



WideGaps help cut energy consumption in preliming step at Swedish sugar mill

Nordic Sugar Örtofta, Eslöv, Sweden

Case Story

In 1999 Nordic Sugar's Örtofta mill in Sweden added a sixth evaporation step. Six WideGap heat exchangers from Alfa Laval, offering close temperature approach, were installed as prelimed juice heaters. Now, with energy consumption down, the mill sells its surplus energy to the local district heating grid. Production Manager Jerker Magnusson: "The introduction of WideGap plate heat exchangers was the breakthrough for plate heat exchangers in the raw sugar process. The WideGap really works on demanding fluids and the heat economy is superior."

Energy consumption reduced

At Örtofta waste heat in the form of condensate and vapour from the sixth evaporation effect provides 90% of the heat demand when heating the prelimed juice. The remaining 10% comes from bleed-off vapour from the fifth effect. Calculated as equivalents of steam from the boiler, only 2% of the heat demand in this process step is fresh energy from the boiler.

In 1999 before the investment in the sixth effect, this figure was 5.4%. The combination of the sixth effect and the WideGaps has reduced the energy consumption by more than 60% for heating of prelimed juice!

Surplus energy from the Örtofta mill is used to feed the local district heating grid for the nearby cities. Thus, all energy savings the mill can make in the sugar process are valuable, as more heat can be fed to the grid. This also benefits the environment as the local district heating plant can reduce its consumption of fossil fuels.



According to Jerker Magnusson and Niklas Hanner, by adding plates to the WideGaps, a further reduction in energy consumption of 30% is expected for the campaign 2010/11.

Additional plates will save even more energy

For the campaign 2010/11, Nordic Sugar is increasing the heat efficiency even further in the prelimed juice line by adding 60% more plates to the first heating step. This will make the temperature approach closer and an additional 30% reduction in energy consumption is expected. Since there is sufficient space in the WideGap frames and the connections are big enough, this expansion can be achieved easily.

Fast Facts

Nordic Sugar – Örtofta mill, Sweden

Since 2009 Nordic Sugar has been part of the German Nordzucker group, the second largest sugar producer in Europe.

Nordic Sugar has seven sugar facilities in Sweden, Denmark, Finland and Lithuania. With a history stretching back to 1890, the Örtofta mill in southern Sweden is today Nordic Sugar's biggest mill. Production capacity is 18,000 tons of beets per day, and Örtofta is one of the most heat efficient mills in Europe.

Facts

Energy savings per ton of beets	2.8 kWh
Amount of beets processed 2009/10	2,450,400 tons
Total annual energy savings	6,860 MWh

Confidence in plate technology

Nordic Sugar has now replaced all its shell-and-tube and spiral heat exchangers with plate heat exchangers. "Plate heat exchangers are more efficient as they always present a higher k value," says Jerker Magnusson. "In addition, the plates are much easier to clean and access for maintenance. We have full confidence in plate technology!"

Backflushing and CIP the keys to success

After the campaign, which lasts from mid-September to mid-January, the units are cleaned using an Alfa Laval CIP (Cleaning-in-Place) system. The cleaning procedure includes flushing with water,



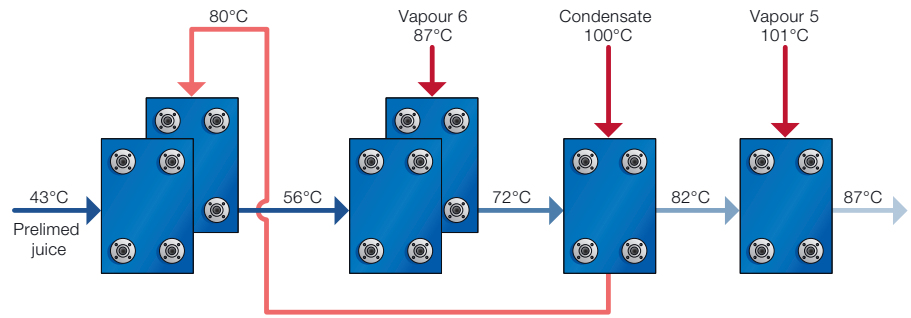
Behind the vacuum pans is a glass mosaic from 1903 showing beet harvesting.

followed by soda ash, then sulphamic acid, and finally water again, together with some caustic in order to ensure that no acid is left in the units when they are taken out of service after the campaign.

Jerker Magnusson: "Backflushing and CIP are the keys to success for using plate heat exchangers in the raw juice line."



Heating of prelimed juice at Nordic Sugar, Örtofta



Regarding heating media, steam or vapour work efficiently in plate heat exchangers, but Jerker Magnusson recommends the use of an automatic closure valve in the vapour line. This will avoid caramellisation of the sugar if there is an interruption of the sugar flow. Also to prevent caramellisation, Magnusson recommends using liquid heat sources, such as condensate instead of steam, to heat thick juice solutions where the sugar concentration is above 65%.

Gaskets have never been replaced

The WideGaps are never opened unless there is a good reason for it. Department Manager Niklas Hanner: "Our policy is to open the plate heat exchangers as little as possible in order to save the gaskets. The units have been in operation since 1999 and so far the gaskets have never been replaced." After the campaign when the units have been cleaned, the inspection covers are opened to check that the port holes look clean.

Long co-operation with Alfa Laval

Why did Örtofta mill choose Alfa Laval? Jerker Magnusson: "Proposals from

different suppliers were brought in, and Nordic Sugar has had a long co-operation with Alfa Laval. Knowledgeable suppliers that can give good advice are what customers want, and if the price is right, the choice is easy."



WideGap plate heat exchanger

WideGap functions well with fibrous media, such as raw juice and limed juice. A gap of up to 17 mm between the plates allows fibres and particles to flow easily, minimizing clogging. The WideGap is suitable for various heating media, such as liquids, steam and low pressure vapour.

- Suitable for fibrous media
- Plate pattern designed for high turbulence and efficiency
- Easy to clean with Cleaning-in-Place equipment or mechanically
- Easy to expand capacity

Technical data

- Large capacity: up to 350 mm ports available
- Plate gap: 5, 8, 11 or 17 mm, depending on duty
- Design temperature: up to 145°C
- Design pressure: up to 10 barg

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.