

Forced circulation flash evaporator

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Plant design

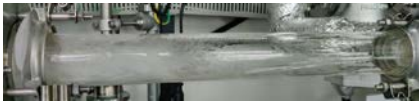
- Plant height 4 m
- Phase separator DN 150; height 2 m; 1.4571
- Flash pipe DN 50; length 0.5 m; glass, st. steel
- Plate heat exchanger (steam heated)
- Low pressure operation (vacuum pumps)
- Circulation pump (max. head 50 m)
- Pin-hole apertures for pressure reduction

Measuring range

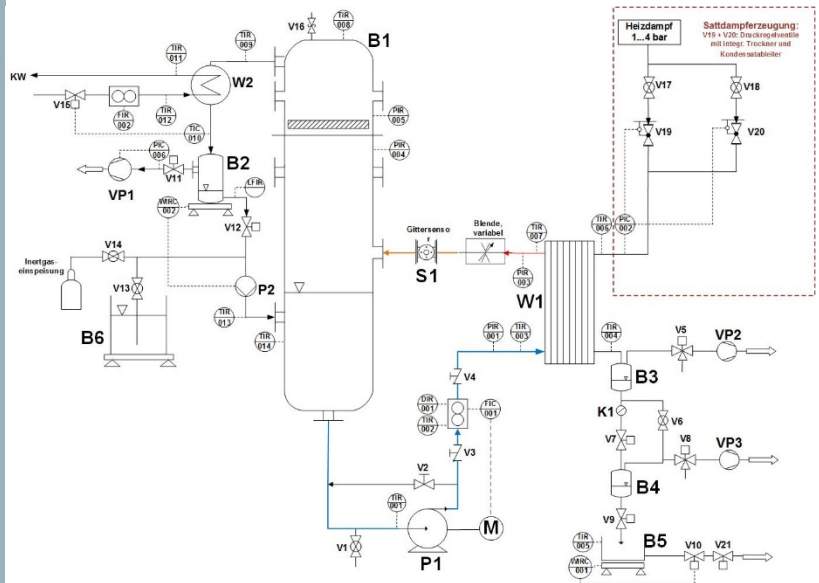
- Op. pressure product side: 100...1000mbar abs.
- Op. pressure heating side: 0.2... 3.5 bar abs.
- Mass flow product side: 900 ... 6000 kg/h
- Heat and cooling duty: 55 kW
- F-factor in phase separator $0.3 \dots 4.0 \text{ Pa}^{-0.5}$
- Vapor velocities in phase separator up to 15 m/s



Flashing liquid



Flow chart



Substances

- Water
- Glycerol/water
- 1-hexanol

Tracer:

- Ionic Liquid: EMIM-OTF*

*1-Ethyl-3-Methylimidazolium-Trifluormethansulfonat

Measurement procedure

Determination of droplet entrainment

- Single phase heating of product (liquid + tracer) within heat exchanger W1
- Pressure increase behind W1 using e.g. a pin-hole aperture
- Flash evaporation of superheated liquid results in a partial evaporation with a vapor content up to 10 %
- Heat and mass balancing of product and heating side by gravimetric measurements
- Conductivity of destillate correlates with tracer concentration and entrained liquid content