



Wine-bottling power that lasts

Location:

Kaisersesch, Germany

Challenge:

Reliable filtration process with an extended service life for two-stage cartridge filtration during bag-in-box bottling.

Solution:

Replacing the existing pre-filter cartridges with innovative BECO® Helix depth filter cartridges featuring a unique design for efficient particle and yeast retention, a longer service life and strong backwashability.

Result:

In a one-year on-site trial at Einig-Zenzen, the new depth filter cartridges demonstrated a 40 percent increase in service life (vs. the previously used standard wrapped cartridges), consistently high performance and quality, and enhanced protection of downstream membrane filter cartridges.

"I was really very surprised by the long service life. In all BECO Helix depth filter cartridges, we detected only low amounts of clogging for the entire runtime. The downstream membrane filter cartridges were also always well protected."

*Paul Schmitz,
technical director at Einig-Zenzen*

Background

Einig-Zenzen is one of the oldest wine merchants in Germany and, as an internationally active winery and wine trading company, processes approximately 10.3 million U.S. gallons (35 million liters) of wine annually from 13 countries, delivering to trading partners and end customers around the world. This makes Einig-Zenzen not just a producer, but also a trustworthy partner for quality and reliability.

When processing such quantities, durable, reliable filtration is crucial for offering customers a consistently high level of quality. This is why Einig-Zenzen relies on a multi-stage filtration process. The first stage of this process consists of diatomaceous earth pre-coat filtration, which is then followed by sheet filtration. Lastly, the ready-to-bottle wine is filtered and bottled using a two-stage cartridge filtration process, in which depth filter cartridges are used in the preliminary stage and membrane filter cartridges are used in the final stage.

Three bottling systems are available: two for bag-in-box bottling, which features a packaging solution with flexible inner bag and protective outer box, and one fully automated glass bottling system. Einig-Zenzen has been working in partnership with Eaton's Filtration Division for a long time. The work has included process optimization, application-specific advice, microbiological control and index measurements using the BECO LiquiControl₂ testing device, which determines the filterability of the wine.

Challenge

Despite proven processes, Einig-Zenzen is always looking for potential areas of optimization, such as in the service lives of individual plant components. Eaton recommended the new BECO Helix depth filter cartridge as a pre-filter. Its unique design surpassed the standard wrapped filter cartridges that Einig-Zenzen had been using up to that point.



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The design featured the exact properties required by Paul Schmitz, technical director of Einig-Zenzen—improved performance values and increased service life as well as reliable process reliability.

The partners agreed on a thorough practical test, which Eaton supervised and documented using application-specific measurements. What followed was an intensive, one-year testing period using one of the bag-in-box filtration systems at Einig-Zenzen. This was to confirm how long the new depth filter cartridges actually lasted.

Solution

The BECO Helix depth filter cartridge sets itself apart from standard depth filter cartridges, mainly due to its design. The centerpiece of the filter cartridge is the helix wrapping, which creates an innovative pleated filter material design. High-quality, particularly thin and graded polypropylene (PP) fleece layers are wrapped helically around a core in a continuous spiral, rather than stacked. The structure follows an asymmetrical funnel effect that ranges from coarse to fine.

The structure has been optimized specially for demanding applications such as food and beverage filtration, because products such as wine contain quality-imparting fine colloids that can pass through the filter, while particles and larger colloids, such as β -glucans and mannoproteins, are removed. Due to its unique design, the filter cartridge also provides high mechanical stability.

BECO Helix filter cartridges fit into a standard cartridge housing and do not require any process adjustments. Einig-Zenzen was therefore able to replace the standard filter cartridges and continue work without modification.

The tests were performed in the bag-in-box systems using two-stage bottling filtration: Pre-filtration with BECO Helix depth filter cartridges, with a retention rate of 0.6 μm , and final filtration with BECO MEMBRAN PS Wine membrane filter cartridges, with a retention rate of 0.45 μm .

Eaton supervised the entire testing period via continuous measurement. The team performed index measurements to determine filterability as well as microbiological analyses to ensure that the service life met expectations and that the quality of the filtered wine was retained.

The tests required just over a year to complete, because the filter cartridges lasted significantly longer than expected. Instead of clogging within the typical service life, they demonstrated an endurance that surprised even Eaton.

Result

The results at the end of the testing period were clear:

- 40 percent longer service life compared to standard wrapped filter cartridges
- 154 steaming cycles performed compared to approximately 100 cycles historically achieved with the standard filter cartridges under similar operating conditions
- Low tendency to clog over the full operating period
- Highly backwashable—rare instances of clogging could be rinsed out easily
- Significant index value improvement: The downstream membrane filter cartridges were better protected, extending their service life

“I was really very surprised by the long service life,” says Einig-Zenzen’s Paul Schmitz about the results.

“In all BECO Helix depth filter cartridges, we detected only low amounts of clogging for the entire runtime. The downstream membrane filter cartridges were also always well protected,” reports Schmitz, who is also pleased with Eaton’s partnership and their outstanding support during the tests.

The decision to switch to BECO Helix once the last standard filter cartridges were out of stock was an easy one for Schmitz, because fewer filter changes per year will result in lower material costs and reduced downtime for replacement and maintenance. Einig-Zenzen has even experienced a reduced need for procurement and warehouse management. The new filter cartridges are also good for the environment, because they reduce waste and improve backwashing efficiency by using less water and energy.

For Paul Schmitz and his team, there is one obvious conclusion: “The extension of service life and the resulting cost and time savings were the goal of our latest efficiency endeavors. By reducing filter changes, we will achieve our ambitions safely and with a long-lasting effect.”

The collaboration between Einig-Zenzen and Eaton shows how continuous improvement is possible in established processes. A long-standing partnership, mutual trust and a willingness to test new technologies has garnered strong, measurable outcomes.

The result is a strong outcome for both parties: With the innovative BECO Helix depth filter cartridges, Einig-Zenzen saves money and maintains product quality, while Eaton has provided tried-and-tested evidence of the performance of its new filter cartridge technology.



Cartridge filtration with **BECO Helix depth filter cartridges** in the bag-in-box filter system at Einig-Zenzen.



Despite their innovative design, the **BECO Helix depth filter cartridges** have the same dimensions as standard designs and are available with all common adapters (0, 2, 7) and in all common lengths (10", 20", 30" and 40"). Therefore, they can be installed in existing cartridge housings without modification.



The unique design of the **BECO Helix depth filter cartridges** consists of very thin, graded polypropylene fleece layers arranged as a pleated band and helically wrapped in a continuous spiral around a core.

Available from



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