Dairy plant saves energy with new cooling system featuring U-Turn evaporator

Sorelait (Danone Group), The Pacific island Réunion **Case Story**

The dairy producer Sorelait is a company within the Danone Group, based on the Pacific island Réunion. When they decided to substitute their former refrigerant (R22) and install a more powerful and energy-efficient cooling plant, Alfa Laval was selected to provide the equipment. Compared to conventional systems, the new arrangement (including an evaporator module, with the compact U-Turn liquid separator and combined with frequency controlled compressors) offered substantial energy savings, reduced production cost, considerable less space requirement and a correct natural refrigerant ready for future demands.

A major dairy producer

The island of Réunion is a French overseas department, situated in the Pacific off the East African coast some 200 kilometres south-west of Mauritius. It is also the domestic market for the dairy company Sorelait (Danone Group). From a modest start in 1989 (10 employees), this company now has a staff of 90. With a daily output of 200 000 yogurts Sorelait holds 45 percent of the island market while generating an annual turnover of EUR 20 million. The major product is the yogurt branded Danone.

A fair set of technological challenges

Besides energy saving, higher productivity and interaction with a new refrigerant, the demand specification brought some additional challenges. In order to cope with the confinements of a small machinery room and to facilitate overseas container shipping, the new equipment had to be very compact. Also, it had to be installed without any prolonged interruption of plant operation.

Fast facts:

End-customer: Sorelait (a major dairy producer within the Danone Group)

Buying customer: JPO Froid (refrigerant system builder)

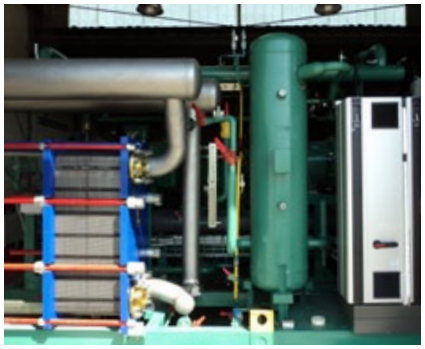
The scene: The Pacific Island Réunion

The task: Replacement of the cooling plant

The challenge: Confined space, energy saving, substitution of refrigerant and short installation time

The result: Improved productivity, considerable energy savings and a high degree of automation

Energy saving: Reduces the need for power from 900 kW to 700 kW. This means an annual cost reduction of more than EUR 8,000.



A longstanding relationship

In fierce competition, JPO Froid came out as the potential system builder most successfully addressing the problems defined by Sorelait. This company specialises in systems for food refrigeration and is a longstanding partner of Alfa Laval – notably within extensive projects aiming at CO_2 reduction. JPO Froid purchases the vast majority of their heat exchangers from Alfa Laval and over the years a solid professional relationship has been developed.

Saving space, energy and installation effort

The solution presented by JPO Froid comprised a U-Turn condenser as well as other equipment from Alfa Laval. By combining the U-Turn with frequency controlled compressors, JPO Froid was able to present a very compact system with two compressors (combined effect of 1 MW) and a total length of just 4.5 metres. Conventional solutions call for 3-4 compressors and traditional LP cylinders.

By the use of frequency controlled compressors, they were able to work at a higher speed (up to 60 Hz instead of 50 Hz), thus delivering savings in the production. Also, the new plant eliminates the need for manual adjustment of the power supply to load variations – e.g. during weekends or evening hours. The power supply is automatically tuned to meet the actual demand.

When it comes to tolerance to load changes due to large fluctuations of temperature, U-Turn comes out very well. As you can imagine, generating the refrigeration (700 kW) for a production plant like this one implies very low tolerance for frequent cut-outs or long breaks for re-energizing.

The fact that the U-Turn represented somewhat of a turnkey solution enabled JPO Froid to save considerable volumes of time and cost for dimensioning, engineering and skilled labour.

U-Turn and ammonium

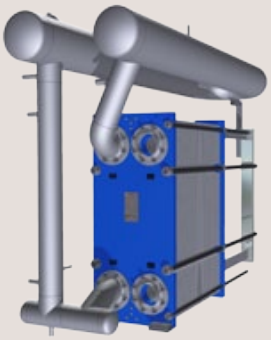
To address the energy savings issue, the installer Sorefroid and Sorelait acquainted the French Energy Management Agency (ADEME) with the novel idea to use ammonium rather than the refrigerant R404A in order to take sustainability one step further. With financial support from ADEME, this scheme was implemented and the anticipated energy savings were achieved.

Considerable energy savings

After an initial period of operation, the actual energy savings were validated by an independent research institute. By eliminating peaks in the use of energy, the new solution could reduce the need for power from 900 kW to 700 kW – which means a cost reduction of more than EUR 8,000 annually. Depending on the time of year, energy savings fluctuate within the 13-20 percent range.

"When the U-Turn solution was presented to us, we immediately decided to go for it as we knew it would help save space, limit the quantity of ammoniac and allow us to reach our energy-efficiency target. The system has been in use for a year now and we had very little maintenance to do, even no maintenance at all when the old system needed constant monitoring and frequent human interventions!" *Patrik Cadet, Maintenance Manager, Sorelait*

More about the U-Turn solution



The U-Turn liquid separator is especially designed for use with plate heat exchangers in ammonia applications. It is lightweight and compact in design, making it easy to install. It can cover ammonia capacities from 200 to 1,400 kW at 0°C evaporation temperature and from 50 to 500 kW at -40°C evaporation temperature.

U-Turn is designed to take advantage of the very best of Alfa Laval plate heat exchanger technology.

- Efficient separation by means of agglomeration, gravity, centrifugal forces and surface tension.
- Low internal pressure losses – good part load performance.
- Compact design and low refrigerant charges.

Alfa Laval reserves the right to change specifications without prior notification.

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