



AlfaVap and AlfaCond save energy in Japanese beet sugar factory

Hokuren Nakashari, Japan

Case Story

The Hokuren Federation of Agricultural Cooperatives began installing Alfa Laval AlfaVap rising-film plate evaporators at its Nakashari sugar beet factory in 1992. Impressed by their high heat transfer performance and compact design, in 2005 Hokuren installed four AlfaVaps to help recover energy from the process steam. An AlfaCond condenser was also installed.

“Installing more Alfa Laval equipment was an important part of our plans for cutting energy costs,” says the Sugar Production Manager. “It is far more efficient than the equipment we had previously, and maintenance is much easier. We’ve accomplished the energy savings we hoped for.”

A total of 39 AlfaVaps installed

Hokuren operates two sugar beet factories in the Hokkaido region, Nakashari and Shimizu. It began installing Alfa Laval equipment in the 1970s and, today, has a total of 39 AlfaVaps in both factories, as well as another 90 Alfa Laval plate heat exchangers.



Hokuren operates two sugar beet factories in Japan’s Hokkaido region, the Shimizu Factory to the west in Tokachi, and the Nakashari Factory.

Fast Facts

The customer Hokuren, Japan

Officially known as the Hokuren Federation of Agricultural Cooperatives, Hokuren gathers, processes and ships Hokkaido-sourced agricultural, meat and dairy products to the main island of Honshu, provides farmers with seeds and seedlings and conducts agricultural research and development.

Eighty per cent of Japanese-produced sugar comes from beets. Hokuren operates two sugar beet factories, the Shimizu Factory to the west in Tokachi, and the Nakashari Factory, which is the second largest of a total of eight beet sugar factories in Hokkaido operated by three different organizations.

Pulp sold as feed

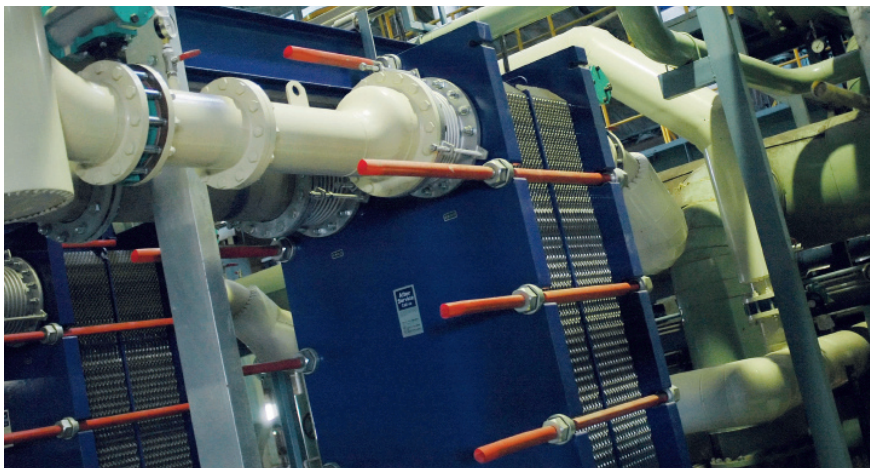
After harvesting in the autumn, the sugar beets are trucked to the Nakashari factory. They are washed, mechanically sliced into small strips and mixed with hot water for 60 to 80 minutes to extract the sugar.

Once the sugar has been extracted from the beets, the pulp is removed, pressed and sold as animal feed. The juice is then treated with a mixture of lime and carbon dioxide, which removes non-sugar materials. The remaining juice can be stored for later processing.

Quality depends on controlling temperature and pressure

The juice is filtered before passing through two more processes in which calcium and excess colour are removed. It then enters one of several Alfa Laval AlfaVap evaporators in the plant, where it is boiled and reduced to “thick juice,” before becoming crystallized sugar. “To make a good sugar crystal, the difficult part is in controlling temperature and pressure,” explains the Sugar Production Manager.

The liquid sugar is boiled at a reduced pressure and infused with fine sugar



Hokuren has a total of 39 AlfaVaps installed in its Nakashari and Shimizu sugar beet factories, as well as another 90 Alfa Laval plate heat exchangers.

seed that will provide a base for the crystals to begin forming.

High heat transfer performance

Installed at Nakashari in 1992, the first AlfaVap was used as a first effect booster. Hokuren appreciated the unit's high heat transfer performance and the fact that it was extremely compact and easy to install.

Since increasing the number of effects reduces the amount of steam, and therefore the amount of energy required, Hokuren decided to install a five-effect complete station with the AlfaVap evaporators in the Shimizu factory in 1995.

Close teamwork

"We had never done an installation like that before," says Akihiro Kumagai,

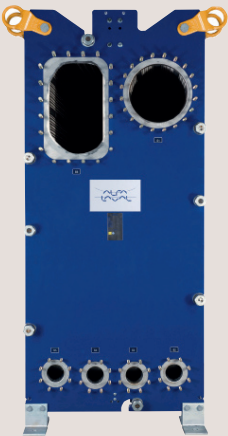
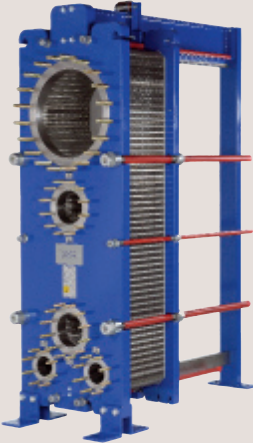
Alfa Laval, Japan. "However, with close teamwork between Hokuren and Alfa Laval in both Japan and Sweden, we were able to develop a solution that met the customer's needs. The system worked very well, and our relationship grew much stronger," he says.

When the Shimizu Factory was renovated in 1998, Hokuren ordered 17 AlfaVaps. "They wanted to set up an eight-effect complete station for raffinade processing – a liquid remaining after removing sugar from molasses," relates Akihiro Kumagai. "This was something else that we had never done, but we were very confident after the success in 1995 and everything worked perfectly."

Nakashari factory renovated in 2005

Japanese-made sugar cannot compete with imports on price, and even with Government subsidies, Hokuren needs to keep a tight rein on costs. According to the Sugar Production Manager, this was a major reason for the complete renovation of the equipment in the Nakashari factory in 2005. The project included the previously mentioned, highly successful installation of four AlfaVaps, and an AlfaCond condenser to help recover energy from the steam.



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|  <p>AlfaVap evaporator</p> <p>The AlfaVap is tailor-made for evaporation. Particularly efficient at high concentration and high viscosities, it can work with temperature differences down to 3–4°C.</p> <p>Features and benefits</p> <ul style="list-style-type: none"> • Corrugated plate pattern ensures a high degree of turbulence, which gives high heat transfer coefficients • Rising film concept eliminates the need for a re-circulation pump and avoids problems with feed distribution • Excellent wetting ability – a once-through evaporation process can often be used • Flexible design: easy to adapt to changing capacity demands |  <p>AlfaCond condenser</p> <p>The AlfaCond is the first plate condenser in the world specifically designed for low-pressure vapour condensation in all types of industries.</p> <p>Features and benefits</p> <ul style="list-style-type: none"> • Plates specially designed for condensation • Condensate and cooling water never mix, eliminating a source of pollution • Flexible design: easy to adapt to changing capacity demands • Compact size for a leaner installation • Minimized fouling and easy maintenance for maximum uptime |
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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.