



## Which Membrane is the Best for Your Winery:

*The differences between PVDF (Polyvinylidene Fluoride) and PES (Polyethersulfone) cartridges used in the wine industry.*



### What impact does the membrane have on the components of wine?

PVDF has the lowest protein and color binding of any common membrane used in cartridges. This leaves more in the wine. Lower binding also leads to less plugging and better cleaning of proteins – a leading cause of membrane blockage over time.

### How important is surface area?

It is possible to lower the amount of membrane in PES cartridges while maintaining the same flow traits and number of cartridges. Manufacturers do this to lower the cost of the filter; however, this also lowers the total area available for contaminants. Even with the best cleaning procedures, materials are deposited over time and the filters gradually lose permeability. Lowering the membrane surface area of a cartridge directly leads to a shorter filter life span during wine filtration. Surface area is one of the single most important aspects of choosing a membrane.

### Are both membranes retentive when it comes to wine microbes?

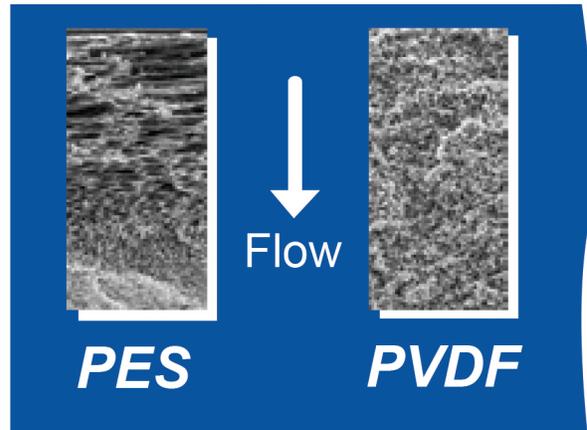
PVDF and PES membranes will both ensure the microbial stability of the wine if they've passed an integrity test.

## Is membrane flow rate important for a winery?

PES membranes have roughly 3x the maximum flow rate specification of PVDF membranes, given the same membrane area, however, wine filtration must be sized to achieve the most total throughput – not flow rate. Forcing a higher flow through the filters leads to faster blockage and more complete plugging at the end of the filtration cycle, resulting in a less effective cleaning and shorter lifespan. In fact, most cartridge filtration systems are sized and run at a fraction of their maximum flow rate in order to prolong membrane life.

## What is membrane symmetry?

Symmetry is a membrane property that describes how the depth of the membrane is composed. Symmetric membranes have relatively the same porosity and retention throughout the depth, while asymmetric membranes have an open upstream that tightens to the final level of retention (pore size) stated for the filter. Only the final portion of an asymmetric membrane has the stated retention.



## Are there differences in strength/robustness?

Membranes with a uniform (symmetric) depth tend to be stronger in the forward and reverse directions. Asymmetric membranes are more hollow for much of their depth, sometimes leading to a higher potential for membrane cracking under stress.

## What differences are observed during an integrity test?

Water is retained in the membrane pores during an integrity test. Bubble point measures the pressure required to force water from the pores. Pressure hold and diffusion measure the air flow through wetted pores while a pressure is applied. The ability for a membrane to be reliably wet for an integrity test is higher for symmetric membranes. Asymmetric membranes do not hold water as well since only the bottom portion is at the stated retention rating. This may lead to problems when integrity testing large installations, or when the filter is contacted with various oils, chemicals, or flavorings that can change the surface tension of the membrane.

Through our partnership with EMD Millipore, Gusmer Enterprises has access to one of the largest libraries of PES filters in industry but has decided to continue to exclusively represent PVDF final filters to the wine market due to superior performance and quality.