



The sweet taste of success

Automated filtration line improves the soft drink production process

Soft drinks are available carbonated or still in various flavors and colors, with something to suit every drinking occasion, from social to sports activities. With the urge to fully control the manufacturing process, from raw ingredients to the final product, a soft drink manufacturer turned to Eaton to develop a new filtration line. The resultant fully-automated filtration plant equipped with Eaton's backflushable Becodisc R+ stacked disc cartridges enabled the manufacturer to retain microbiological contaminants and suspended solids from raw syrup cost-effectively while increasing productivity and filter service life.

Sweetening soft drinks is a complex process

Soft drinks are beverages produced from water with syrup, carbon dioxide, and coloring and flavoring agents added. Their production process requires numerous filtration steps including activated carbon filtration for odor and color removal from the syrup, low calcium filtration to prevent instability problems, process water or gas filtration. The quality of the syrup, which is the main ingredient other than water, significantly impacts the quality of the finished product and depends on many factors such as ori-

gin, production process, transport and storage. The preparation of the sugar syrup is therefore one of the most important stages in the manufacturing process of the soft drink.

The syrup is, by nature, prone to particle and microbiological contamination (yeast, mold, bacteria), which is unacceptable in any food and beverage product. Suspended solids affect the appearance of the end product, and contamination can lead to product degradation, such as unwanted appearance, taste and off-flavor effects.

How to effectively filter a viscous raw syrup cost-effectively

The supply chain of raw sugar has changed significantly over the recent years, meaning that the quality of the product at the desired price-point is now different, posing new challenges. Typically, raw syrup, regardless of its quality, is microbially stable at 70°Brix, whereby the sugar content is so high that any microorganisms present cannot withdraw any water to grow. However, at lower Brix levels, the raw syrup is unstable and must be controlled using microbial reduction filtration or other means of sterilization.



Filtration rethought with Eaton's backflushable stacked disc cartridges. (All images Eaton)

Image: Eaton

The soft drinks manufacturer on this particular line used a 45°Brix syrup at 45°C and was experiencing some turbidity, causing cloudiness to the end product. Microbiological issues were traced back to the raw sugar. Both of these quality issues were being closely monitored within the manufacturing process, but the safety countermeasures implemented were not ideal in terms of productivity and cost.

The manufacturer wanted to fully control the production process and use consistent syrup quality regardless if refined, not refined or dissolved raw sugar was used. They were looking for an automated, in-line filtration solution to remove the microbiological and suspended solid particles from sugar syrup.

Solution: Reliable filter media

Cellulose is a natural material that effectively filters out most contaminants from water and other liquids within the food and beverage industry. Having already deployed Becodisc R+ stacked disc cartridges at another European plant to filter syrup, Eaton suggested using a similar solution.

Eaton's Becodisc R+ stacked disc cartridges use Becopad premium depth



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Eaton's Becodisc R+ stacked disc cartridges use Becopad premium depth filter sheets made of high-purity cellulose to retain microbiological contaminants and suspended solids from raw syrup.

line, ensuring that the required microbiological and particle retention levels are achieved. More importantly, regenerating the filters multiple times while maintaining the filtration quality extended filter service life. For the soft drinks manufacturer, the result was fewer filters and less maintenance and service work, thus lowering costs significantly.

“To justify the investment of the new fully automated filtration line and take into consideration the cost of energy and the filters, the manufacturer's objective was to filter 50 tons of raw syrup with one full set of eight Becodisc R+ stacked disc cartridges,” said Elke Brandscheid, Team Leader Technical Service at Eaton Technologies, Germany. “The result was 300 tons, which is six times more than expected.”

The customer is pleased with the results, and the relationship with Eaton is very positive and productive. The manufacturer is now in complete control of its production process. It is also not reliant on a particular raw sugar supplier to ensure just-in-time delivery and can ensure the quality of the mixed syrup itself. ←

Process parameters of Eaton's Becodisc R+ fully automated filtration line that helps to improve productivity, microbiology, and filter service life.

Total sugar filtered:	300,000 kg
Sterilization cycles:	50
Regeneration cycles:	100
Reverse flow regeneration cycles:	50
Differential pressure:	< 0.5 bar
Wetted conservation:	6 months
Process flow rate:	14 m ³ /h
Temperature:	45°C

filter sheets made of high-purity cellulose, which has an extremely high wet burst strength and reliable backflushing capacity. High assembly pressure is applied to the cells with an intermediate spacer of multi-layer polyester fabric, which supports the filter cells during the backwashing process. Moreover, filter utilization is maximized due to an optimized flow distribution upstream and downstream, ensuring that there are no blind spots in the filter area. The result

is that the Becodisc R+ stacked disc cartridges have the necessary robustness for a minimum of 20 regeneration cycles.

Solution: Maintaining filtration quality while regenerating and sterilizing for longer filter service life

The collaboration between Eaton and the soft drinks manufacturer's production and lab teams enabled them to develop a fully automated filtration

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