

LEWA homogenizer test system.



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The metering system with an integrated homogenization valve for emulsions.



In an emulsion, droplets that are usually of different sizes are finely dispersed in a second liquid with which they cannot mix. For process engineering reasons, it is often important to reduce the droplet size and make the size distribution as homogeneous as possible. This is necessary in order to make the mixture more stable or to increase the active surface area of the disperse phase. In particular, the LEWA test system can be used to test the aseptic operation of a homogenizer based on a hermetic process diaphragm pump. A downstream spray drying step could thus be supplied directly in a hygienic manner.

Performance overview:

Discharge pressure up to 400 bar

Media flow rate (max. 1,000 cp) up to approx. 150 l/h

Functional principle:

The flow rate and pressure required to homogenize the process fluid at the two-stage, dynamically controllable homogenization valve are realized by a LEWA triplex process diaphragm pump. After reaching a specified upstream pressure on the suction side via a controlled twin screw pump, the high-pressure diaphragm pump, which is also speed-controlled, first conveys the required flow rate to a preselected pressure P2 of the 2nd stage (valve remains pneumatically closed during this process). Once the pressure and pump capacity have been reached, the homogenization valve of the 1st stage closes until the default value is also reached there. The valve of the 2nd stage is no longer controlled. The ratio is usually $P2 < 1/5 \times P1$, but can be freely selected. The now leading homogenization pressure of the 1st stage is also maintained by pneumatic valve control of the dispersion gap. The system can be operated both standalone (batch operation) in a circuit and continuously integrated into the system. Fluid is supplied

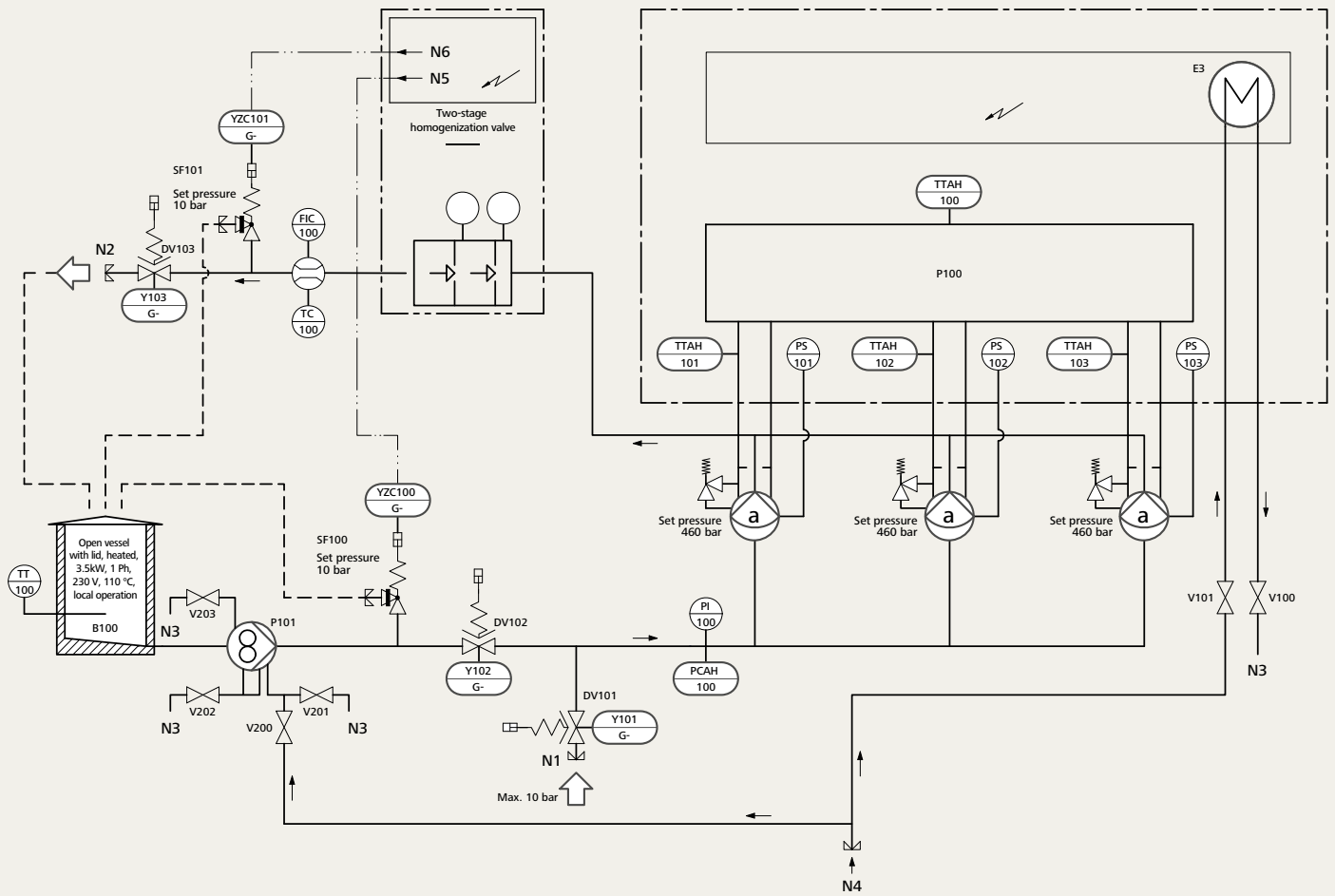
either via the heatable vessel on the system side or via a separate media connection.

Essential components of the LEWA test system:

- LEWA triplex process diaphragm pump with diaphragm rupture indicator, incl. motor 5.50 kW
- Twin screw pump with double-acting purged mechanical seal, incl. motor 2.2 kW
- Equipment cabinet (at the rear of the system), hygienic design
- Heatable double-walled vessel, 60 l, unpressurized, lockable, max. 110 °C
- Two-stage sterilizable homogenization valve, pneumatically controlled, max. 400 bar/150 l/h
- Diaphragm valves, flows switchable depending on the operating mode
- Safety valve (automatically cleanable inline) to protect the system against overpressure
- Various pressure and temperature transmitters
- Warning elements: Signal lights and horn
- Water connection with piping for cooling the control cabinet and flushing the mechanical seal of the twin screw pump

The above-mentioned components are piped hygienically and mounted on a common base frame. The system is suitable for washdowns. The specially developed LEWA smart control controller is integrated into a control cabinet mounted on the metering frame. The "Automatic" and "Manual" operating modes can be selected in the control system. Automated processes such as CIP, SIP or emptying are stored in step chains.

Flow diagram of the LEWA homogenizer test system



Dimensions and connection data

Dimensions:

- 2.56 x 1.66 x 2.16 m (L x W x H)
plus swing area of the doors
- Weight: approx. 1,800 kg, filled

Electrical connection data:

- Voltage: 400 V/50 Hz
- Performance: 12.5 kW

Other connection data:

- Compressed air and cooling water:
For details see below (connection list)

Connection list

Number	Size	Pressure rating	Type	Description for operating mode	
				Standalone mode	Within a process line
N1	DN25	10 bar	DIN 11864-1 threaded connection	Drain suction line	Product inlet
N2	DN25	10 bar	DIN 11864-1 threaded connection	Drain/cleaning pressure line	Product outlet
N3	Ø 12 mm		Pipe end	Cooling water outlet control cabinet/ screw spindle pump	
N4	DN25	1 - 5 bar	DIN 11851 threaded connection	Cooling water inlet control cabinet/ screw spindle pump	
N5	Ø 6 mm			System-internal pneumatic line	
N6	Ø 6 mm			System-internal pneumatic line	
N7	Ø 8 mm	2 - 3 bar	Compression fitting	Inlet cleaning (CIP)/sterilization (SIP) Homogenization valve	
N8	Ø 8 mm	2 - 3 bar	Compression fitting	Outlet cleaning (CIP)/sterilization (SIP)	
N9		6 - 10 bar	Quick release coupling	Compressed air supply (quality class 4.4.4 in accordance with ISO8573-1)	

Your local representative:



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