Wine Clarification Solutions

KMS | Crossflow Microfiltration for Wineries
Clearly the Best

Koch Membrane Systems (KMS), an established name in crossflow microfiltration (CMF), has helped wineries produce quality vintages for more than 20 years. From boutique cellars to large wineries, KMS enables hundreds of wine producers around the world to create premium wines with a customized filtration approach.

In the 1980s, KMS pioneered the use of crossflow membranes in the wine industry with the KMS WINEFILTER™ system that is well known for the production of clear, stable, flavorful wines.

Over the years, KMS has introduced a number of improvements in CMF technology. The latest generation of KMS WINEFILTER systems and membrane cartridges delivers consistent results on all wine varieties, producing red, white, and rose wines of a quality that was once only achievable with more labor intensive and less efficient filtration technologies.

Improved Yield with Crossflow Microfiltration

CMF can cut wine filtration losses by as much as 70% and improve overall wine yield by up to 5%. Since most of the cost of producing the wine has already been absorbed, the improved yield translates into a potentially significant revenue increase. Thus the payback on a KMS WINEFILTER system is very attractive, even before considering the additional cost savings that result from eliminating replacement, disposal, and handling of filter pads, cartridges, and diatomaceous earth (DE).

Crossflow Versus Conventional Wine Filtration

<table>
<thead>
<tr>
<th>Conventional</th>
<th>Crossflow</th>
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<tbody>
<tr>
<td>Flavor, aroma, color, and clarity affected</td>
<td>Flavor, aroma, color, and clarity maintained</td>
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<tr>
<td>Multiple steps required</td>
<td>Fewer steps, less handling</td>
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<tr>
<td>Significant wine loss</td>
<td>Wine loss can be reduced up to 70%</td>
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<tr>
<td>Labor-intensive, difficult to automate</td>
<td>Capable of unattended operation</td>
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<tr>
<td>Disposal costs for used DE, pads, and cartridges</td>
<td>No DE, pad, or cartridge disposal costs</td>
</tr>
<tr>
<td>DE health hazard for winery workers</td>
<td>No DE health hazard</td>
</tr>
<tr>
<td>Frequent DE, pad, and cartridge replacement</td>
<td>Membranes can last for years under normal conditions</td>
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KMS WINEFILTER™ Batch Design Microfiltration System

Example Shown = 99.8% Wine Recovery*

* Actual results may vary based upon specific conditions and wines filtered
WINEFILTER™ Benefits

KMS has a long history of developing high quality filtration products designed and made specifically for the wine industry, providing these key benefits:

**Increased Wine Yield**

With every pass through conventional filtration, more of your valuable wine is absorbed, and in many cases discarded with the spent filter media. Significantly less wine is lost using WINEFILTER cartridges.

- Higher yield of finished wine
- Recover wine of higher quality and value compared to traditional systems

**Reduced Safety Risk and Disposal Costs**

Airborne dust from diatomaceous earth raises serious safety and environmental concerns, and carries high disposal costs. Crossflow filtration makes diatomaceous earth, with its associated problems, a thing of the past.

- Elimination of hazardous materials and waste
- Reduced wine handling

**Simplicity**

One membrane can be used to filter all kinds of wine—including the most difficult reds—with consistent results.

- A one-step solution for any size winery
- Streamlined process, easier to use

**Better Resource Management**

Features such as reverse flow result in long, sustained runs, reducing labor, material, energy, and maintenance costs.

- Lower total cost of ownership
- An economical method for producing high quality wine consistently.

“Crossflow microfiltration saves us an enormous amount of time and money, because we now filter all our wine in a single step.”

John Skrip III
Winemaker and Vice President
Clover Hill Vineyards & Winery
Pennsylvania, USA
The KMS WINEFILTER standard system is the company's flagship product for the wine industry. The WINEFILTER system increases productivity by streamlining processes to improve efficiency, increase throughput, and reduce filtration steps and down time. At the same time, WINEFILTER systems are gentle on wine due to minimal oxygen pickup and heating.

WINEFILTER systems are available in various levels of automation, from manual machines to fully automated systems requiring almost no operator attention. Sizes range from compact, low cost systems in the 5 to 10 gpm (10 to 20 hl/hr) filtrate flow range to larger systems capable of flows exceeding 100 gpm (230 hl/hr). One system can be used for all styles of wine, keeping overall capital investment low. Additionally, KMS provides systems that incorporate techniques such as reverse flow and back-pulse, which stabilize the flow of filtered wine and minimize membrane fouling.

Since KMS is a company that not only manufactures its own membranes but also designs membrane systems, customized systems meeting specific customer needs are available. Depending on the operating conditions, our unique continuous system is capable of operating for days without cleaning or shutdown. The KMS cartridge isolation feature on batch systems allows batchdown and lower holdup volume on shorter runs.

The Benefits Are Clear:

- Compact and efficient
- Highly instrumented and automated
- Reduced capital and operating costs
- Self-contained, wheel-mounted options
- Available in multiple voltage configurations
- Lower energy requirements, smaller pumps and piping
- Three-hose design eliminates extra tank
- No costly and time-consuming backflush needed

* Actual results may vary based upon specific conditions and wines filtered
WINEFILTER™ High Volume Custom System

For unattended, one-step continuous crossflow microfiltration, the frame mounted automatic and semi-automatic PLC-controlled KMS WINEFILTER systems are preferred. These systems operate at low pressure causing virtually no increase in wine temperature, and will shut down automatically. Due to the asymmetric pore design, reverse flow can be used to optimize filtrate flow, eliminating time-consuming backflush operations. KMS customized WINEFILTER systems feature integral safeties for pressure, temperature, and flow, VFDs on all pumps, and HMI with touchscreen.

KMS WINEFILTER™ Reverse Flow Feature

Key: Raw Wine ➔ Filtered Wine ➔

WINEFILTER Series

KMS is a trendsetter in putting membranes to use in the wine industry, working closely with winemakers to enhance the organoleptic and aesthetic characteristics of their products. Using crossflow filtration with WINEFILTER cartridges offers excellent throughput and eliminates the need for using DE or filter sheets. Now a gentle, one-step process can reduce your processing costs while boosting the wine’s quality and color intensity.

When you are striving to achieve the very best in clarity, color, and taste, conventional filtration is simply insufficient. We can show you a better way to achieve optimal results.

KMS continuous WINEFILTER cartridge advantages:

- Long runs between cleanings
- High and stable filtrate flow
- Narrow membrane pore size distribution
- Excellent mechanical strength for durability
- Sanitary cartridge design
- Asymmetric membrane pores easily cleaned
Woodbridge Winery

The Challenge
Using conventional methods, wine has to be filtered in multiple steps, and the excessive filtration often strips the red wines of flavor and color. Conventional methods also involve high labor, material, storage and disposal costs when compared to crossflow microfiltration technology.

The Solution
The KMS WINEFILTER™ crossflow microfiltration system provides Woodbridge Winery with an economical alternative to conventional wine filtration methods without sacrificing wine quality.

“Our KMS WINEFILTER system means we can eliminate almost all diatomaceous earth filtration and its associated costs and disposal issues,” said Dan Hansen, Director of Cellar Operations at Woodbridge Winery. “Not only have we reduced our biggest cost, but we also spend less on bottling final filters, the wine is cleaner so the filters last longer.”

Woodbridge expanded their first WINEFILTER system in 2006 and added a second system in 2008. “Upgrading to a second system has doubled our capacity. Filtration time for our 216,000 gallon tanks has been cut in half,” said Hansen.

The winery now clarifies wine in two steps, using centrifugation followed by two automated three-stage crossflow microfiltration systems from KMS. The two systems produce 50-100 gallons per minute in 36-hour continuous runs, and run up to 100 hours in a typical week and even longer during harvest season. This continuous design converts a minimum of 99 percent of the feed to filtered wine with less than one percent of high solids lees left for further processing downstream. The first system filtered 18 million gallons before the cartridges needed to be replaced; the newer system filtered nearly 27 million gallons before cartridge replacement.

“The KMS single-pass system is definitely a better way to go; it runs almost trouble-free,” says Hansen. “Another great feature of the WINEFILTER system is the ability to isolate cartridges. This is really important because if one cartridge needs to be removed, you can easily isolate and bypass it without shutting down the entire system.”

Dan Hansen
Director of Cellar Operations
Woodbridge Winery
California, USA
Llano Estacado Winery

The Challenge
Llano Estacado Winery, a premium winery in Texas, has produced a number of award-winning wines over its 35 year history. When Llano needed a new wine filtration system, the company sought a solution able to handle the different levels of processing required by their many varieties of wine.

The Solution
After a thorough evaluation of competing systems, Llano Estacado determined that the KMS WINEFILTER™ would meet the winery’s needs in terms of both price and features. Llano started operations with their new WINEFILTER in July 2011.

In its first five months, Llano Estacado’s system has processed approximately 140,000 gallons of red and white wine varieties. It can easily handle 12-18 hour runs, can run overnight unattended, and is extremely energy efficient.

A key factor in Llano Estacado’s decision to purchase a WINEFILTER is that KMS not only manufactures the system but the membranes as well. “One of the most important features to us is the fact that KMS makes their own polymeric membranes. We find non-organic filters are very expensive and use more power than polymeric filters,” said Greg Bruni, Vice President Executive Winemaker at Llano Estacado Winery.

The winery is satisfied with the system’s operational efficiencies, noting that the system is quiet, uses less energy, can stop fermentations much easier, and reduces filtration losses. “We’re also impressed with the unique reverse flow feature of the WINEFILTER system, which really seems to be working well for us,” Bruni said.

Bruni also praised KMS’ follow-up and service, in particular KMS engineers’ experienced help in determining the best operation and cleaning regimens for the membranes.

““The KMS system works great. It does everything we hoped it would do. I would highly recommend it to anyone in the market for such a system.”

Greg Bruni
Vice President
Executive Winemaker
Llano Estacado Winery
Texas, USA

KMS Crossflow Membrane Filtration System for Lees

The Challenge
Product recovery from wine lees is one of the biggest challenges facing the wine industry.

The Solution
KMS crossflow microfiltration (CMF) technology configured in a multi-tube modular geometry is ideal for processing streams that contain high levels of suspended solids such as wine lees. CMF entirely eliminates the need for diatomaceous earth and other filter aids currently used with traditional recovery techniques.

KMS CMF systems for recovery of wine from lees have been used successfully by producers of both red and white wines and continue to gain in popularity. CMF maintains the wine’s acidity, aroma, color, and flavor, with no oxygen pickup or noticeable “stripping.”

The economics of the CMF system are very favorable when compared to conventional methods. High value wine recovery plus significant annual operating cost savings are providing wineries with an attractive return on their investment.
The KMS Difference

For more than four decades, Koch Membrane Systems, Inc. has led the way in developing innovative membrane technologies that serve a diverse range of industries and applications around the globe. KMS provides solutions to markets including industrial and municipal water and wastewater, food and life sciences and industrial processes helping thousands of industries reduce their water footprint, increase productivity, and reduce costs. With an installed base approaching 20,000 systems throughout the world, KMS is setting the standard as a comprehensive membrane solutions provider.

KMS is based in Wilmington, Massachusetts with factory direct representatives around the world and manufacturing locations in Wilmington, Massachusetts and Aachen, Germany.

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