NITROGEN SAVINGS WITH PRESSURE SIPHON

P112e.1

GENERAL

To avoid an explosive atmosphere or contamination of the product, chemical plants are normally made inert with nitrogen and fluids are covered in nitrogen. Pressure holding valves feed nitrogen, depending on the pressure permitted, so the inert atmosphere remains even during emptying procedures. When the apparatus is filled or heated, the nitrogen must be able to exit the apparatus via a reciprocating line without the permissible pressure being exceeded.

- ☞ Secure and low maintenance pressure holding even with the smallest permissible pressures
- ☞ Protection against under- and overpressure
- ☞ No N2 loss through imprecise or contaminated pressure holding valve
- ☞ High operating safety, since there are no moving parts

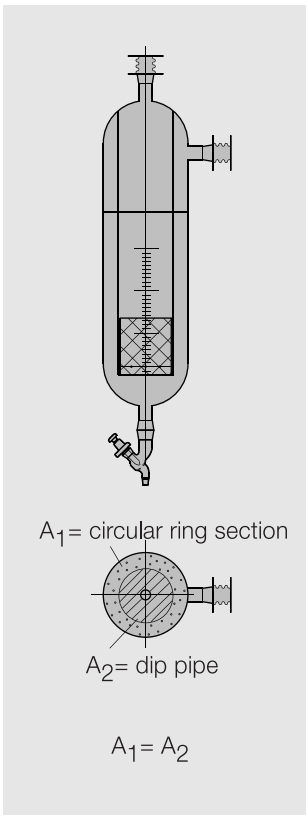

Fig. 2: Design of a pressure siphon

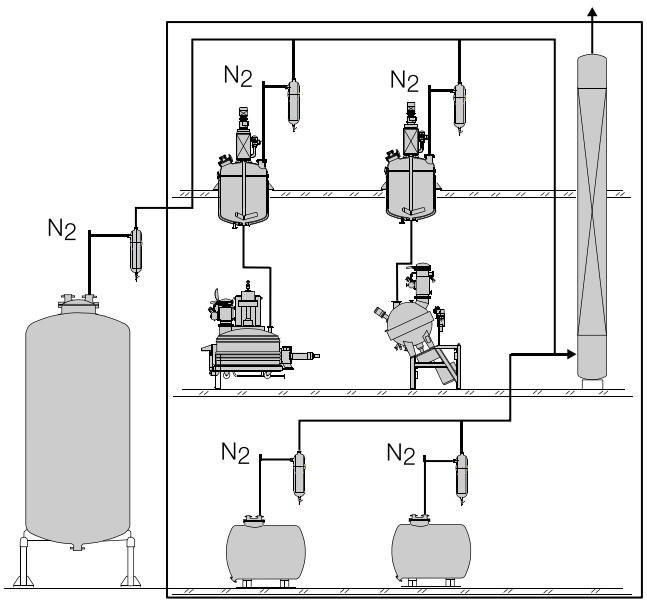

Fig. 1: Possible installations

In particular storage containers, which are only designed for low under- or overpressure, must be additionally protected against the failure of the nitrogen valves. Valves used for this must work at the lowest pressures and are sensitive to contamination. The pressure siphon from QVF® offers an elegant alternative here. The set over-/underpressure is maintained through the fill level of a heavy boiling medium. The hydrostatic pressure can also be safely set via an integrated scale even at very small values.

FUNCTION

In the basic version, the cross-sectional surfaces of the inside tube and the nozzle clearance area are equally large, so the maintained over- and underpressure are also equally large. Through the change in the surface ratio, the maintained underpressure can deviate from the overpressure, which occasionally makes sense for tank facilities.

If the specified operating pressure is exceeded in the apparatus, the nitrogen bubbles out evenly through a PTFE knit. Nitrogen is backfed via a pressure reducer, which,

however, is set below the blowing-off pressure. Through this setting, blowing off of the nitrogen is avoided during normal operation and the operating safety simultaneously increased, since no moving parts are needed for proper functioning. Experience shows that using dip tanks can reduce nitrogen consumption considerably compared to pure valve circuits.

COMPOSITION

The QVF® dip tank consists of the material borosilicate glass 3.3, which has universal corrosion resistance and permits optical control of the fill level. Standard containers are available in various lengths in the nominal bores DN 200 and DN 300. The delivered product contains the PTFE knit to even out the bubble flow, two connection bellows and an emptying valve.

All glass parts are produced in accordance with the pressure device guideline (PED) and are awarded a CE mark. The glass flange connections of the pipe lines have been granted permits in accordance with the Technical Instructions on Air Quality Control (TA-Luft).

Polyethylene glycol is often used as a locking fluid, but this does not belong to the scope of supply. The recommended throughput of the gas stream can be taken from the following table.

OPTIONS

- tubular frame, galvanized or made of stainless steel
- coating of the glass parts as protection against impact
- level indicator monitoring for integration into the C&I

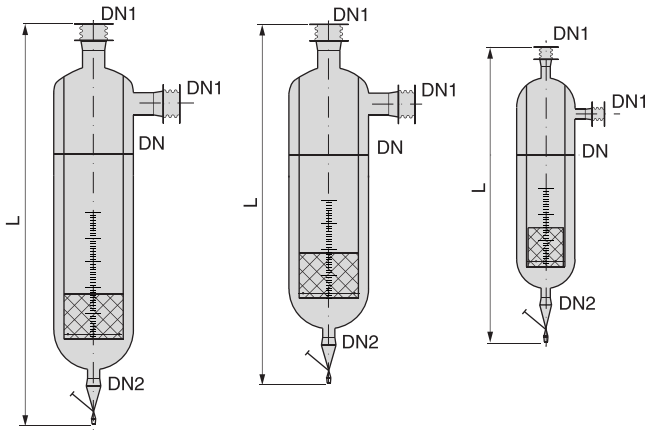

Fig. 3: Sizes of the pressure siphons

TECHNICAL DATA

	TFL50	TFL30	TFL10
DN	300	300	200
DN1	80	80	40
DN2	40	40	25
L [m]	ca. 1,5	ca. 1,3	ca. 1,1
volumes [l]	50	30	10
p max* [m bar]	80	50	50
gas throughput*	15m³/h	15m³/h	6m³/h

* at liquid viscosity of 1000 kg/m³

Tab. 1: Technical data of the QVF® pressure siphons

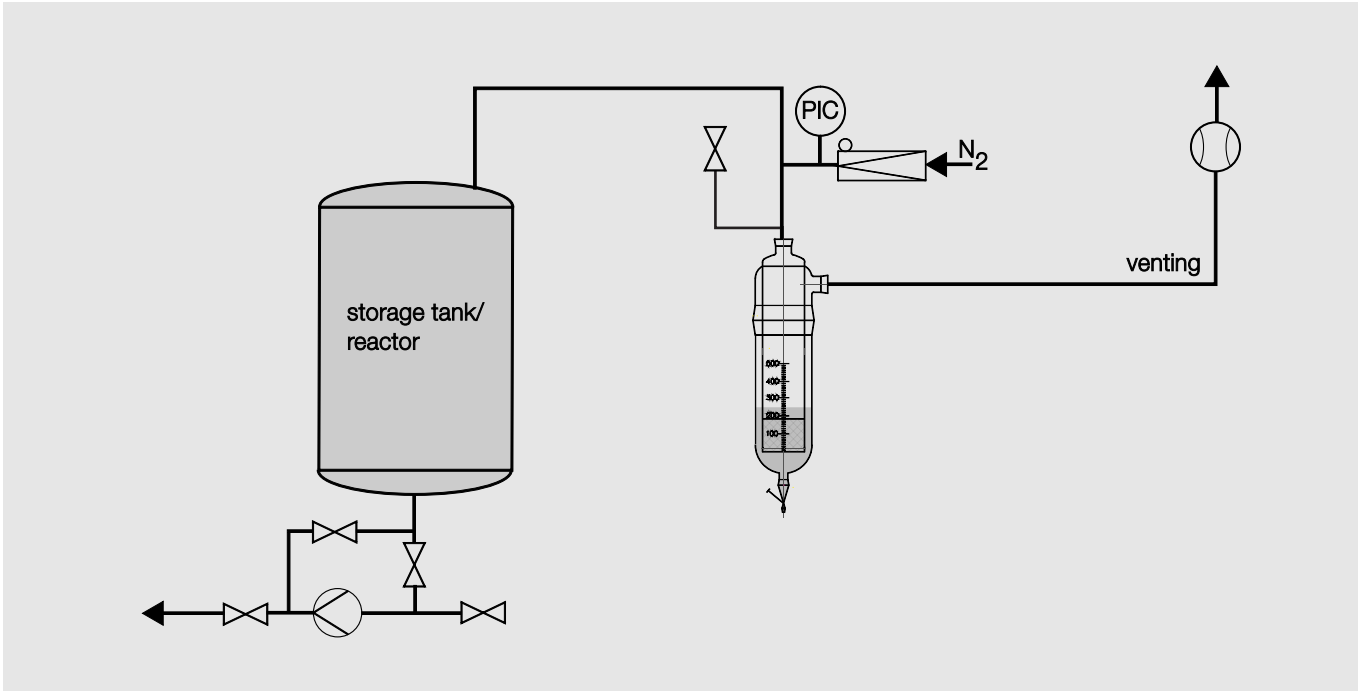

Fig. 4: Tank protection with pressure siphons

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