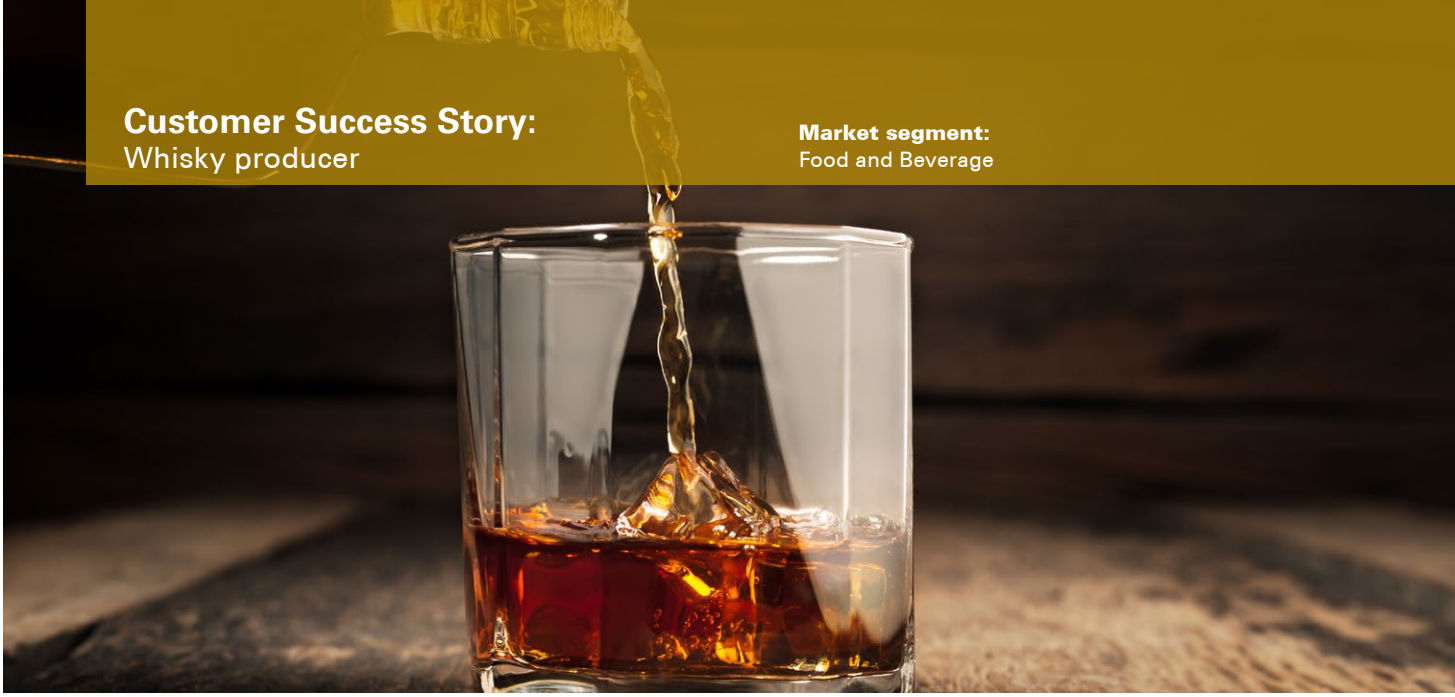
Customer Success Story:
Whisky producer

Market segment:
Food and Beverage



Precise filtration for clear, high-quality whisky

Location:
United Kingdom

Challenge:
Installing a modern plate and frame filter that can be adapted to growing production volumes and therefore fulfill all requirements in terms of whisky quality, explosion protection and employee safety

Solution:
BECO COMPACT® PLATE A600 plate and frame filter with specially adapted equipment and ion reduced BECO SELECT® A depth filter sheets

Result:
Clear whisky within flavor and color specification requirements thanks to precise chill filtration under safe production conditions

"Our filtration system offered the customer the optimal solution for its requirements. He was particularly pleased with the effectiveness of the spray suppression device, which ensures the highest level of safety thanks to its robust components."

Karl Henger,
Head of Process Technology,
Eaton Technologies, Germany

Background

To be able to meet high global demand, modern whisky distilleries must be both reliable and efficient. At the same time, the unique taste of each individual brand should not fall short of expectations. In the British Isles—the birthplace of whisky—there is a particular demand for unique products of a consistently high quality. Many factors play a part in this, for example: the raw material used, such as the grain and source water; the distillation process; the barrels in which the spirits subsequently mature; and the filtration process before bottling.

This final aspect is essential to achieving a high-quality whisky. Even distillates may contain unwanted particles that, if left unfiltered, would affect the character and appearance of the drink, for example metal haze, crystalline precipitation and carbon particles. Carbon particles can be introduced during the maturation process, as the product is stored in wooden casks for several years. Particularly with charred casks, which are used to create a characteristic smoky taste, it is impossible to prevent the charred wood from becoming brittle and individual particles from dissolving into the whisky.

Other elements that can cause hazing include compounds containing oils and fats. Should they remain in the product following the intensive cooling process, the whisky will become turbid when it is mixed with water. Efficiently removing elements that cause hazing is imperative as water is added to the whisky during production. This reduces the alcohol content from cask strength to drinking strength, and to prevent haze with the consumer mixes water or ice with the whisky. In terms of haze reduction, fatty acid esters are paramount, as they influence both the flavor and turbidity of the whisky.

Producers have long used chill filtration as a targeted method of filtering fine spirits. In this process, the whisky is cooled to temperatures close to 0°C using a heat exchanger. When chilled, long-chain fatty acid esters are changed in their solubility and can be selectively filtered out of the liquid. Following this process, the finished product no longer develops a haze due to temperature changes or added water.

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Challenge

An awareness of the significance of chill filtration in terms of first-class taste and appearance led one of the largest and most renowned whisky producers in the world to reach the decision to replace its outdated plate and frame filters in several locations. One of the company's motives for this change was to incorporate plans for new and larger production systems that could meet the growing market demand. Another was the fact that an increasing number of the company's systems were reaching the end of their life cycle and needed to be replaced with cutting edge technology. It was also necessary for several locations to install solutions that would bring modern efficiency and reliability to the company's production processes without compromising the quality or artisanal characteristics of the whisky.

The company wanted the filtration systems used in the production of its high-quality whisky to meet a clear set of specifications:

- Reliable retention of its characteristic flavor
- Assured reduction of haze-causing substances such as long-chain fatty acid esters and crystalline precipitation
- Visible retention of color

The company also wished to minimize product losses in the filtration system. Carefully distilled whisky is expensive, and other factors to consider include employee safety requirements and explosion protection for if this highly flammable liquid leaks out of the system.

Solution

The whisky producer invited tenders for the required solution so that it could examine all options and consider the scope of investment. In the end, they were convinced by the proposal from Eaton. The filtration specialist is well known among many manufacturers in this well-connected industry for its high-quality solutions. For many years, Eaton has also been known as a reliable supplier of filter media and filtration systems for whisky producers wishing to expand their operations.

BECO COMPACT PLATE A600 is the filtration system that allows Eaton to fulfill this whisky producer's every requirement. This high-quality multi-sheet filter offers a comprehensive range of design options, meaning that it can be adapted to individual requirements and production conditions. The filtration process has two stages: In the first stage, charcoal particles that have been released from the burnt-out wooden casks during storage are removed. The second filtration stage is crucial for haze removal. "Using a precise and low filtering speed is of paramount importance during whisky filtration," explains Karl Henger, manager process technology in Eaton's Filtration Division. "This ensures that all haze-causing substances can be removed."

To minimize product losses in the filtration system, the design of the BECO COMPACT PLATE A600 has been optimized to enable filter plates and filter sheet formats to precisely align with one another. The thickness of the filter plates has also been reduced to lower the volume of dead space per plate. As a result, the overall dimensions of the filter can be reduced significantly, and the system takes up less space in the production facility. The hydraulic closing mechanism with automatic subsequent pressing enables the filter package to be effectively sealed. If the product leaks from its container, the filtration system is equipped with a spray suppression device that surrounds the filter package. There is a collecting drip pan underneath the spray suppression device that collects any leaking product before feeding it back into the filtration process. These factors not only reduce product losses to a minimum, but also bolster explosion protection requirements.

This filtration system design offers an additional benefit to production employees: "Filter sheets for chill filtration in whisky production usually need to be changed once a week," Henger explains. For this reason, Eaton designed the filtration system for this British whisky producer to use 600 × 615 mm filter sheets. "This size is very ergonomic to handle, and the filter can be changed swiftly by one employee," Henger emphasizes. As a result, the production process benefits not only from employee-friendly processes, but also reduced downtimes.

Eaton supplied both the filtration system and filter sheets required to produce this traditional whisky. In order to preserve the distinctive profiles of the whisky, Eaton has developed reduced-ion depth filter sheets specially for chill filtration. Their selective filtration properties retain each whisky's individual character and color, ranging from golden yellow to deep amber. The low calcium, magnesium and iron ion content in the filter sheets help to reliably stabilize cask-matured whisky, preventing precipitation and turbidity after bottling. "If a producer were to use conventional filter sheets, they would run the risk of allowing the ingress of ions, which can create further problems with turbidity," Henger explains.

Result

After installing the new Eaton filtration system at the initial production location, the British whisky producer appeared highly satisfied with the results. "Our filtration system offered the customer the optimal solution for its requirements," Henger confirms. Alongside their performance and good sealing, the filter sheets could also be replaced with impressive ease. "The customer was particularly pleased with the effectiveness of the spray suppression device, which ensures the highest level of safety thanks to its robust components," Henger adds. "The customer has expressed their high satisfaction in the form of both referrals and follow-up orders: the customer is using BECO COMPACT PLATE A600 plate and frame filters and reduced-ion BECO SELECT A depth filter sheets in an ever-increasing number of its locations."

BECO COMPACT PLATE A600 plate and frame filters offer a wide range of design options. For whisky filtration, they are specially equipped with a spray suppression device, including a collecting drip pan and pneumatic hydraulics for safety in ATEX zones.

Close-up of spray suppression device

The **BECO SELECT A** reduced-ion depth filter sheets preserve the high-quality ingredients used in whisky and other spirits. They ensure that the product retains its original color and prevent the filtration process from affecting the quality of taste in the product.

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