construction Materials

- Filtration Media: Polypropylene
- Filtration Media Support: Polypropylene
- End Caps: Polypropylene
- Center Core: Polypropylene
- Outer support Cage: Polypropylene
- Sealing Method: Thermal Bonding
- O-rings: Buna, Viton, EP, Silicone, Teflon®
- Encapsulated Silicone, Teflon®
- Encapsulated Viton



GGD Prefilter Products



- GGD grade Glass Fiber cartridges are designed for general purpose use
- Rated at 99% efficiencies at the rated pore size
- Designed to hold the maximum amount of filter media that can be completely and effectively utilized in a cartridge.
- GGD Glass Fiber media has excellent solids holding properties
- GGD cartridges are flushed with 17+ megohm-cm water to remove potential extraneous manufacturing debris.

Construction Materials

Filtration Media: Glass Fiber

Filtration Media Support: Polypropylene

End Caps: Polypropylene

Center Core: Polypropylene

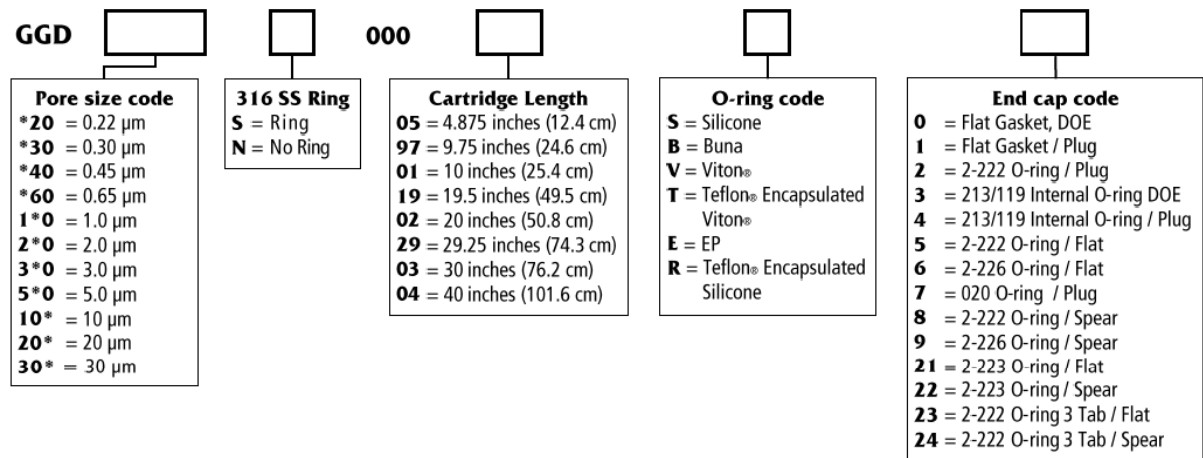
Outer support Cage: Polypropylene

Sealing Method: Thermal Bonding

O-rings: Buna, Viton, EP, Silicone, Teflon®

Encapsulated Silicone, Teflon®

Encapsulated Viton



Engineered Filtration, Inc.

NSPD Prefilter Products

- NSPD Non-Spun Polypropylene cartridges are designed to hold large amounts of contaminants
- Rated at 99% efficiencies at the rated pore size
- Designed for high solids loading applications.



Construction Materials

Filtration Media: Hydrophilic Polypropylene

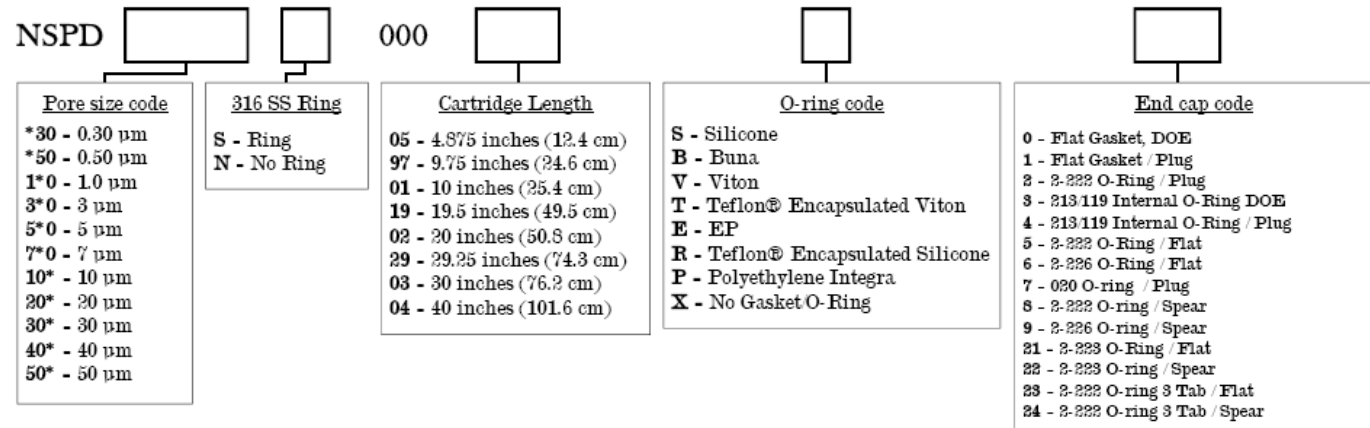
End Caps: Polypropylene

Center Core: Polypropylene

O-rings: Buna, Viton, EP, Silicone, Teflon®

Encapsulated Silicone, Teflon® Encapsulated

Viton



Engineered Filtration, Inc.

Membrane Products

- **FPS** - Polyethersulfone Membrane
- **VPS** - Dual Layered Polyethersulfone Membrane
- **FNM** - Nylon Membrane
- **FPM** - Polypropylene Membrane
- **FTM** - PTFE Membrane

Available in:

General Grade

Food & Beverage Grade

Electronics Grade

Pharmaceutical Grade



Engineered Filtration, Inc.

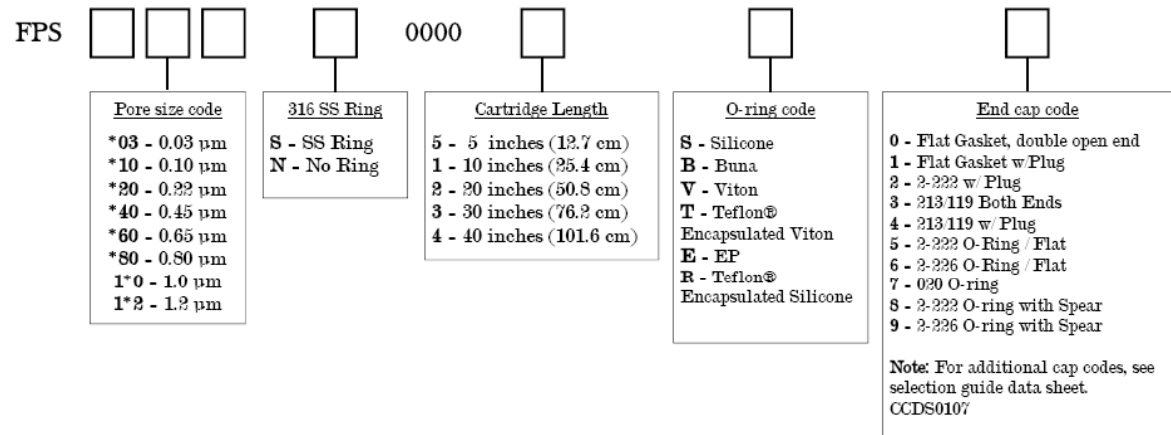
FPS Membrane Products

- FPS food and beverage grade cartridges have been designed to comply with all FDA requirements for the food industry.
- Polyethersulfone is low protein binding and therefore a good choice for fermented beverage filtrations.
- FPS cartridges are flushed with 17+ megohm-cm water to ensure that no manufacturing debris.
- FPS cartridges are individually integrity tested and validated.



Construction Materials

- Filtration Media: Polyethersulfone
- Filtration Media Support: Polypropylene
- End Caps: Polypropylene
- Center Core: Polypropylene
- Outer support Cage: Polypropylene
- Sealing Method: Thermal Bonding
- O-rings: Buna, Viton, EP, Silicone, Teflon®
- Encapsulated Silicone, Teflon®
- Encapsulated Viton



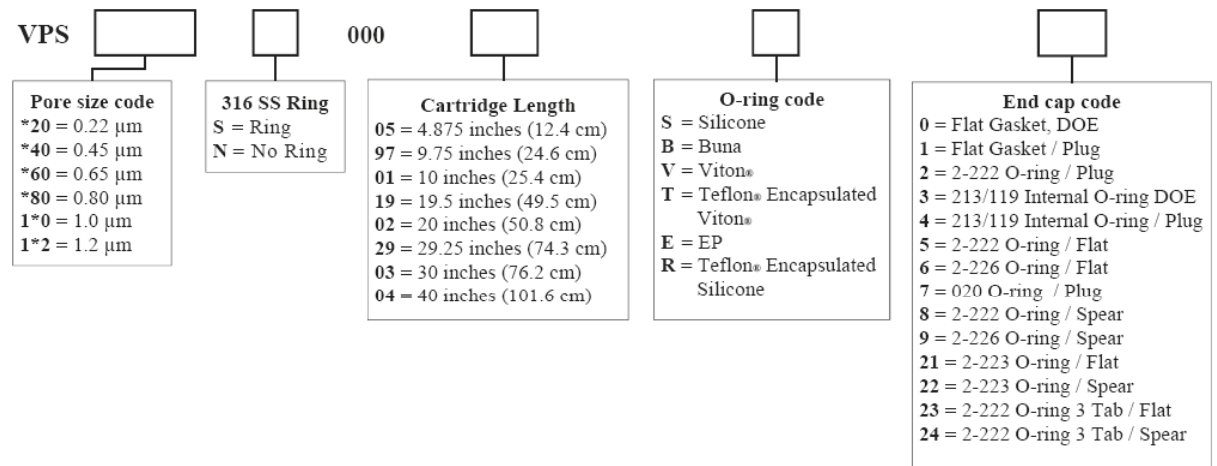
VPS Membrane Products

- VPS food and beverage grade cartridges have been designed to comply with all FDA requirements for the food industry.
- VPS cartridges have TWO LAYERS of Polyethersulfone Membrane
- Polyethersulfone is low protein binding and therefore a good choice for fermented beverage filtrations.
- VPS cartridges are flushed with 17+ megohm-cm water to ensure that no manufacturing debris.
- VPS cartridges are individually integrity tested and validated.



Construction Materials

Filtration Media: Polyethersulfone
Pre-Filtration Media: Polyethersulfone
Filtration Media Support: Polypropylene
End Caps: Polypropylene
Center Core: Polypropylene
Outer support Cage: Polypropylene
Sealing Method: Thermal Bonding
O-rings: Buna, Viton, EP, Silicone, Teflon®
 Encapsulated Silicone, Teflon®
 Encapsulated Viton



Engineered Filtration, Inc.

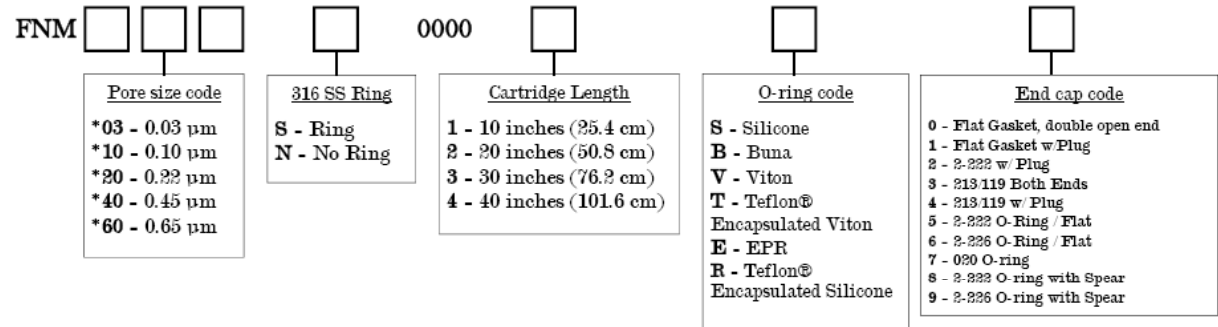
FNM Membrane Products

- FNM food and beverage grade cartridges have been designed to comply with all FDA requirements for the food industry.
- FNM cartridges are particularly suited for water and syrup filtration.
- FNM cartridges are flushed with 17+ megohm-cm water to ensure that no manufacturing debris.
- FNM cartridges are individually integrity tested and validated.



Construction Materials

- Filtration Media: Nylon
- Filtration Media Support: Polypropylene
- End Caps: Polypropylene
- Center Core: Polypropylene
- Outer support Cage: Polypropylene
- Sealing Method: Thermal Bonding
- O-rings: Buna, Viton, EP, Silicone, Teflon®
- Encapsulated Silicone, Teflon®
- Encapsulated Viton



FPM Membrane Products

- FPM food and beverage grade cartridges have been designed to comply with all FDA requirements for the food industry.
- FPM cartridges are particularly suited for water and syrup filtration.
- FPM cartridges are flushed with 17+ megohm-cm water to ensure that no manufacturing debris.
- FPM cartridges are individually integrity tested and validated.



Construction Materials

Filtration Media: Polypropylene

Filtration Media Support: Polypropylene

End Caps: Polypropylene

Center Core: Polypropylene

Outer support Cage: Polypropylene

Sealing Method: Thermal Bonding

O-rings: Buna, Viton, EP, Silicone, Teflon®

Encapsulated Silicone, Teflon®

Encapsulated Viton



Engineered Filtration, Inc.

FTM Membrane Products

- FTM food and beverage grade cartridges have been designed to comply with all FDA requirements for the food industry.
- FTM cartridges are hydrophilic particularly suited for compressed gas and tank vent filtration.
- FTM cartridges are flushed with 17+ megohm-cm water to ensure that no manufacturing debris.
- FTM cartridges are individually integrity tested and validated.



Construction Materials

Filtration Media: PTFE

Filtration Media Support: Polypropylene

End Caps: Polypropylene

Center Core: Polypropylene

Outer support Cage: Polypropylene

Sealing Method: Thermal Bonding

O-rings: Buna, Viton, EP, Silicone, Teflon®

Encapsulated Silicone, Teflon®

Encapsulated Viton



Engineered Filtration, Inc.

End Cap Designs



226 O-Ring



222 O-Ring



Flat Gasket



Internal O-Ring
213 / 119



Spear / Fin



Flat Cap



Recessed Plug



020 O-Ring



223 O-Ring



222 O-Ring / 3
Tab

Stainless Steel Rings



222 O-Ring With
Stainless Steel Ring



226 O-Ring With
Stainless Steel Ring

Note: The stainless steel rings are only available in the 222 and 226 end caps. Please reference the ordering guide on your data sheet and replace the N with an S.

End Cap Codes

- 0 = Flat Gasket, double open end
- 1 = Flat Gasket w/Plug
- 2 = 2-222 O-Ring / Plug
- 3 = 213 119 Internal O-ring Both Ends
- 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 with Spear
- 9 = 2-226 O-ring with Spear
- 21 = 2-222 O-Ring / Flat
- 22 = 2-222 O-Ring with Spear
- 23 = 2-222 O-ring 3 Tab / Flat
- 24 = 2-222 O-ring 3 Tab with Spear

Note: Consult factory if other End Cap Configurations are required.



Engineered Filtration, Inc.

Integrity Testing

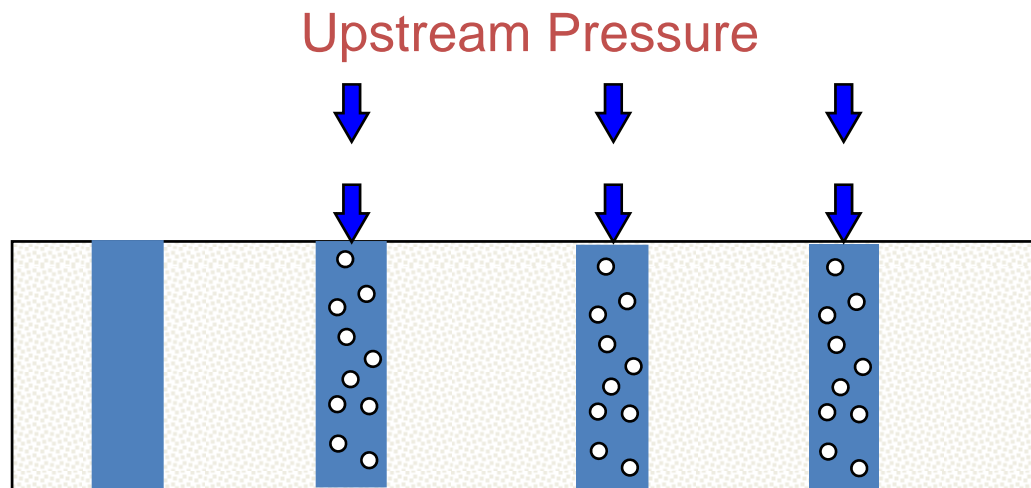
- Integrity Testing: A non-destructive method of evaluating filter performance to manufacturer's published specifications.
 - Bubble Point
 - Diffusional Flow
 - Pressure Hold



Integrity Testing *Diffusional Flow*

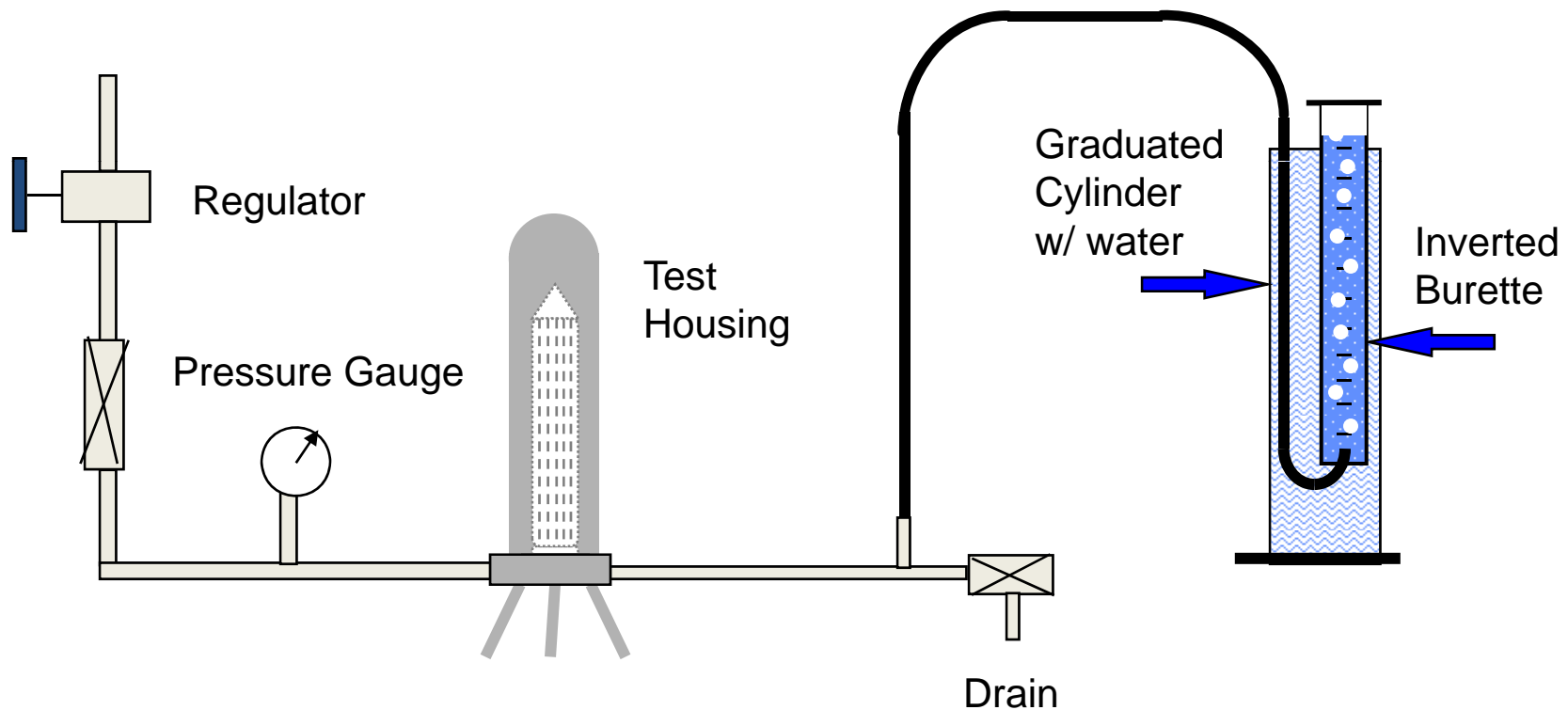
Basic Procedure

- Pre-wet membrane
- Apply pressure to upstream side at 80% of the specified pressure
- Measure volume of gas collected on downstream side



Integrity Testing

- Bubble Point / Diffusional Flow Test Stand



Sterilization

Sterilization (or sterilisation) - any process that effectively kills or eliminates transmissible agents (such as fungi, bacteria, viruses, spore forms, etc.) from a surface, equipment, article of food or medication, or biological culture medium

➤ *Chemical Sterilization-*

- Hydrogen Peroxide, minimum 15% concentration for 30 minutes.
- Isopropyl Alcohol, 70% concentration for 30 minutes.
- Ethanol, 70% concentration for 30 minutes.
- Peroxyacetic Acid, minimum 1% concentration for 30 minutes.
- Citric Acid, minimum 1% concentration for 30 minutes.

➤ *Filtered Hot Water* - 190°F (88°C) 30 minute cycle.

➤ *Autoclave* - 260°F (127°C) 30 minute cycle.

➤ *In-line Steam* - 275°F (135°C) 30 minute cycle.



Sanitary Filter Housings

CSH Single or Multiple Cartridge Housings

- Available in T-style or Inline configurations.
- Single Housings Offered in lengths from 5 through 40 inches.
- Multi cartridge sanitary housings, available in 3,6,8,12 and 21 round models with swing bolt closures.
- Sanitary clamp closures are a proven design suited for high purity beverage, chemical and pharmaceutical applications.
- Housings are manufactured in 316/316L Stainless Steel with a 25 RA internal finish.
- All CSH housings are standard with 226 style cartridge adaptors.
- CSH housings have no internal threaded parts that come in contact with the process fluid and are standard with food grade silicone gaskets.
- Housings include 1" sanitary gauge port tops with 1/2" sanitary vent and drain ferrules.



For Further Information

Please contact:

info@safety-tek.com

www.safety-tek.com

or

info@engfilt.com

www.engfilt.com



Engineered Filtration, Inc.

