Application Note

Sheet Filtration of Wine and Sparkling Wine
Backwashing of BECO® Depth Filter Sheets

In sheet filtration high efficiency compared with competitive filtration systems is a decisive factor. Here, not only the flow rate per square meter and hour is important, but rather the total service life of the filter until the depth filter sheets are completely exhausted.

Backwashing = Benefits For Users

At the end of a filtration cycle, the high wet strength of BECO depth filter sheets allows them to be backwashed, thus offering chances for reducing filtration costs. If backwashing is performed before reaching the maximum permitted differential pressure of 150 kPa, 1.5 bar for sterile sheets and 200 kPa, 2.0 bar for clarifying sheets, i.e. at 70 kPa, 0.7 bar or 100 kPa, 1.0 bar, several backwashing cycles of the sheets in the filter are recommended. This considerably enhances the filter life and economy of sheet filtration.

Flow Rate and Counter Pressure

Before beginning the backwashing cycle the filter package should be slightly loosened. Backwashing should be done at 1 to 1.5 times the filtration rate, which means for BECO sterile sheets at 350 – 500 l/m²/h and for BECO clarifying sheets at 750 – 1,100 l/m²/h, at a counter pressure of at least 50 kPa, 0.5 bar. A sufficient backwashing effect will only be obtained if the counter pressure is high enough. Simply allowing water to flow back through the sheets without pressure is less effective. To improve the washing effect and necessary counter pressure a good diagonal flow of the backwashing water in the filter should be intended. This is achieved by throttling the discharge and venting valves on the water outlet side and closing the valves on the water inlet side shortly after starting the backwashing procedure.

The water used for backwashing should not be circulated. It should be of drinking water quality, biologically safe, and free from mechanical impurities.

Backwashing Times

Long backwashing cycles will not always produce the best regeneration effect. Eaton's observations have shown that backwashing with cold water involves the use of large quantities of water that are in no way in relation to the achieved washing results.

However, if the flow rate and necessary counter pressure are chosen with care, good regeneration results will often be achieved after only 5 minutes washing with cold water.

A final warm washing cycle is always recommended. In this case a backwashing time of between 15 and 20 minutes has proven sufficient. Flow rate, counter pressure, and temperature must be optimised again.

Backwashing Temperature

In order to wash beta-glucane, albumen, and colloids out of the depth filter sheets, a temperature of between 104 °F (40 °C) and max. 131 °F (55 °C) was previously considered to be ideal. However, Eaton's new findings show that a temperature of up to 176 °F (80 °C) produces a better washing effect.

In this case, the backwashing water should be heated to 176 °F (80 °C) in three stages after a brief cold washing cycle. As the depth filter sheets also heat up to 176 °F (80 °C), turbid matter and colloids are washed out at the relative optimum dissolving temperature.

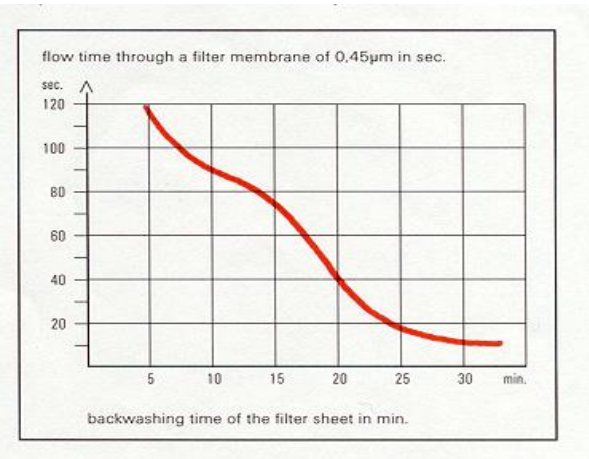
The backwashing operation is finished when the water running from all valves after passing through the sheets is clear. The filter is then cooled down again. After retightening the filter-packing, the filter is ready for the next filtration cycle.

Filters packed with sterile sheets for final filtration must be re-sterilized after the backwashing operation.

Checking the Backwashing Effect

A test of the rinsing effect is easily carried out by taking the COS* values.

***** chemical oxygen demand



Summary

Back flow rinsing is carried out at slightly released tension of the filter pack and a minimum counter pressure of 50 kPa, 0.5 bar.

a) Rinsing flow direction and temperature:

1. Opposed to filtration flow, with cold water.
2. Opposed to filtration flow, warm at minimum 122 °F (50 °C), preferably heated by degrees to a maximum of 176 °F (80 °C).

b) Duration of back flow rinsing:

1. In the case of cold rinsing, until perfectly clear water flows from the outlets, but at least for 5 minutes.
2. In the case of hot rinsing, 15 – 20 minutes until perfectly clear water flows from the outlets.

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