

# C O N D E N S A T E R E C O V E R Y U N I T



BAVIERA CRU provides maximum energy efficiency in a closed-loop-recovery and ensures optimal heat transfer in the Corrugator.

## Fully integrated

### One steam system – one control point

BAVIERA CRU can be integrated into BAVIERA RAS for monitoring from the control room.

Recovering condensate coming from a corrugator in a closed loop condensate recovery system makes possible to achieve energy savings that can range 15-20%, water savings, chemical treatment savings and to reduce CO2 emissions. CRU is the solution by BAVIERA for Corrugator closed loop condensate recovery.

Since condensates of all rolls and steam chests in a corrugator are purged/drained with very high temperature and pressure, pressurized recovery of these condensates, avoiding their depressurization and its associated cooling down (with flash steam production), is the best way to avoid energy losses, maximizing energy efficiency and, therefore, reducing fuel consumption.

Baviera condensate recovery system's design is the result of more than 40 years of experience within this field. It is a system that achieves energy efficiency optimization and, at the same time, heat transfer optimization since several control systems make compatible both features.

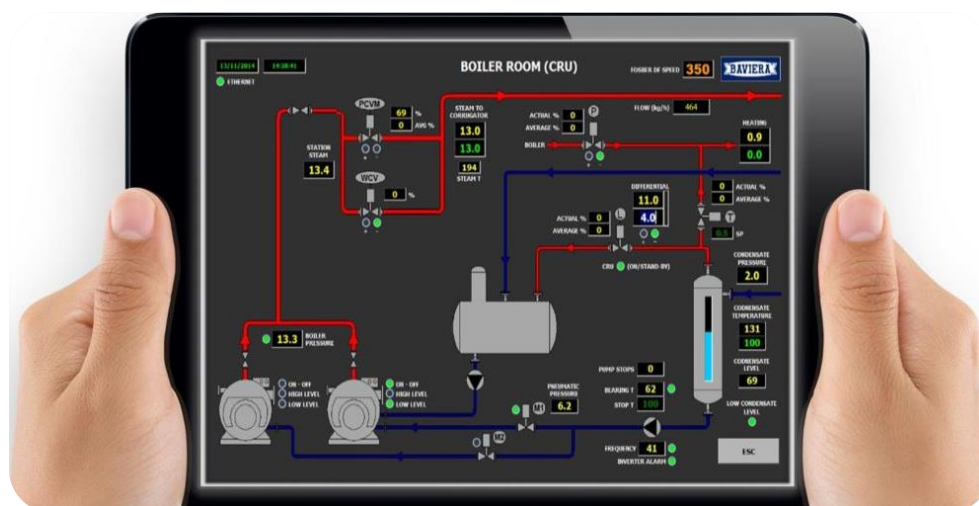
Moreover, because of the long experience with this kind of systems, all components that make up the condensate recovery unit are robust and practically exempt from any kind of maintenance.

The Baviera condensate recovery unit is usually placed in the boiler house. It has a vertical tank, sealed at 18 bar, where condensates are recovered with pressure, around 8-9 bar, so that condensates are fed to the boiler at a temperature that rounds 175-180°C.

The condensate pump feeds the boiler from the lower side of the CRU. Although the pump works with high temperature condensates, its natural air-cooled mechanical seal works at around 90°C, so that the working conditions of the mechanical seal are excellent resulting, in fact, a maintenance free pump with a long lifespan.

The system includes the necessary controls to guarantee:

- ✓ Differential pressure between steam to corrugator and condensate in the CRU
- ✓ Degassing of the condensate return
- ✓ Quick warm-up with extra air removal
- ✓ Instant efficiency and the average efficiency

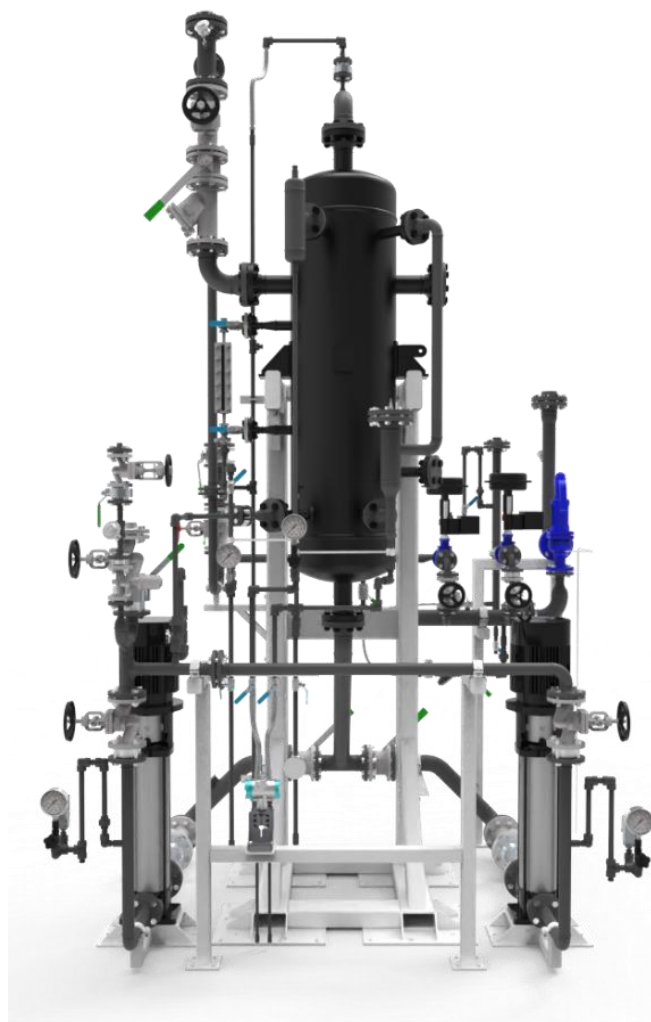


## System Controls

The system has controls to ensure optimal operation with full energy efficiency, while at the same time ensuring optimal differential pressure conditions for the steam traps along the corrugator. Some of these controls are:

- Level control: 4-20 mA level control acting on the inverter, controlling the pump speed. The condensate pump works continuously with regulated, speed controlled by the inverter.
- Differential pressure control: There is an electronic and digital differential pressure control, where you can check and control the minimum differential pressure of the installation (main steam supply pressure – condensate recovery pressure).

The differential pressure control acts on valve L, guaranteeing that, in any situation, the differential pressure of the installation is always higher than the set point, normally set at 4 bar. By doing so we guarantee that regardless of the maintenance of steam traps, the closed loop condensate recovery system will always provide the necessary motive force for condensate evacuation from the corrugator.



- Warm up control: Condensate temperature control and pressure control system acts on automatic valve L during warm-ups and shut-downs. With the automatic warm-up & shut-down control, the CRU makes sure that all non-condensable gases and oxygen accumulated during the corrugator stop are deviated to the hot well/degasser in order to avoid feeding them into the boiler. This way boiler is protected and warm-up in the corrugator improved.
- Steam recycling: by means of automatic valves T & P the CRU is able to use recycled steam (coming from the flashing of condensate) for feeding low pressure services, such as hot well / degasser heating, starch kitchen, heating systems, etc. By doing so, we further improve energy efficiency of the system.

# CRU VXL



## Ensure Optimal

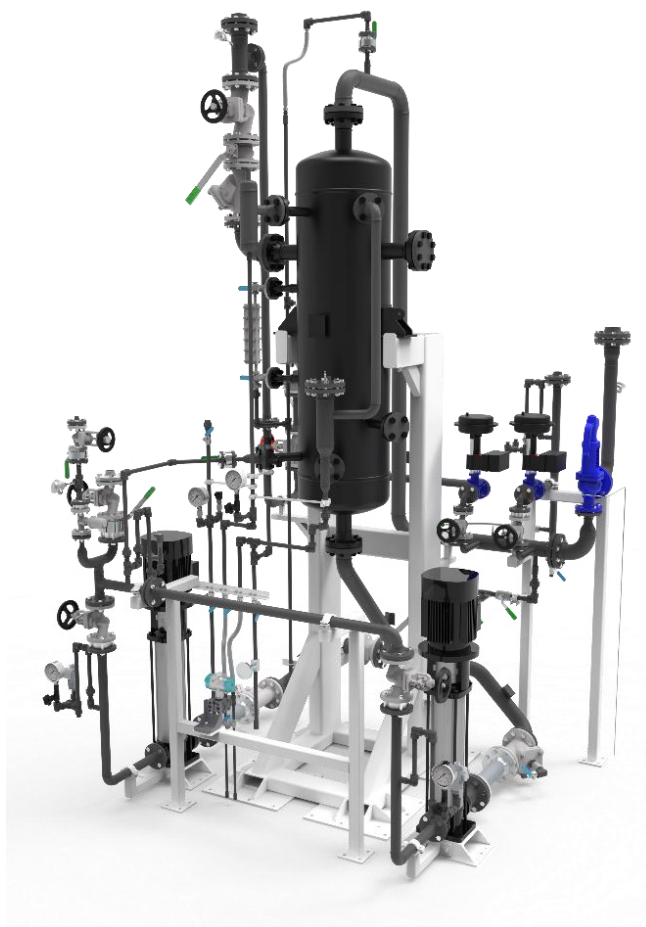
### ○ Heat transfer

Optimal heat transfer conditions are maintained by monitoring and automatically ensuring a **big enough differential pressure** along the whole corrugator.

Ensuring differential pressure is critical since it ensures that condensate is properly drained at the corrugator.

### ○ Efficiency & stability

Condensate is pumped **with high temperature** and at a **constant flow** into the boiler, helping to improve the stability and energy efficiency of boiler operation.



## Increase Boiler life expectancy

**Less corrosion.** BAVIERA CRU avoids corrosion by deviating all the oxygen-rich condensate during system start-ups.

This cold condensate is automatically taken to the flash tank where the oxygen is released.

- *Oxygen rich condensate can easily corrode and damage the interior of the boiler -*





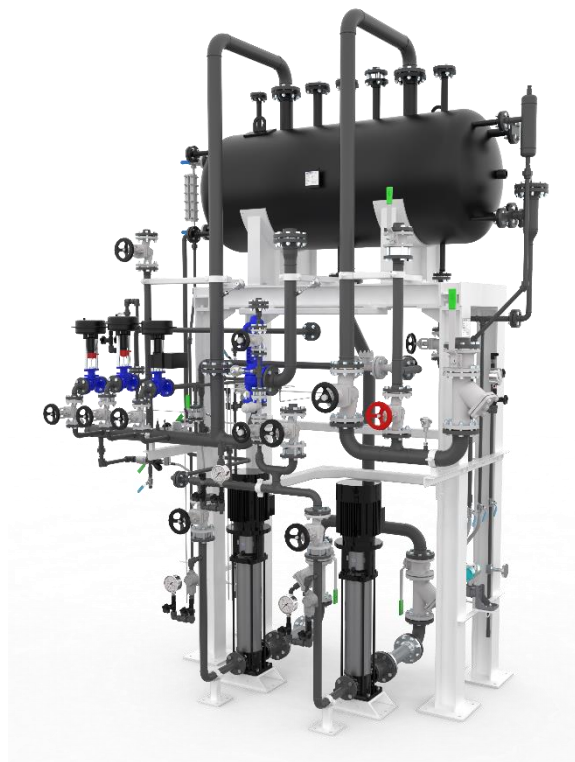
# CRU HE



CRU HE reaches the maximum energy efficiency achieving up to 20% energy saving.

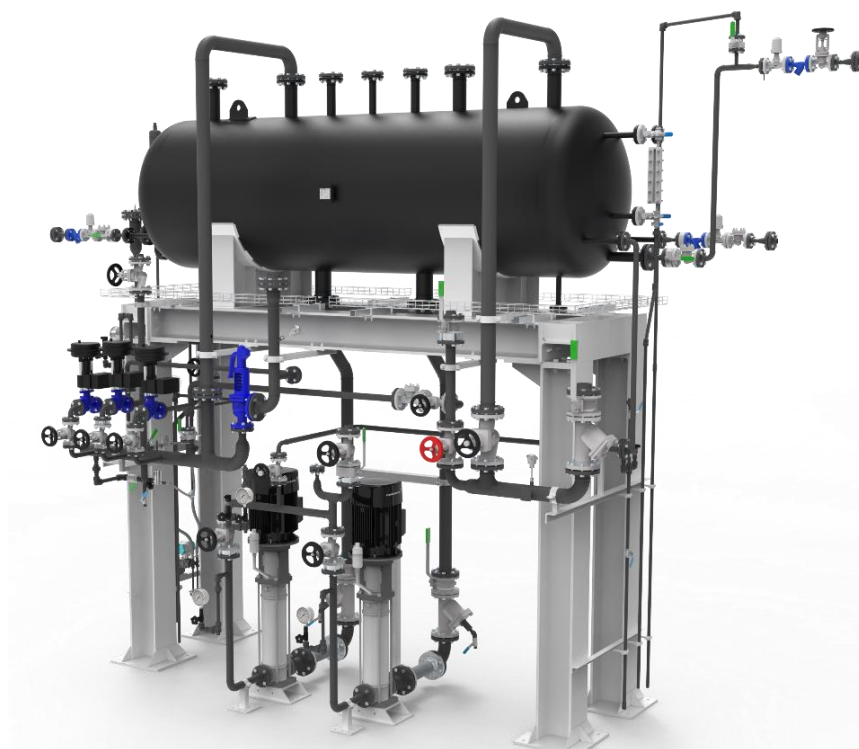
CRU HE feeds the boiler not only with condensate returning from the corrugator, but also with makeup water coming from the hot well / degasser, which previously is added to the CRU HE. This way, degasification is enhanced, thermal heat balance of the system is optimized and existing economizer's efficiency are maximized.

CRU HE maintains the boiler level constant and the feeding to the boiler continuous, additionally optimizing the economizer's efficiency and the degasification quality of the boiler feeding.



## Warm-up and shut-down controls

When working with low pressure deaerator, during warm up, by opening automatic Valve Q, air is quickly removed to the atmosphere and cold condensate is deviated through Valve 4 up to the deaerator. Once the condensate return goes above 120°C in temperature, the system comes to the closed loop.





# **BAVIERA**

## **Steam Systems**

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