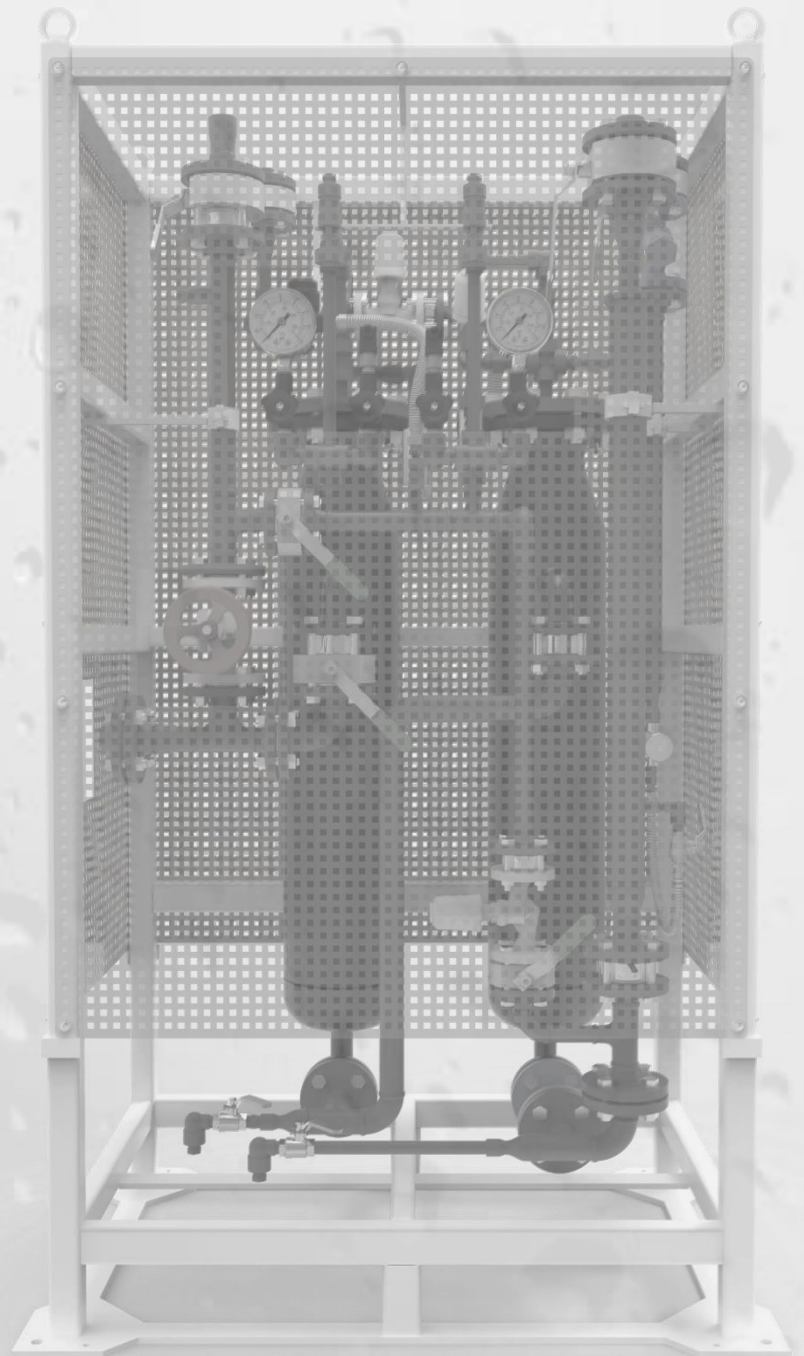


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**DIGITAL
STEAM
PUMP**



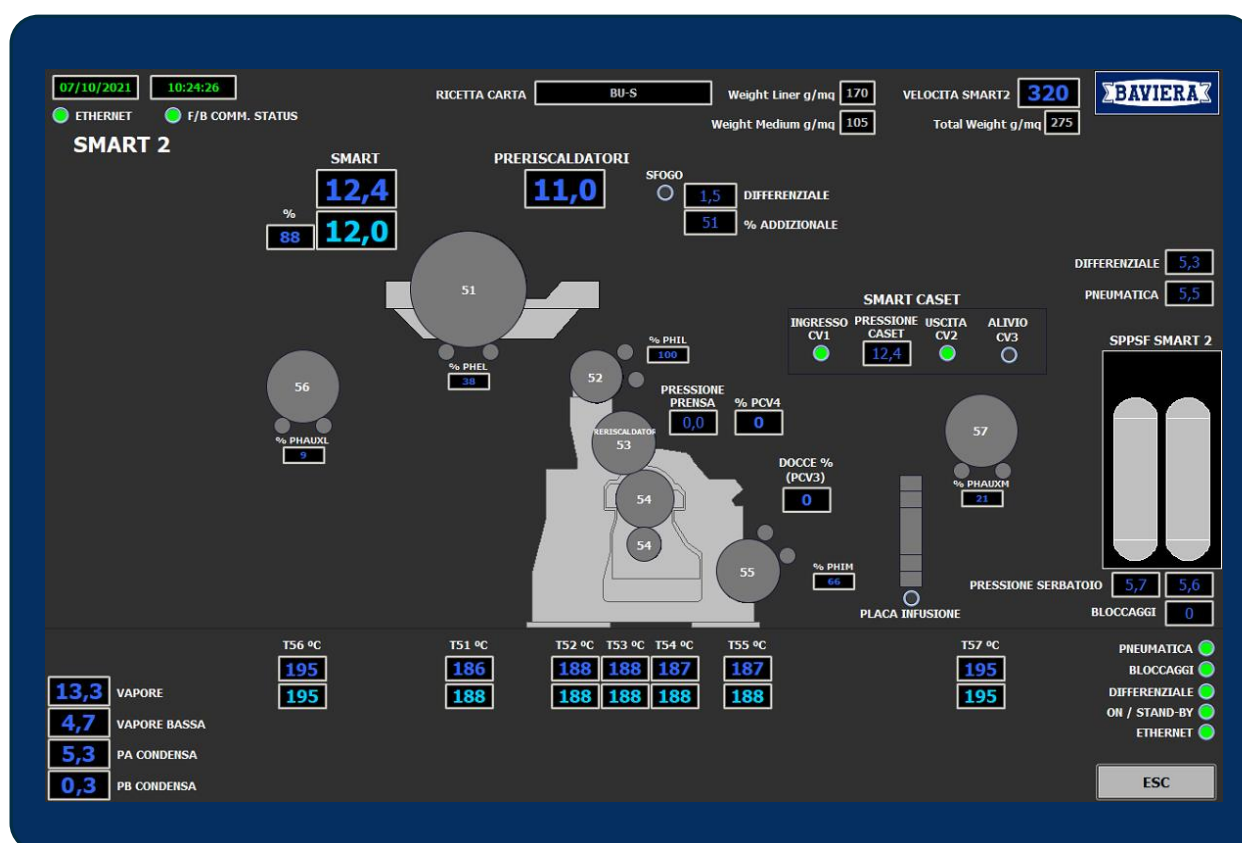
DIGITAL STEAM PUMP

BAVIERA Digital Steam Pump for Single Facer makes possible to regulate at desire Heat Transfer in the SMART/EDGE Single Facer.

Pressure can be regulated as low as desired, thus effectively providing full heat transfer flexibility, with no risk of flooding. A single solution for a widespread technical challenge.

It's digital!

Meaning operators will be able to easily **visualize** and **understand** the SMART's condensate recovery system, with an extended an unprecedented **traceability**.



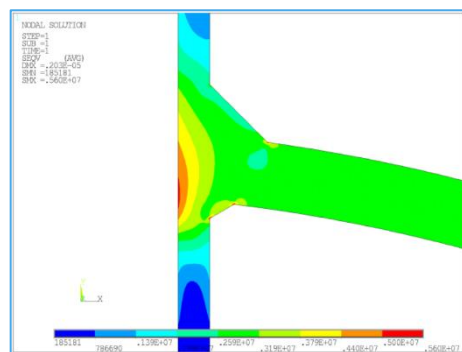
A reliable and versatile **PLC-PLC INTERFACE** with FOSBER's SMART is possible, making possible integration of condensate recovery system into RAS (industry 4.0) and enhanced reaction of the steam pump to:

- ✓ Machine warm-ups
- ✓ Cassette changes
- ✓ Pressure regulation changes



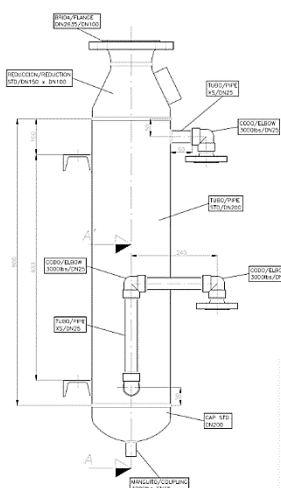
Internal mechanisms such as levers can wear down and eventually break down - BAVIERA Digital Steam Pump has no internal moving parts, thus has negligible maintenance needs because of its intrinsically reliable design.

BAVIERA digital steam pump is provided with automatic Active Differential Pressure Control that provides continuous traps surveillance.



$$\Delta\sigma_{ij,k} = {}^m\sigma_{ij,k} - {}^n\sigma_{ij,k}$$

$$\Delta S_{p,k} = \frac{1}{\sqrt{2}} \left[\left(\Delta\sigma_{11,k} - \Delta\sigma_{22,k} \right)^2 + \left(\Delta\sigma_{11,k} - \Delta\sigma_{33,k} \right)^2 + \left(\Delta\sigma_{22,k} - \Delta\sigma_{33,k} \right)^2 + 6 \left(\Delta\sigma_{12,k}^2 + \Delta\sigma_{13,k}^2 + \Delta\sigma_{23,k}^2 \right) \right]^{0.5}$$



Optimal Energy Efficiency

BAVIERA Digital Steam Pump returns condensate coming from SMART/EDGE Single Facer back to the high-pressure condensate receiver (typically in the boiler room), thus providing optimal energy efficiency while making possible full flexibility in heat transfer.

Long Life Expectancy

Designed with ASME's Boiler and Pressure Vessel Code to exceed expectations, our Steam Pumps are designed and manufactured to withstand decades of operation in an ambient of high temperature and pressure subject to cyclical stress.

- Main Design:
ASME Boiler and Pressure Vessel Code Section VIII Div. 1
- Stress & Fatigue Analysis:
ASME Boiler and Pressure Vessel Code Section VIII Div. 2

DIGITAL STEAM PUMPS FOR SINGLE FACERS. SPPSF

When dealing with light weight papers and especially with small flutes, it is convenient (it can even be indispensable) to regulate pressure in the Single Facers.

The use of digital electro pneumatic steam pumps for condensate recovery in Single Facers makes compatible closed circuit condensate recovery at pressure with totally free pressure regulation in Single Facers.

The operation of a digital electro-pneumatic steam pump is very simple and robust:

When the level controller detects that condensate in the injection tank has reached its maximum level, injection valve (VI) automatically opens and pushes condensate, with life steam, to the Condensate Recovery Unit (boiler house) through the high-pressure condensate recovery.

While life steam injection is taking place, the aspiration tank buffers coming condensate. If, after having ended the injection cycle, condensate in the aspiration tank reaches its maximum level, the decompression valve (VD) opens during 5 seconds in order to decompress the condensate tank and enable condensate flow from the aspiration tank to the condensate tank.

Furthermore, there is a degasification spiral in each tank that continuously allows the air and rest of incondensable gases deaeration.

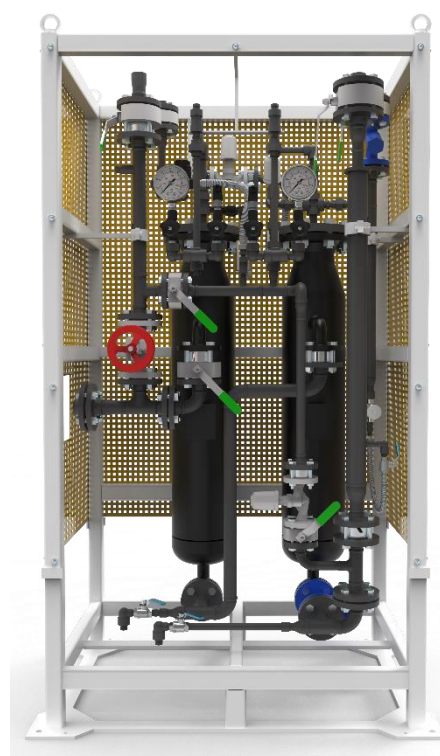
Therefore, the condensate recovery system with electro-pneumatic steam pump works as per the following cycles (these times may change from plant to plant):

- Filling cycle: 2 to 7 minutes.
- Injection cycle: 5 to 10 seconds.
- Decompression cycle: 3 to 5 seconds.
- The filling cycle starts again.

This equipment has a VE valve whose only aim is to deviate the condensates from the single facer up to the atmospheric condensate recovery at night when the steam supply to the corrugator is closed, or in the morning during start ups when a minimum pressure in the steam supply has not been reached yet.

The steam pump for single facer has an active control of the differential pressure between the single facer and the aspiration tank. The differential pressure control eventually acts over the VD valve, in case it falls below the set point.

The whole process is electrically and digitally controlled by a PLC. The materials used (check valves, VI, VD, pressure differential transmitter, spirals, etc.) are of excellent quality and maintenance free.





BAVIERA

Steam Systems

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