



## WideGaps reduce live steam consumption at Brazilian sugar-ethanol plant

SantelisaVale, Sertãozinho, Brazil

Case story

At its Sertãozinho sugar and ethanol plant, SantelisaVale uses excess steam from the process to generate electricity. To conserve more live steam for power generation, six Alfa Laval WideGap plate heat exchangers were installed, replacing old, inefficient shell-and-tube units. Designed to handle fibrous media, the WideGaps immediately dispelled customer concerns that fibers in the product could clog plate heat exchangers. “The WideGaps work very well and consumption of live steam is down by 40 to 50%,” says João Carlos Francisco, Production Manager for sugar extraction.

The Sertãozinho cane sugar mill produces both thermal and electrical energy, so-called co-generation. Bagasse, the fibre remaining after the extraction of the sugar-bearing juice from the sugar cane, is used as fuel in a boiler. The bagasse produces more than enough steam to



Sugar cane crops, the basic raw material for Brazil's sugar and ethanol industry.

### Product Facts

#### Alfa Laval WideGap plate heat exchangers

Designed to avoid clogging, WideGap plate heat exchangers are suitable for general heating, cooling and heat recovery of media containing fibres and coarse particles. The wide-gap channels are also suitable for highly viscous fluids.

- Plate pattern designed for high turbulence and heat transfer 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 180°C
- Design pressure: up to 10 barg

heat the sugar production process, and the excess live steam is used to drive a turbine that produces electricity which is sold to the national grid.

### Reducing live steam consumption

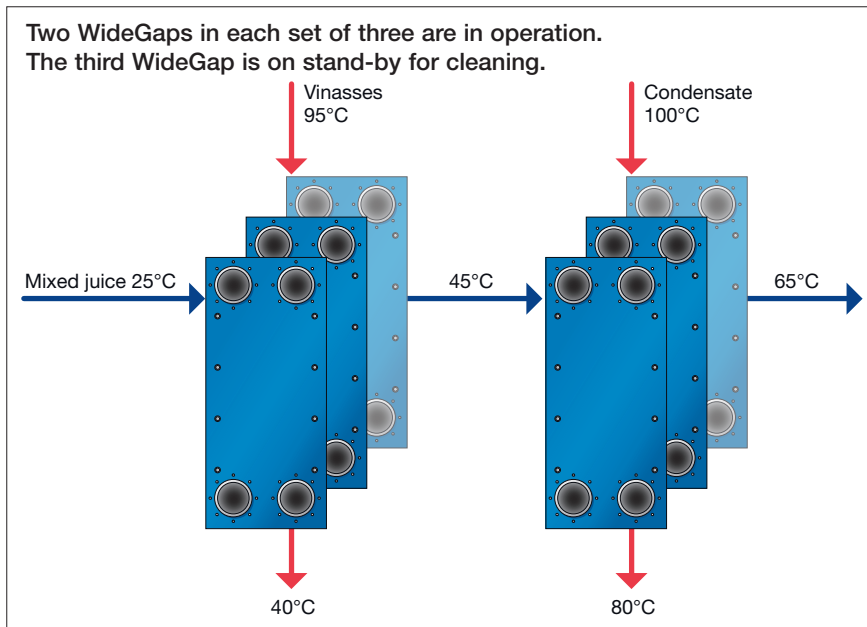
The mixed sugar juice needs to be heated from around 25°C to 105°C. This was previously achieved in about 40 shell-and-tube heat exchangers, using live steam at 127°C. In 2002 SantelisaVale's aim at the Sertãozinho mill was to reduce live steam consumption, saving more live steam for power generation. The method chosen was to use more efficient heat exchangers which allow the use of lower grade vapours.

Since space limitations ruled out shell-and-tube heat exchangers,

SantelisaVale began to consider plate heat exchangers. There was, however, some concern at the plant about using plate technology since the mixed sugar juice contains cane fibers which can easily clog up a poorly designed plate heat exchanger.

### Six WideGaps installed

Despite their concerns, SantelisaVale put their trust in Alfa Laval's application know-how, based on references and previous good experience with Alfa Laval products. Six WideGap plate heat exchangers, designed to handle fibrous media, were installed at Sertãozinho mill. The duty performed by the six WideGaps is the same as in about 15 of the old shell-and-tube heat exchangers. The WideGaps were installed in two sets of three. In each



João Carlos Francisco, production manager for sugar extraction at Sertãozinho.

105°C is still performed in the old shell-and-tube heater and additional investments to further reduce the live steam consumption are being considered.

“After a year of operation we no longer had concerns about using plate technology,” says João Carlos Francisco. “The WideGaps work efficiently and the people in the sugar manufacturing department are spoiled with reliable deliveries of mixed juice at 60°C!”

#### WideGaps cleaned by CIP

To clean the WideGaps hot water is circulated for four hours per day. Once a week a 20-30% caustic solution is circulated for 1.5 hours. No backflushing has been necessary in this case.

According to João Carlos Francisco, the units have only been opened twice since 2002, and both times it was due to failures in the 0.5 mm gap filter that is placed before the heat exchangers. “The gaskets have never been replaced. The less we open the units, the better it is for the gaskets,” says João Carlos Francisco.

#### Fast Facts:

##### The customer

##### SantelisaVale, Brazil

- With 11 plants in operation, SantelisaVale is the second largest sugar and ethanol producer in Brazil.
- The Sertãozinho cane sugar mill, some 300 km north of São Paulo, is the third in size in Brazil with a capacity of 29,000 tons of cane per day.
- Now a standard in the Brazilian sugar industry, the plant is equipped for co-generation, producing both thermal energy and electricity.



Alfa Laval WideGap plate heat exchangers, for fibrous media, installed at SantelisaVale's Sertãozinho sugar and ethanol plant.

set two units are in operation while the third is being cleaned.

In the first set of WideGaps the mixed juice is heated from 25°C to 45°C, using vinasses, waste liquor from the mash distillation column in bioethanol production, instead of live steam. Prior to installing the WideGaps, the plant had no forced way of cooling the vinasses before they left the plant. The vinasses are now cooled rapidly from 95°C to 40°C in the WideGaps, which saves time in the process and makes use of the waste heat.

The second set of WideGaps takes the mixed juice up from 45°C to 60°C using condensate from the pre-evaporator. This condensate is then used for sugar

preparation at the front end of the plant where the sugar is extracted from the cane.

The sugar preparation requires water at 40°C, and the condensate is mixed with water from the nearby lake in order to achieve the desired temperature. Since the condensate now has a lower temperature than before, less water is needed from the lake, which is seen by SantelisaVale as a major advantage.

#### Live steam consumption reduced

Thanks to the use of WideGaps, the consumption of live steam at 127°C has been reduced by 40-50% and the steam saved is boosting the power generation. The last heating step from 60°C to

#### 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](http://www.alfalaval.com).