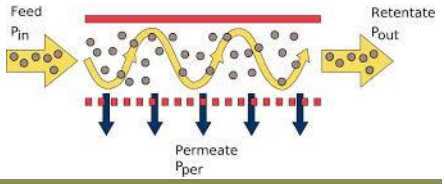
AGWA Process Efficiency Case Study 5

Wine Industry

- **Cross flow filtration (high solids)**



Process Efficiency Opportunity	Outcomes
Cross flow filtration	Material efficiency improvements (ability to capture quality wine from lees)
	Labour efficiency (less labour for the addition of DE, higher automation so no operator attendance)
	Production speed (ability to undertake multiple filtration activities)

Process Efficiency Outcomes	Outcomes
Production efficiency	Increase throughput
	Increased flexibility
Materials efficiency	Removes the need for filter aids (i.e. DE)
	Higher value wine recovery from lees
	Decreased material disposal costs (i.e. DE, wine laden lees, etc)
Labour efficiency	Unattended operation increasing labour efficiency
	Lower labour costs

A large winery was undertaking lees filtration using a rotary drum filter (RDF) system. The RDF system was a process intensive operation requiring the following resources:

- Labour
- Water
- Waste
- Materials
- Energy

The materials requirements for RDF operation included the generation of a perlite slurry with a 1:5 ratio of perlite to water. This slurry required ~600kg of perlite and 3000L of water.

The RDV system required 3 hours of preparation time prior to use. The RDF could process ~ 2.6kL of wine lees per hour and required continuous supervision during the 12 hour filtration. The RDF system used a water vacuum pump and this consumed ~28kL of water during the 12 hour operation. Once filtration was complete, 200kg of filter cake was removed from the drum and disposed of through solid wastes.

The winery installed a high solids cross-flow filtration unit (HSXF) to replace this RDF unit. The HSXF unit did not require any addition filtration medium (perlite) to undertake operations. Once the HSXF unit was prepared for operations, no additional supervision was required excluding occasional checking of operation performance. After filtration, the HSXF required rinsing, back flushing and caustic cleaning and this required 2.8kL of waster and 40L of caustic solution.

The resource requirements for each systems has been summarised in the below table.

Resource	RDF	HSXF
Process speed (excluding preparation time)	2.6kL/hour	3.2kL/hour
Labour (time)	17 hours	5 hours
Water (litres of water used per kilo litre of wine processed)	998	26
Solid waste (tonnes)	10T	-
Materials	200kg (perlite)	-

The HSXF filter system requires less resources compared with the RDF system. In particular, the HSXF system uses considerably less labour, materials and waste and these resources are likely to contribute the most to operating costs.

When recovering wine lees, the RDF system tends to result in a lower quality of wine and this will need to be blended with other recovered wine lees for a lower value product. The HSXF system maintained the quality of the wine and so this recovered wine was able to be added back to the original batch of wine maintaining a high value product.

The additional benefits of purchasing the cross flow unit was the multipurpose use in that it could be used to recover juice from must lees and undertake post fermentation clarification.

Given the above benefits, the installation of a HSXF filter to replace the existing RDF systems for this winery was a good investment. The new system significantly decreased resource use and increased process efficiency. This resulted in cost savings and an increase in the production of high value products.