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A Brief History of Lees Filtration

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Lees filtration has come a long way since the early days of the filter press. There have been several developments along the way, each of them revolutionary in their own way.

The Filter Press:

The first filters that were used for lees filtration were the filter presses, which are essentially plate filters with large cavities and the ability to add filtering mediums during filtration.

Pros	Cons
<ul style="list-style-type: none"> • Able to recover previously discarded product 	<ul style="list-style-type: none"> • High labour requirement • Difficult to clean and sanitise • Difficult and messy to dismantle after each filtration • Extremely oxidative due to filtering under pressure

The Rotary Drum Vacuum Filter (RDV):

The next major development was the introduction of the RDV. These filters were revolutionary and are still used widely today due to their clever design. The concept is that a rotating drum (under vacuum) is pre-coated with a filtering medium before the product is supplied. The product to be filtered is then introduced to the filter, and as the filtration progresses a blade cuts off the deposited solids and a very fine amount of the pre-coat. This presents a clean surface to the product at all times.

Pros	Cons
<ul style="list-style-type: none"> • Clever design allows for the filtration of products that are very difficult to filter • Less labour requirement than filter presses • Less oxidative than the filter press • Can use different grades of earth for filtering versatility • Can handle additives such as bentonite • Good flowrates 	<ul style="list-style-type: none"> • Still a relatively high labour requirement • Uses a lot of water during filtration and cleaning • Uses large amounts of filtering medium • Filtering medium must be disposed of • Can be oxidative and cause earth taint • Can cause foaming • Expensive to run

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Wide-Bore Crossflow Filters:

Following the development (and acceptance) of crossflow filtration, the wide-bore crossflow filter was developed. The purpose of this was to allow more viscous products, such as lees, to pass through the capillaries of the crossflow filter. Traditional crossflow filters have very fine capillaries, and lees would simply block the capillaries and cause severe issues with cleaning.

Pros	Cons
<ul style="list-style-type: none"> • Able to filter a large variety of products • Low labour requirement • Less oxidative than RDV's • No filtering medium required 	<ul style="list-style-type: none"> • Large recirculation pump • High power usage • High shear stresses and temperature increase of product • Limited product recovery due to viscosity • Limited ability to handle additives such as bentonite • High capital cost • Relatively frequent cleaning cycles • Low flowrates on lees

Rotary Dynamic Crossflow Filters:

The development of this style of filter provided a functionality that cannot be matched by wide-bore crossflows. In this style of filtration, the membranes are spinning, providing the necessary surface speed that keeps the membranes clean and filtering. Currently these machines employ ceramic membranes.

Pros	Cons
<ul style="list-style-type: none"> • Able to filter a large variety of products • Able to handle virtually all wine additives, such as bentonite, PVPP, carbon and finings • Low labour requirement • Virtually no oxidation or temperature increase • No filtering medium required • Low power requirement • Little to no damage to the filtrate (no downgrade) • Long running cycles without the need of a CIP (can extend into days) • Short ROI due to high recovery rates and filtrate quality 	<ul style="list-style-type: none"> • Ceramic membranes that can break • Not suitable for filtering large volumes due to relatively low flowrates • High capital cost

As you can see, as the new technologies were developed the list of pros got longer and the list of cons got shorter. Each stage in the development of these filters required clever designs and massive amounts of research and development. The new rotary dynamic crossflow filters are currently the pinnacle of lees filtration technology, but as with everything there is still room for further development.