



WideGap plate heat exchangers are a sweet deal for sugar plant

Shri SaiKrupa Sugar & Allied Industries Ltd, Maharashtra, India

Case story

When Shri SaiKrupa Sugar & Allied Industries Ltd in India opened its new sugar refinery in 2010, it was not only the largest plant in the Maharashtra region, but also one of the most modern – using unconventional heating technology to save precious energy.

Unlike the Indian sugar industry at large, Shri SaiKrupa uses Alfa Laval's WideGap plate heat exchangers to heat its raw sugar juice. So far, they have resulted in considerable energy savings and trouble-free operation.

Shri SaiKrupa produces sugar and ethanol – both very energy-intensive manufacturing processes. By consuming less vapour for the actual heating of raw juice, more can be captured and used for clear-juice heating and evaporation. Equally important, this saves live steam for generating electricity.

With these objectives in mind, the new plant was equipped with plate heat exchangers (PHEs) rather than traditional shell-and-tube exchangers.

Ideal for fibrous fluids

The Alfa Laval WideGap PHEs are designed and built especially for operating with fibrous fluids such as raw juice from crushed sugar canes.

Thanks to special plate patterns and non-clogging ports, the flow rate remains high, with high turbulence and heat-transfer capacity – despite the viscous medium processed. There is no clogging anywhere, and



One of four Alfa Laval WideGap PHEs installed at Shri SaiKrupa for heating raw sugar juice.

cleaning is reduced to flushing the units once in a while, without opening them. Mr E.G. Sadanand, vice president at Shri SaiKrupa, is very happy with the company's choice of heating technology: "During their first two years of operation, our four WideGap PHEs have surpassed our original expectations in terms of energy savings and ease of operation. Most importantly, the live steam consumed is down by 1.92 to 2.0 % on cane crushed."

Two-phase heating process

Before liming and purifying the raw juice, it needs to be heated from around 35 °C to 70 °C – mainly for anti-bacterial reasons. This is done in two phases. First the juice passes through a WideGap PHE where it is heated by 80 °C evaporator body condensate, condensed from low-pressure vapor. This raises the temperature of the juice to 48 °C. Vapour from the evaporator is used in the second phase to heat the juice to 70 °C.

Thanks to the close temperature approach of the PHEs, condensate can be used as the heating medium for raw juice heating. As a result, more steam can be used to generate power – either for in-plant purposes or for feeding back to the local power grid.

Small and flexible

The PHE technology brought other advantages to the new Shri SaiKrupa sugar plant. The footprint is only a fraction of comparable shell-and-tube equipment. No heavy (and costly) foundations or special structures were needed in the boiler house, nor any clearance space for cleaning the tubes and pulling tubes out of shells for replacement.

The flexible capacity is another plus. After the first crop season, Shri SaiKrupa needed to increase production from 180 to 250 tons/h. This was easily accommodated by adding more plates to each PHE. Similarly, should less capacity be needed in the future, removing plates is just as easy.

Alfa Laval WideGap PHE



WideGap PHEs are suitable for various heating media, such as liquids, steam and low-pressure vapour.

- Designed 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



“The WideGap PHE technology has delivered on its promise of heat-transfer efficiency and energy savings,” says Mr E. G. Sadanand, vice president at Shri SaiKrupa.

The art of cleaning

Keeping the WideGap PHEs clean is a task significantly less time-consuming than cleaning shell-and-tube equipment, thanks to Alfa Laval’s cleaning-in-place (CIP) process. At Shri SaiKrupa, the PHEs are flushed for 4-5 hours once a week with hot water and a caustic solution. (Meanwhile, production is taken over by back-up units).

Also, the PHEs are switched between forward-flow and backward-flow operation every eight hours, which helps keep them clean longer. This can be done with virtually no impact on the temperature of the juice.

Back flushing and cleaning in place keys to success

After each crop season (generally running from October to mid-April), the PHEs are cleaned in place once again. In addition to hot water and a caustic solution, sulphamic acid is also used, followed by more water to remove all traces of acid.

“Alfa Laval’s approach, with backflushing and CIP is the key to success for using PHEs in a raw-juice line,” says Mr K. Gopalkrishnan, head of operations at Shri SaiKrupa. He also points out that, unlike shell-and-tube heat exchangers, WideGap PHEs need to be opened only very infrequently, which spares the gaskets from unnecessary wear and tear. “In our first two years of

Fast facts

The customer

Shri SaiKrupa Sugar & Allied Industries Ltd in Maharashtra, India – a leading Indian producer of sugar and ethanol.

Company challenge

Reducing energy consumption in the pre-liming heating of raw sugar juice. Using a low-temperature heating medium for raw-juice heating.

The benefits

- Significant heat recovery allows excess steam to generate power.
- Small footprint saves space in the boiler house.
- Flexible capacity by adding (or removing) plates.
- Fast, convenient cleaning-in-place and backflushing.
- Infrequent openings increase operational life of plate gaskets.

The solution

WideGap plate heat exchangers function well with fibrous media, such as raw juice and limed juice. An average gap of up to 17 mm (max 22 mm) between the plates allows fibres and particles to flow easily, minimizing clogging.

Installed units

4 x WG200S FM: design temperature 130°C, design pressure 6 barg
Plate gaps: 11 mm (juice), 5 mm (condensate)
Port size: 200 mm

operation, we have not replaced any gaskets,” says Mr Gopalkrishnan.

Delivered on the promise

Overall, Shri SaiKrupa management finds the cooperation with Alfa Laval very satisfactory. “The WideGap PHE technology has delivered on its promise of heat-transfer efficiency and energy savings,” says Mr Sadanand. “The operation and maintenance processes are simple and convenient. And Alfa Laval provides the support we need through its efficient service network.”



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.