



The magic formula: Improve product quality while reducing costs, energy consumption and downtime

Pendik Nisasta San AS, Istanbul, Turkey

Case story

By replacing shell-and-tube heat exchangers with Alfa Laval Compabloc fully welded plate heat exchangers, Pendik Nisasta San (PNS) drastically reduced heat loss, raw material use and cleaning costs while improving product quality and colour.

Driven by their goal of continuous improvement and innovation, PNS have looked for ways of meeting the challenge of increasing revenues and keeping their competitive edge in the starch business, without increasing costs. They turned to Alfa Laval who offered an innovative solution – replace a bulky, inefficient shell-and-tube with an Alfa Laval Compabloc.

The production process

From the starch plant the highly viscous starch milk is pH adjusted by an acid, before it enters the starch conversion heater, where it is heated by steam to above 100 °C. In this step the starch molecule is cut into smaller molecules, i.e. a sweetener. Next the proteins are removed in a rotary drum filter before the sweetener enters an ion exchanger. Finally the product is evaporated to its end concentration.

Uneven heat transfer creating problems

Working in partnership with PNS' production manager, Mr Ömer Faruk Balci, Alfa Laval's technical experts analyzed the process. They found that a shell-and-tube heat exchanger was seriously compromising the efficiency of the process. Not only was it taking a long time to heat the starch milk at each start up, the large surface area was causing heat loss during the process.



Pendik Nisasta San (PNS) produces glucose/fructose syrups, starch and by-products used as raw material in foods and other industry sectors.

Uneven heat transfer was creating inconsistent fragmentation and impairing the quality of the product. Sub-standard fragmentation meant that more filter aid had to be used for an efficient separation, which gives a high raw material cost and lower filter capacity.

Test system showed the potential benefits

Alfa Laval suggested investing in a Compabloc to replace the bulkier and less efficient shell-and-tube equipment.

This would revolutionize the process almost overnight, resolving all the challenges faced and bringing additional benefits and increased revenues.

Alfa Laval created a test system with a smaller plate heat exchanger to demonstrate the benefits in action. It was a success, with productivity levels higher and a better quality product, so the move was made to upgrade the main system.



“Using Compabloc in the heating process has proven to be a big success”, says PNS’ production manager, Mr Ömer Faruk Balci.

Better quality product at less cost

The results were soon visible. Compabloc’s even and efficient heat transfer resulted in more homogenous fragmentation of the starch milk product, leading in turn to fewer blockages and a much higher quality and consistent colour in the end product.

After fragmentation in the Compabloc, the product enters rotary vacuum filters to separate the protein. The more efficient fragmentation delivered by the Compabloc also enabled a reduction in raw materials consumption in the rotary vacuum filters, and increased their capacity.



Alfa Laval Compabloc - high performance fully welded plate heat exchanger

- Compact, flexible design
- No gaskets between plates enabling effective operation with aggressive media at high temperatures and pressures.
- Easy to inspect, service or clean
- Heat transfer ratios 3-5 times greater than shell-and-tube heat exchangers.



Alfa Laval’s sales engineer, Mr Eser Aydin standing next to the Alfa Laval Compabloc plate heat exchanger.

The heating process itself becomes much more efficient than with shell-and-tube equipment. Compabloc’s smaller footprint uses a lower surface area and drastically reduces heat loss during the starch milk liquefaction stage. Starch heating duration is also three times lower than with shell-and-tubes.

Alfa Laval’s equipment is designed to be easily opened for maintenance and cleaning, if needed, and the Compabloc is no exception. Even scheduled downtime can be costly, so saving time on the cleaning process means saving money too.

“Using Compabloc in the heating process has proven to be a big success. Not only have we managed to improve the quality of our products, we produce sweeteners in a much more cost-efficient way, reducing downtime and costs for heating and raw materials. We are very pleased with the results”, says PNS’ production manager, Mr Ömer Faruk Balci.

“It’s a pleasure to work with such an innovative and forward-thinking company like PNS. They were brave enough to see the potential that Compabloc could have on their processes. Now that they are installed and working above expectations is a testimony to a partnership based on technical expertise and the striving to optimize processes to make them as efficient as possible”, concludes Mr Levent Dincer, sales manager, Alfa Laval.

Fast facts:



About the company

Pendik Nisasta San AS (PNS), jointly owned by the Cargill group and the Turkish food company Ülker, are leading innovators in Turkey’s starch processing market. Since 1996, PNS has been delivering outstanding customer satisfaction and high quality starch products for use in food, confectionary, paper, glue and textiles.

Company challenge

To improve processes and stay competitive in the starch production world, PNS needed to cut energy waste and expenditure as well as increase process efficiency.

About the solution

Replace inefficient shell-and-tube equipment with an Alfa Laval Compabloc. This revolutionized the process, bringing the following revenue-boosting benefits:

- Start up starch heating duration three times lower than with shell-and-tube equipment, leading to shorter start up time, better control of parameters and reduced energy expenditure
- Reduced heat loss during the starch milk liquefaction stage
- More efficient heat transfer and homogenous fragmentation, causing:
 - Improved product quality and colour
 - Reduced raw material consumption in rotary vacuum filters
 - Increased feed capacity of rotary vacuum filters
- Easier operation and maintenance, leading to reduced labour and cleaning costs.
- Compact equipment that can be installed anywhere and frees up space.



The Compabloc significantly cut down on space and drastically reduced heat loss.

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.