



## DuroShell maximizes uptime and reduces costs at biomass combined heat and power plant

Jämtkraft, Östersund, Sweden

Case story



Swedish renewable energy company Jämtkraft installed Alfa Laval DuroShell plate-and-shell heat exchanger to recover surplus heat from boiler blowdown water at its Lugnvik combined heat and power plant.

At its Lugnvik combined heat and power (CHP) plant, Swedish renewable energy company Jämtkraft experienced issues with the heat exchanger used to recover heat from boiler blowdown water. Due to repeated leakage from the unit, the company turned to Alfa Laval. The solution? The all-welded Alfa Laval DuroShell plate-and-shell heat exchanger designed for demanding high-temperature duties and high resistance to cyclic fatigue. Now there's more uptime, reduced energy costs and better compliance with environmental regulations at the Jämtkraft Lugnvik plant.

The Jämtkraft Lugnvik CHP plant has been processing forestry biomass into bioenergy since 2002. The plant converts about a third of the biomass into electricity and two-thirds into district heating that covers the needs of 90% of Jämtland county, which lies in the middle of Sweden. After repeated leakage from the boiler blowdown heat recovery unit, Jämtkraft suspected that the cold makeup water was cyclic, causing temperature and pressure cycling on the heat exchanger.

### A high-temperature, fatigue-resistant solution

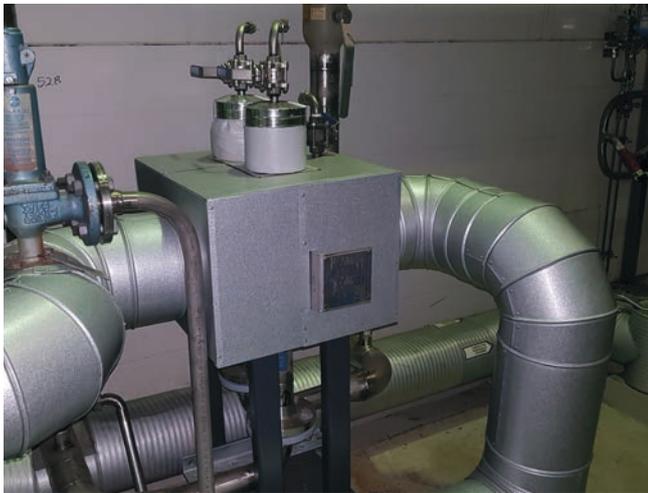
Due to process temperatures above 200°C, gasketed plate heat exchangers were not an option. After consultations with Jämtkraft, Alfa Laval recommended using the robust and fatigue-resistant Alfa Laval DuroShell plate-and-shell heat exchanger for boiler blowdown heat recovery.

### Greater savings and better compliance

The advantages of the Alfa Laval DuroShell heat exchanger and a flash tank for heat recovery in the high-pressure, continuous blowdown steam system at the Lugnvik CHP are twofold. First, the DuroShell recovers 130 kW from boiler

“ Robust and fatigue-resistant, the Alfa Laval DuroShell withstands the high process temperatures required for our biomass-fired CHP plant.”

– Karl Selander, Operation Manager, Jämtkraft



At the Jämtkraft Lugnvik CHP plant, the Alfa Laval DuroShell provides high resistance to material fatigue, outstanding thermal efficiency and minimal fouling.

blowdown to preheat the incoming makeup water, which results in significant energy savings. This is equivalent to recovering more than 1100 MWh on a yearly basis, which is sufficient to heat about 50 homes. Second, it reduces the drain water temperature, making compliance with drain discharge regulations easy.

### Payback time within three years

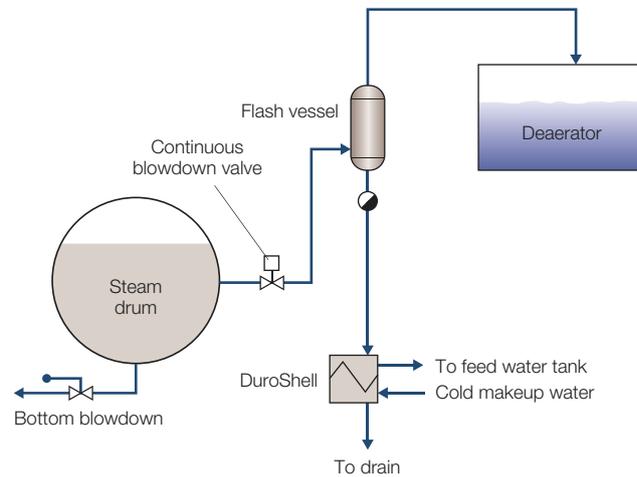
Superior thermal efficiency, low installation costs, minimal energy consumption and reduced maintenance costs made investment in the Alfa Laval DuroShell worthwhile for Jämtkraft.

“Payback time for our investment in the Alfa Laval DuroShell was about two to three years,” says Selander. “Apart from excellent heat recovery, we wanted a heat exchanger that required minimal maintenance, year after year. That heat exchanger is the Alfa Laval DuroShell.”

### How it works

The Lugnvik CHP plant produces superheated and high-pressure steam. The steam is collected in a steam drum at a temperature of 540°C and a pressure of 145 bar. In the steam drum, continuous blow down, or the continuous removal of 1–2% of the water in the system, increases the water quality and prevents the formation of mineral deposits dissolved in the boiler water.

The temperature and pressure of this water is high and goes to a flash tank. From there, the separated steam goes back to the deaerator and the water at temperatures of more than 200°C is sent to the Alfa Laval DuroShell. The DuroShell recovers surplus heat from blowdown water by preheating



Schematic of a steam boiler with blowdown heat recovery system at the Jämtkraft Lugnvik CHP.

the incoming makeup water, which is added to the system to replace the 1–2% that is continuously bled off.

This results in saving 400 tons of biomass each year. Reducing fuel consumption not only increases boiler efficiency, but also cuts emissions.

### Fast facts

#### The plant

A combined heat and power plant in Sweden that produces electricity from forestry biomass.

#### The challenge

To recover heat for process reuse and to cool boiler blowdown water from more than 200°C without leakage due to cyclic fatigue that most heat exchangers are prone to.

#### The solution

The Alfa Laval DuroShell plate-and-shell heat exchanger for boiler blowdown heat recovery.

#### The benefits

- Maximum uptime
- Reduced costs
- Increased production capacity



#### DuroShell RollerCoaster

Robust and efficient performance.



#### DuroShell PowerPack

Optimized flow distribution and fatigue resistance.

Learn more at [www.alfalaval.com/duroshell](http://www.alfalaval.com/duroshell).

### 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)