



Plate heat exchangers boost efficiency at leading whisky distillery

Glenfarclas Distillery, Speyside, Scotland

Case Story



Glenfarclas distillery uses traditional processes and skills to produce its world-renowned single malt whiskies.

Glenfarclas Distillery replaced a shell-and-tube evaporation system that was suffering from a serious loss of efficiency due to fouling and scaling, with an evaporation system from Alfa Laval utilizing plate heat exchangers (PHEs). The energy required for evaporation is recovered from the distillation process.

Installed in 2008, the efficiency of the new system has enabled Glenfarclas to increase the concentration of its Pot Ale, a distillation by-product. In addition, the low fouling and scaling rate and ease of opening and cleaning of the PHEs, have

substantially reduced downtime at the distillery.

Shane Fraser, distillery production manager: "It's a hundred times better than the old system! Apart from a scheduled summer close-down, it has run without interruption, producing the quality and consistency of Pot Ale we want. We clean the units in place by flushing at the end of each week and when we inspected the heat transfer surfaces during the summer shut-down, they were clean as a whistle."

Glenfarclas Distillery

One of Scotland's largest independent malt whisky distilleries, Glenfarclas Distillery on Speyside was established in 1836. It is still owned and run by the Grant family who originally acquired the business in 1865. The distillery uses traditional processes and skills to produce its world-renowned single-malt whiskies, but it also invests heavily in the latest technology to maintain efficiency and quality.

Pot Ale – a distillation by-product

Pot Ale, or spent wash, is a by-product from the first distillation stage in malt whisky production. Concentrated into a syrup and rich in proteins, carbohydrates and yeast residues, it makes a highly-nutritious livestock feed. Glenfarclas produces around 4 tonnes of Pot Ale syrup a day for sale to feed producers around the UK

Sold as livestock feed

Pot Ale, or spent wash, is a by-product from the first distillation stage in malt whisky production. At Glenfarclas, Pot Ale is concentrated to around 45% solids using evaporation before being sold to feed producers. Prior to the installation of the Alfa Laval system, the distillery employed a conventional falling film, shell-and-tube evaporator for this duty.

“The old evaporator gave us a lot of problems simply because it fouled so easily,” relates Shane Fraser. “It was extremely difficult to clean and maintain because it was over 6 metres high and impossible to access. Towards the end, we were probably operating at 50% efficiency because the evaporator was fouling so badly.”

Consulted Alfa Laval

In the autumn of 2007, Shane contacted Alfa Laval to discuss the installation of a new Pot Ale evaporation system. A complete system based on plate heat exchangers with integrated CIP (cleaning in place), was delivered in mid-2008. At the heart of the system are two Alfa Flash evaporators, providing two effects, an M6M Plate Heat Exchanger, which is used as a pre-heater, and an AlfaCond condenser.

Shane Fraser, distillery production manager: “It’s a hundred times better than the old system!”



An Alfa Laval plate heat exchanger in the evaporation system. Glenfarclas invests in the latest technology to maintain the quality of its products.

As a first step in the concentration process, Pot Ale, at roughly 4%, enters the 2nd Effect Alfa Flash evaporator and is part concentrated using vapour from the 1st Effect as the heat source. From the 2nd Effect, it travels to an M6M Plate Heat Exchanger where it is further heated using heat recovered from the condensate from the 2nd Effect. Finally, it is pumped to the 1st Effect Alfa Flash evaporator where it is concentrated to the desired thickness of 45% utilizing waste heat from the distillation process.

AlfaCond – high turbulence and wide plate gap

The AlfaCond semi-welded plate condenser is used to condense the vapour from the 2nd Effect AlfaVap. Its cooling water channels induce high turbulence while the welded vapour channels feature a wide gap with extremely low pressure drop.

The Alfa Flash’s high wall shear keeps viscosity low and the risk of fouling to a minimum. This, in turn, extends cleaning intervals and enhances the efficiency of the CIP system. The true counter-current flow of all three heat exchangers ensures optimal heat transfer efficiency between the media.

Plate evaporators the right decision

When the new Alfa Laval evaporator system started operating in August 2008, one of the evaporators was losing efficiency due to fouling. However, according to Shane Fraser, this was where the decision to go with plate evaporators proved to be the right one.

“We were able to open up the unit very easily and quickly clear the accumulated product. It was apparent we had over-concentrated the wash and so it was simply a question of adjusting the concentration to the correct level. With regular CIP, there has been no repetition.”

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com.