



Food and Beverage



## Pall Oenoflow™ XL Filtration System At the forefront of separation technology



# Pall Oenoflow XL Filtration System

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With the introduction of the new generation Oenoflow System, the XL series, wineries are setting new standards in achieving quality, yield and efficiency. A more compact footprint, reduced waste volumes, and better process control, enable wineries of all sizes to further reduce operating costs whilst maintaining absolute respect for the qualitative characteristics of the wine.

## Oenoflow Technology

By eliminating the drawbacks of traditional diatomaceous earth (DE) and sheet filtration, Oenoflow filtration systems have become the preferred technology in the wine-making industry.

The hollow fiber system enables wineries to remove suspended contaminants from wine in a reliable, reproducible and single process step. Clarification is achieved without the need for filter aids, centrifugation or interference with the chemical, physical or organoleptic components of the wine.

Cost savings is realized by reducing wine loss, consumables and labor. Furthermore, with a DE-free process and no solid waste for landfill, both environmental and operator safety are improved.

The new Oenoflow XL systems combine the strong points of the existing systems with new high area modules and improved process control resulting in manufacture of more compact and economical systems.

## A Remarkable Membrane

Wine is a fluid rich in complexity with a delicate chemical and physical balance. It is essential to work with an inert filtration membrane to preserve the taste and balance.

At the same time, the contaminants, whether from wine's natural evolution or a result of the manufacturing process, can be very small in size. The membrane must be designed to handle these solids whilst preventing blockage.

Manufactured in polyvinylidene fluoride (PVDF), the Oenoflow membrane has a balanced solid-void ratio that permits operation even with high solids loading. The homogenous structure guarantees resistance to abrasion and high flow rates without compromising reliability, even with aggressive cleaning regimes.

Ten years of experience in the field and absolute excellence in performance, clearly demonstrates the technical superiority of this proprietary membrane.





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## New XL Modules

The new large diameter Oenoflow XL modules incorporate Pall's proven PVDF membrane with approximately 145 % more filter area. With 21.5 m<sup>2</sup> of surface area the XL modules have at least twice the area of typical competitive hollow fiber membranes.

These high flow modules allow Pall to manufacture more compact and therefore more economical systems. With a smaller footprint and less water and chemical consumption, Oenoflow XL systems are in line with many wineries sustainability programs.

Oenoflow XL modules have been qualified for compliance to specific regulatory standards for products coming into contact with foodstuffs. For further details, please contact Pall.

## Opposing the "Gel Layer"

The use of a dedicated and specific wine membrane is essential, however, it is also necessary to keep the membrane as clean as possible. The contamination layer on the membrane (typically called a gel layer) can interfere with filtration, creating a further barrier by slowing down the flow rate and increasing filtration time. Additionally, acting as a filter itself, the gel layer can result in negative effects on the quality of the filtered wine.

Maintaining membrane cleanliness by opposing the gel layer enables the system to perform at its optimal operating condition. Filtration flow rate and the organoleptic characteristics are consistently maintained by the following process characteristics.

## The "Back Pulse"

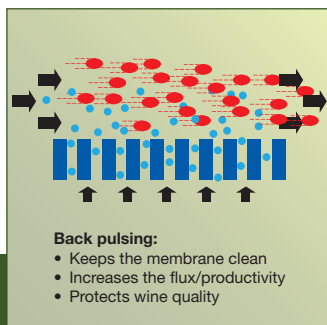
An energetic trans-membrane pressure pulse in the reverse flow direction systematically breaks the gel layer to restore membrane permeability. This process allows wine to continue unrestricted contact with the membrane resulting in longer and more consistent operation. This useful technique plays a key role in the overall system performance.

The uniform structure of the Oenoflow XL hollow fiber membrane has a high mechanical strength that protects it from risk of failure even after many years of continuous operation. A back pulse can apply prolonged mechanical stress on a membrane, however, the Oenoflow XL hollow fibers are constructed to resist this.

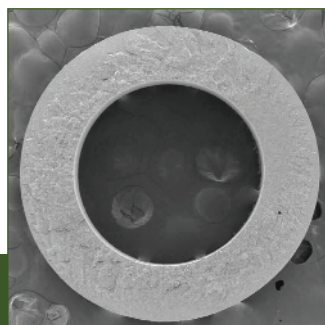
## "Dynamic Solid Control" (DSC)

In addition to increased surface area modules, the Oenoflow XL series incorporates a new and evolved flow distribution. With this new operating logic, the system gradually, but continuously, modifies the percentage of the solids present in the recycling loop upstream of the separation membrane. This "dynamic solid control" (DSC) also opposes stabilization of the gel layer.

Coupled together, the back pulse and DSC, both fully automated, provide increased system performance and longer filtration cycles.



The effect of the "Back Pulse"



Module cross section



XL modules have more than twice the area of most competitive modules



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## Oenoflow XL System Benefits

In addition to the robust, higher area XL modules and the unique DSC flow configuration, the Oenoflow XL system design has additional benefits:

- On-board concentration and filtrate tanks for operation independent of winery conditions
- Low capital investment per m<sup>2</sup> of filter area
- Low water and chemical consumption
- Maximum respect for the organoleptic wine characteristics
- Consistent filtrate quality: low turbidity (<1 NTU), reduced filterability index and low microbiological count
- High yield and low waste volumes due to the patented final concentration step (Typical loss < 0.3 %)
- No additional pre-clarification or separation requirement
  - fewer wine movements
  - reduced labor costs
- No filter aid requirement
  - reduced product handling
  - reduced waste disposal for landfill
- Compact footprint for easy installation and flexible operation throughout the winery

## Meeting Expectations

To meet the different needs and expectations of wineries of all sizes, the Oenoflow XL system is available in different configurations. Whilst the system size and level of automation may vary, they all share the same operating principles, membranes, performance, warranties, product quality, reliability and safety.

## Oenoflow XL E (Easy)

- Fully automatic operation capable of combining filtration and cleaning cycles
- On-board process and cleaning tank
- Automatic chemical dosing
- Simple and logical PLC control with touch screen
- Filtrate flow control
- Safety alarms for the product and the system

## Oenoflow XL S (Smart)

- Fully automatic operation capable of combining filtration, recovery and cleaning cycles
- On-board process and cleaning tank
- Simple and logical PLC control with touch screen
- Automatic chemical dosing
- Small batch filtration program
- High efficiency "solo" water backwash cleanings
- Auxiliary equipment options: remote wine transfer pump, dual pre-filter screens

## Oenoflow XL A (Advanced)

- Fully automatic operation with pre-set and customized working cycles
- On-board process and cleaning tank with incoming wine transfer pump
- Simple and logical PLC control with color touch screen
- Automatic chemical dosing
- Data monitoring and process trend recording
- Automatic Gross Failure Test
- Wide selection of customizable options: turbidity meter, automatic dual pre-filter screens, LCV \*, TDS\*\*

\* Low Concentration Volume

\*\* Tank Distribution System



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## Oenoflow XL Application Range

Whilst the flow rates are strongly influenced by the type of wine, the level of pre-treatment and settling time, the table below provides a guideline for average flow rates considering 6 to 8 hours of continuous operation.

Our wine specialists are available to help select the optimum Oenoflow XL system and options to meet your specific winery requirements.

Number of Modules	XL E	XL S	XL A	Average Flow	
				hl/h	US gph
2	•			20 - 30	525 - 800
3	•	•		30 - 45	800 - 1180
4		•		40 - 60	1050 - 1580
5		•	•	50 - 75	1300 - 2000
6		•	•	60 - 90	1580 - 2375
8			•	80 - 120	2100 - 3170
10			•	100 - 150	2640 - 3950
12			•	120 - 180	3170 - 4750
14			•	140 - 210	3700 - 5550
16			•	160 - 240	4225 - 6350
18			•	180 - 270	4750 - 7100

## Oenoflow XL HP

Oenoflow XL HP systems are designed for the preparation of sparkling wines under isobaric manufacturing conditions, for example, wines under the same pressure as the sparkling wine storage tank.

In Oenoflow XL S and XL A high pressure units, re-circulation incorporates pressure vessels installed on the skid. For the Oenoflow XL E unit, re-circulation is back to the mother tank.

The HP system may also be used for the preparation of base wines before re-fermentation. This allows the use of only one system for all the necessary treatments in the production of sparkling wines.

## Quality and Maintenance

The Oenoflow XL systems utilize components with proven reliability from well-known, industry-accepted manufacturers. This allows for convenient supply of spare parts anywhere in the world.

Qualified Pall personnel are available to carry out scheduled maintenance service for objective verification of the operating system, ensuring optimal use.



Oenoflow XL E System



Oenoflow XL S System



Oenoflow XL A System



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Please contact Pall Corporation to verify that the product conforms to your national legislation and/or regional regulatory requirements for water and food contact use.

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