PALL

Food and Beverage

Application Bulletin

Lowering the Cost of Water Filtration in the Wineries

Overview

Water is a key resource for successful winery operation. Although not directly involved in the make-up of wine, the average winery consumes approximately four liters of water per liter of finished wine. In addition to vineyard irrigation, cellar cleaning and tank washing, water is also used for critical applications like bottle washing, sanitization and filler rinsing. While frequently disregarded, water filtration to remove metals, particulate, and microorganisms is essential to maintain winery hygiene, protect downstream equipment and ensure overall product quality.

With winery mergers and acquisitions among the global suppliers, production down in traditional growing regions, and increasing competition, wineries are under increasing pressure to improve quality while reducing operating costs. When coupled with growing environmental pressures, these trends are forcing many wineries to focus more attention on their water spend.

The Pall Aria™ water treatment system has been implemented at wineries across the globe as a solution to reduce water filtration costs. The system utilizes hollow fiber microfiltration membranes with a unique air scrubbing process to replace traditional water treatment filters. The automated system can remove virtually all of the suspended solids from surface water along with precipitated inorganics from ground water in a cost-effective, compact footprint.

The Challenge

Water filtration at wineries is often overlooked or underspecified with "low cost" technologies like sand or multi-media filters and string wound or nominally rated filters. However, when looking at the overall winery process, the perceived low cost option is often not the most cost-effective solution.

With problems like channeling and bypass, sand or multi-media filters can provide results that are inconsistent and unreliable. With high turbidity water, these filters often require frequent regeneration resulting in downtime, labor and increased water loss. When combined with point-of-use water filters or softeners, short service life may result on the downstream products due to the presence of colloids or microorganisms. Or if no further filtration is employed, rinse and sanitization water can contribute to premature plugging of post fermentation crossflow membranes or wine cartridge filters prior to the bottling line.

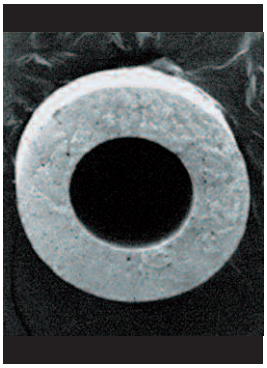
Multi-round disposable cartridge and sheet filtration assemblies can also be costly especially in the case of variable incoming water quality. The dirt-holding capacity is typically not optimal for seasonal algae spikes in surface water or high levels of metals in ground water resulting in turbidity when exposed to the air.

Inconsistent quality, downtime and labor, and frequent disposable change-outs can significantly impact any operating budget. Pall® was challenged with providing wineries an alternate solution with low operating costs. The ideal solution would provide wineries with the capability to handle incoming water with variable quality, high metal content and high turbidity, while providing consistent quality in order to protect downstream filters or secondary treatments like softeners or reverse osmosis systems.

The Solution

The Pall Aria water treatment system is an innovative cost-saving approach to water treatment. The hollow fiber technology utilizes microfiltration membranes to retain contaminants while water and its soluble components pass through the membranes as filtrate. The retained solids are concentrated in a waste stream that is discharged from the system and a unique air scrubbing process allows for long-term uninterrupted performance and high yield.

At 0.1 micron the system provides effluent quality superior to traditional sand and media filters. The Pall Aria system can remove virtually all the suspended solids from water with typical filtrate turbidity less than 0.1 NTU. A gross failure test can be performed on a daily basis to ensure consistent and reliable performance. Additionally, when coupled with oxidation and precipitation, the Pall Aria system is very efficient at removing iron and manganese from well water.



With low maintenance, long membrane life and minimal downtime, the plug and play system provides low running costs. For example, a winery in Hungary recently turned to Pall to reduce costs and increase water quality. By implementing the Pall Aria system with an aeration pre-treatment step for iron removal (>25 mg/L), the winery was able to switch from their municipal source to well water and reduce their operating cost by a hundred fold down to approximately 0.08 Euro/m^3 (~$0.05/100 U.S. gal). The system processes all their incoming water and the permeate holding tank is plumbed to different points of use throughout the facility. With less downtime and water consumption compared to their media filter, the customer consistently achieves 98% recovery.

Another success was witnessed at a large winery in Australia. Two Pall Aria water treatment systems were installed to filter incoming municipal water at the winery's new packaging center. With a river as the source of the municipal water using only deep bed sand filtration, the quality of the water is extremely variable. The Pall Aria systems ensure particulate free water for their filler Clean-in-Place (CIP) systems, for regenerating and sanitizing their process cartridge filters, and for rinsing and cleaning their Oenoflow™ system. The customer initially investigated using a cartridge filtration train, however, the return on investment calculations helped them decide on the Pall Aria system. The payback with the cartridge train was approximately 2.5 years compared to less than a year with the Pall Aria system. The operating costs of the fully automatic units include the electricity to power the systems and a small amount of caustic for a weekly CIP.

The Benefits

Pall Aria water treatment systems provide reliable, low maintenance operation at the lowest running costs. For applications from particle removal for tank washing down to microorganism removal for bottle rinsing, wineries can reduce their overall water spend, and in some cases even reduce consumption by implementing the hollow fiber technology. With the Pall Aria system, wineries can realize the following benefits:

- Improved water quality for protection of downstream water treatment, process filters and bottling equipment
- Less downtime and labor for reduced operating costs
- High solids capability to meet variable incoming water quality
- Long module life for reduced waste and environmental impact
- High filtrate yields to meet or exceed water conservation initiatives
- Potential elimination of municipal water source dependency for reduced running costs

By coupling the Pall Aria water treatment system with other value added technologies like Oenofil systems or Oenoflow systems, Pall can help wineries produce the highest quality products at the lowest possible operating costs.

About Pall Corporation

Pall Corporation is the largest and most diverse filtration, separation and purification company in the world. Pall serves the food and beverage industries with advanced membrane filtration technology and systems engineered for reliability and cost effectiveness. Membrane processes can concentrate products without heat, purify and clarify, selectively remove constituents and minimize effluent. Unique space-saving membrane filtration systems are easy to install, simple to use and satisfy a wide range of filtration requirements - from removing particulates and spoilage microorganisms to providing high-quality air and gases.

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