

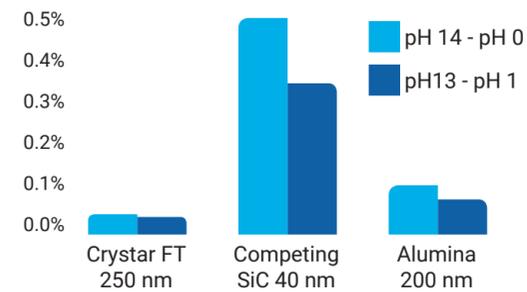
KEY BENEFITS OF CRYSTAR® FT R-SiC MATERIAL

Crystar FT is composed of recrystallized silicon carbide (R-SiC), an outstanding ceramic material with a myriad of advanced mechanical, thermal and chemical properties.

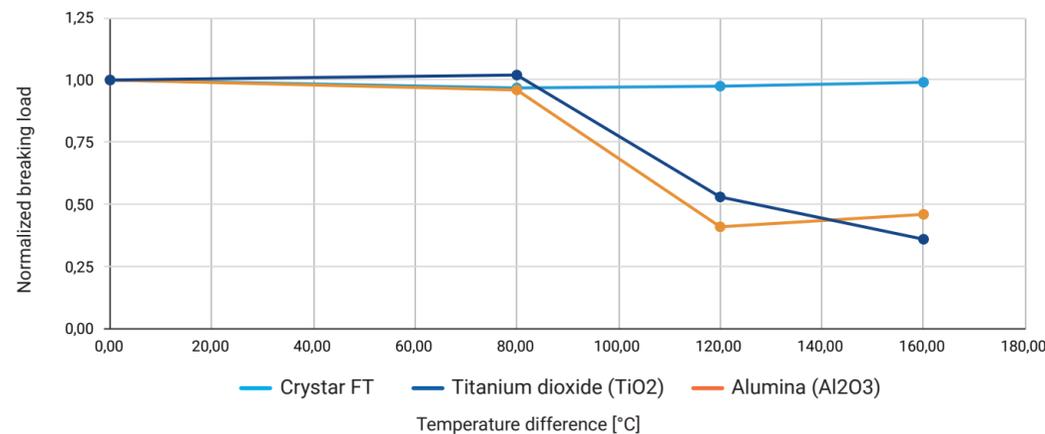
Attributed to their well-controlled and engineered microstructure of high-purity R-SiC from the membrane to the carrier, Crystar FT membranes feature:

- Enhanced permeate fluxes enabling higher throughput filtration at lower operating costs with more compact and lighter installations.
- Superior chemical resistance allowing the use of harsh cleaning agents.
- High thermomechanical resistance enables shorter chemical cleaning cycles at high temperature without risking structural damage to the membrane.
- Low adsorption of organic matter and other negatively charged compounds, enabling fast and efficient cleaning procedures in high-fouling liquids.
- Excellent efficiency in reducing high levels of suspended solids, bacteria, and other particulates in challenging streams.

WEIGHT LOSS AFTER 200 HOURS + 200 HOURS OF CHEMICAL CORROSION



THERMAL SHOCK RESISTANCE ASSESSMENT BY HASSELMAN METHOD



TOGETHER WE MAKE THE MATERIAL DIFFERENCE

1 product out of **4** sold by Saint-Gobain today didn't exist 5 years ago

Nearly **400** patents filed in 2017

3700 Researchers

One of the top **100** industrial groups in the world

Present in **67** countries

2018 net sales **€41.8** billion



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SAINT-GOBAIN PERFORMANCE CERAMICS & REFRACTORIES

Crystar® Filtration Technology (FT)

MICROFILTRATION MEMBRANES FOR WINE CLARIFICATION



CRYSTAR® FT250

A REVOLUTION IN WINE CLARIFICATION

Crystar FT250, Saint-Gobain's newly developed silicon carbide membrane provides:

- Excellent filtered wine quality,
- High productivity thanks to superior filtrate fluxes,
- Unmatched robustness for fast and efficient cleaning procedures.

These features offer the most cost effective and reliable wine processing, especially for difficult red wines.

Success story at an Australian wine maker:

Achievements of Crystar FT250

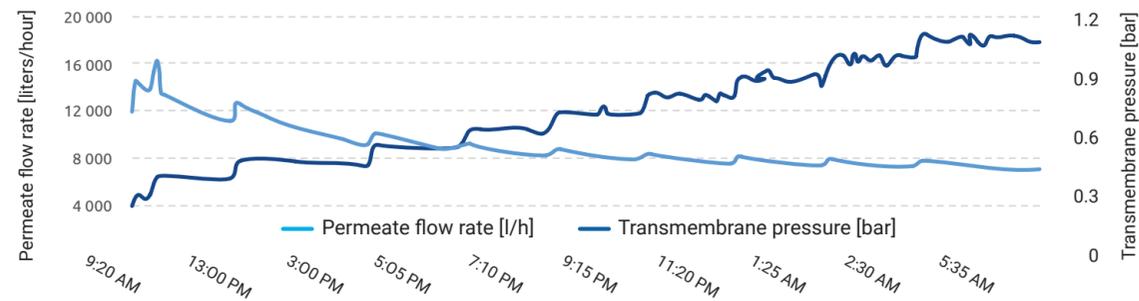
- Increased Production capacity without capital investment in new equipment.
- Reduced maintenance due to higher membrane robustness.

Performance

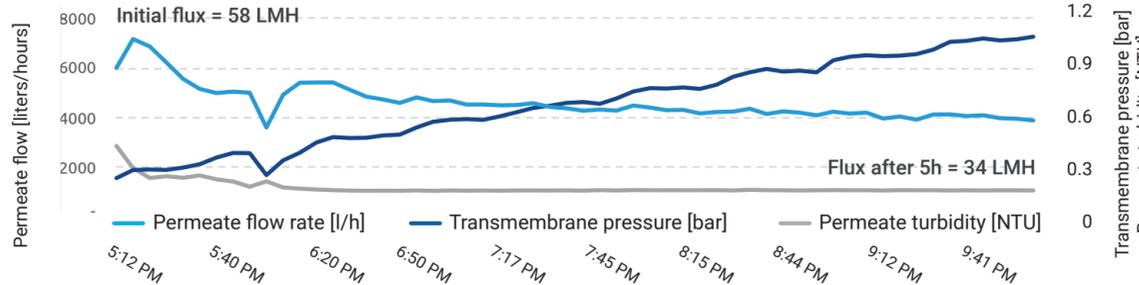
- High and stable wine permeate fluxes: 50% higher productivity than oxide ceramic membranes.
- Improved filtered wine quality (turbidity and fouling index).



Shiraz wine, 32 NTU



Red wine retentate > 1500 NTU



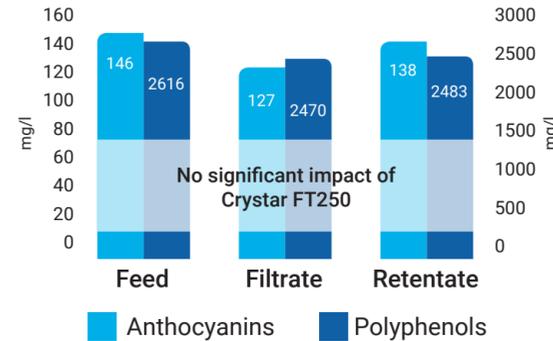
THE QUALITY OF YOUR WINE IS PRESERVED

A PhD work in collaboration with the Institut des Sciences de la Vigne et du Vin*, University of Bordeaux and the Laboratoire de Mécanique, Modélisation & Procédés Propres**, University of Aix-Marseille, demonstrates that Crystar® FT:

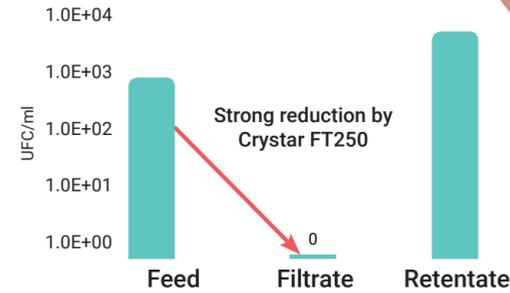
- Does not alter the chromatic characteristics of the wine.
- Does not retain anthocyanins and polyphenols.
- Provides an effective barrier against lactic bacteria and yeast.

Analysis of a Bordeaux red wine with initial turbidity = 150 NTU

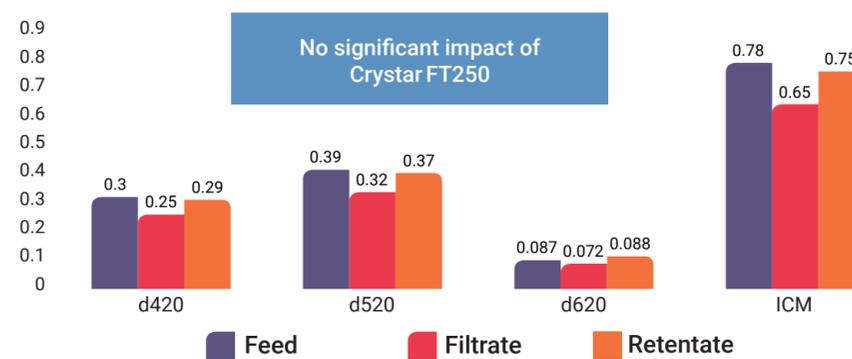
ANTHOCYANINS AND POLYPHENOLS



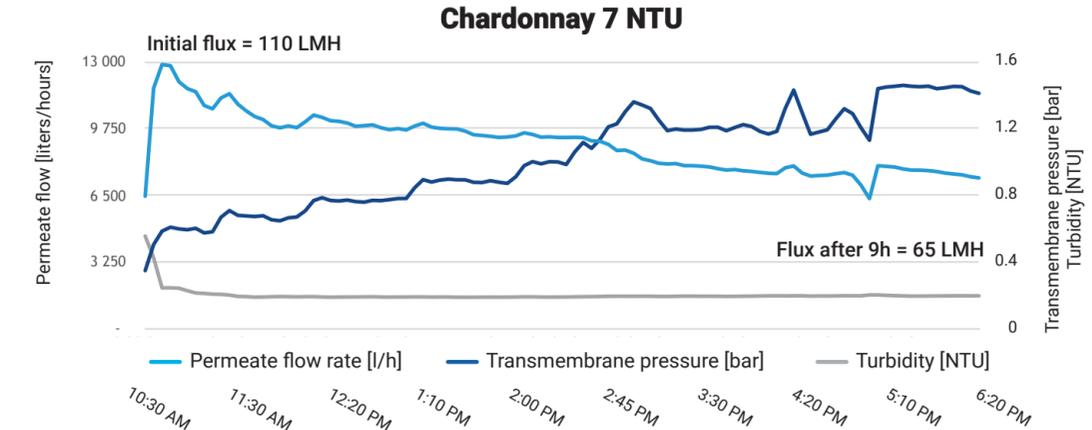
LACTIC BACTERIA



CHROMATIC CHARACTERISTICS

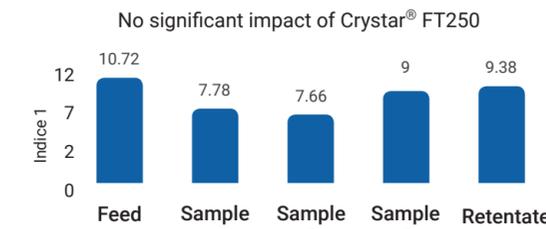


WHITE WINE CLARIFICATION

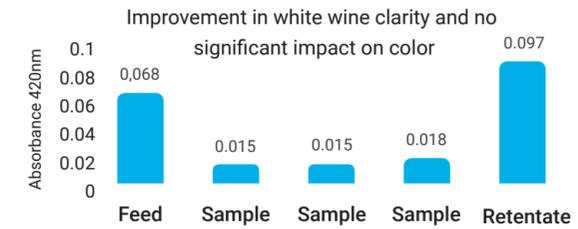


Analysis of Bordeaux white wine with initial turbidity = 78 NTU

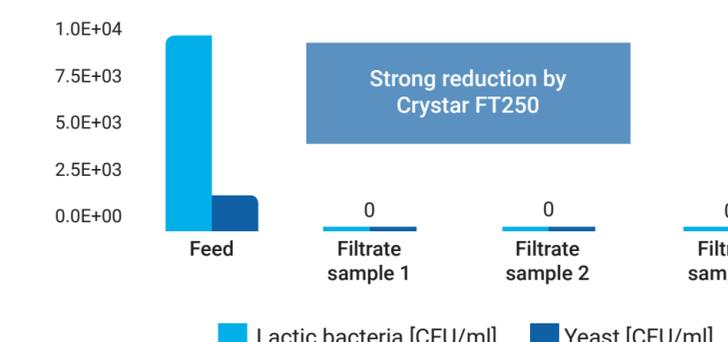
TOTAL POLYPHENOLS INDEX



ABSORBANCE OD420



MICROBIOLOGY RETENTION



* Science Institute of Vine and Wine
 ** Laboratory of Mechanics, Modeling & Clean Processes