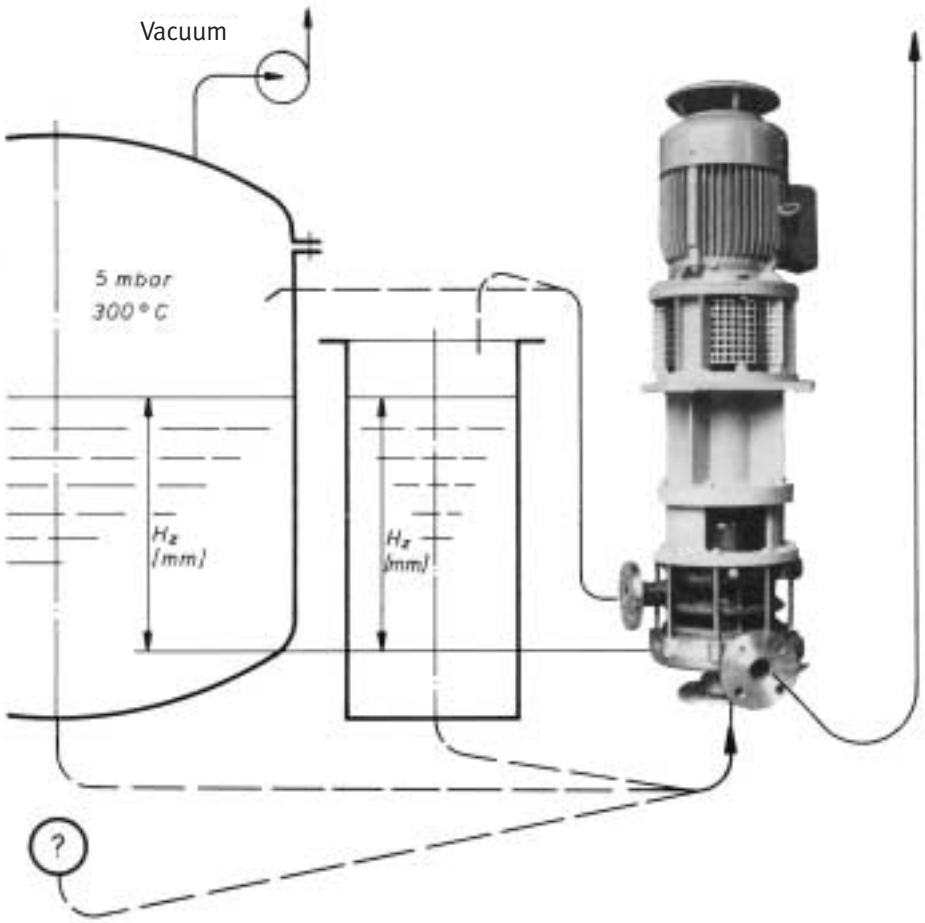
BUNGARTZ

Special Centrifugal Pumps

Self-regulating centrifugal pumps type „V-AN“



The solution to your problem by BUNGARTZ

Advantages:

- self-regulating depending on the flow rate at intake
- operates on the characteristic curve of the system from Q = o m^3/h to Q_{rated}
- safe to run dry
- low NPSH value of the pump (‹ o.1m) even at high speeds
- can also be used for solid contaminated liquids due to the semi-open impeller
- insensitive towards incorrect design of system
- less power consumption compared to a throttled control
- self-venting so that a gas loading of up to 35% is possible

Edition 4/2002

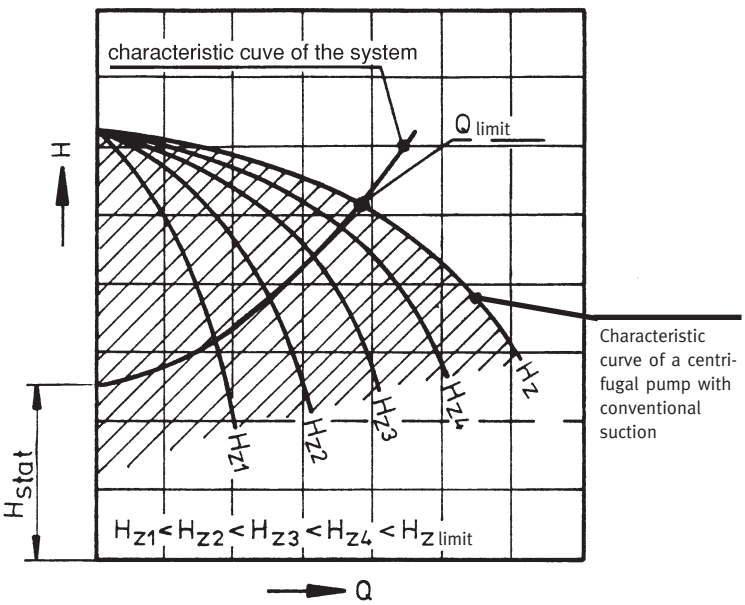
Description of the operating mode

Pumps of type **V-AN** are dependent on intake flow and are self-regulating. These pumps do not have an intrinsic suction capacity. The pump output corresponds to the intake flow rate, upon which the level of liquid (Hz) in the pump intake reservoir also depends.

The characteristic of this pump is described by a family of curves (parameter H_z = constant). The upper limit of this family corresponds to the characteristic curve of a conventional pump. The level of liquid in the pump intake reservoir is determined by the delivery head of the pump and the intake flow rate. The operating point always lies on the characteristic curve of the system between zero flow and Q_{limit} (Q_{limit} is given by the intersection of the characteristic curve of the system with the characteristic of the „conventional“ type of centrifugal pump). H_{Zlimit} lies between 0.5 m and 2.0 m, depending on the size of the pump and the rotation speed.

At H_{Zlimit}, the pump behaves like a conventional centrifugal pump. The NPSH value of the pump is zero, so that it operates without cavitation as long as the pressure in the pump intake resevoir does not fall below the vapour pressure.

Gas bubbles brought into the pump are partly conveyed and partly fed back to the pump reservoir via the gas compensation line. If nothing flows into the pump intake reservoir, the pump maintains the static head of the system at zero flow. From the pump engineering point of view, the pump can be operated for any length of time at Q = 0 m³/h, as long as the temperature increase of the pumping medium does not influence the corrosion behaviour of the material.



Characteristic family of curves of the pump „V-AN“

The secondary seal (e.g. stuffing box, double mechanical seal) of the pump is completely relieved of the hydrodynamic pressure by the back vanes of the impeller. Therefore, even in models with a stuffing box, the pumping medium cannot escape at any time via the shaft exit if the pump is started-up and shut-down correctly. It is possible to clean the pump before it is turned off by flushing with water via the intake port.

Performance data:

- Pumping output: Q up to approx.1200 m^3/h
- Delivery head: H to approx. 100 m

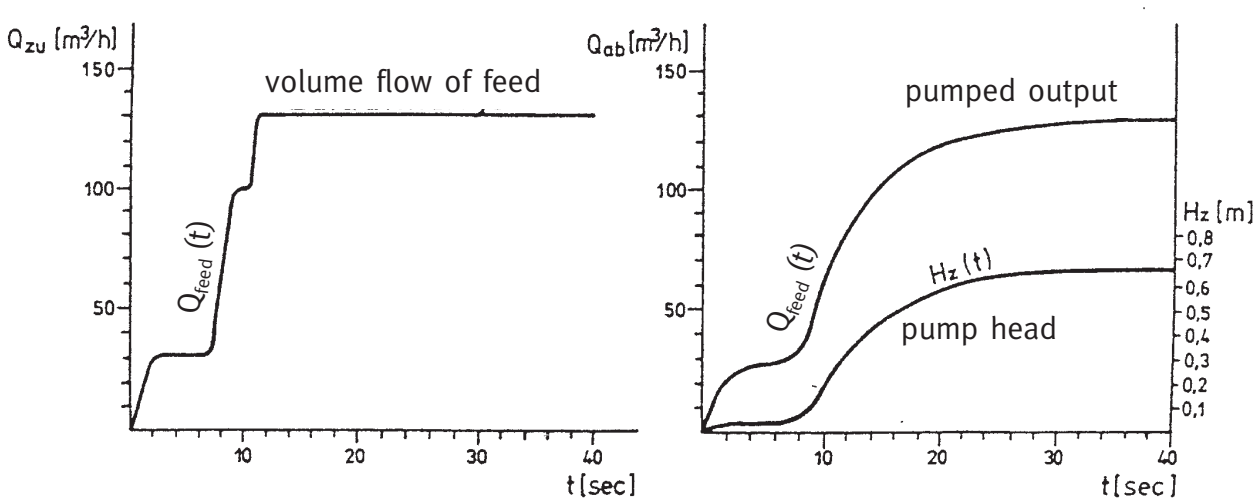
Materials:

- all stainless steel grades that can be welded or casted
- special alloys, castable and weldable
- cast iron in various qualities
- silicon iron (16%Si)
- titanium
- zirconium
- rubberised cast iron

Control characteristics:

The pump automatically self-regulates to the fluctuating volume flow of the feed. The following illustration shows an example of the reaction of the pump to a sudden increase in the feed. The transition period (time-dependent behaviour) can be influenced by the design of the pump reservoir. The time delay of the control response reduces the pressure surges in the pipeline system.

EXAMPLE



For the control characteristic shown above, a feed pipe of nominal diameter 500 is sufficient.

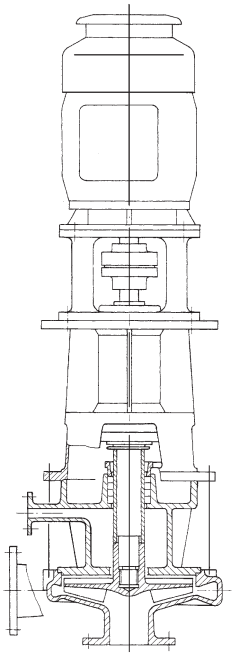
Shaft clearance seal:

- The back vanes of the impeller form a hydrodynamic seal against the liquid pressure. No medium is in contact with the secondary seal. Selection of the secondary seal must correspond to the pumping medium: stuffing box, sealing gasket, double seal expeller, double mechanical seal or magnetic coupling.

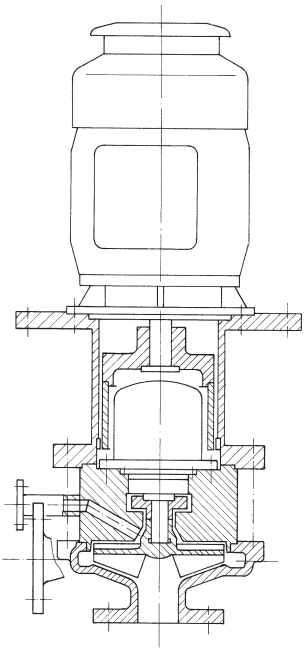
Design:

A robust, single-stage vertical pump for dry or wet installation. Overhung mounted shaft and special semi-open impellers with back vanes.
Driven by a flanged motor.

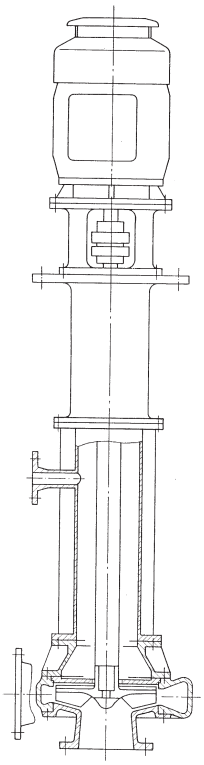
Design alternatives:



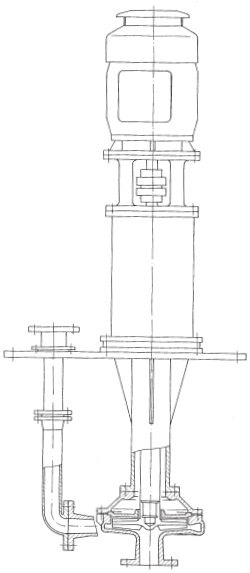
VK-AN



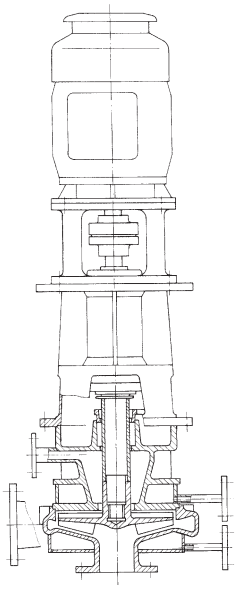
MPVAN
magnetic coupling



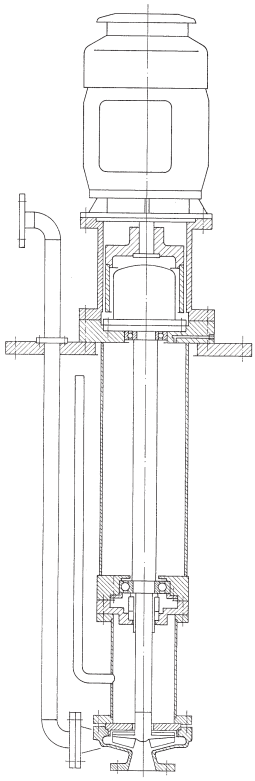
T-AN
(cantilever shaft)



T-AN
(cantilever shaft)



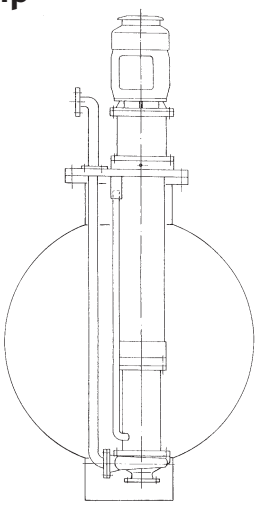
VK-AN
heated model



MPATAN
magnetic coupling

Application examples:

Slop pump

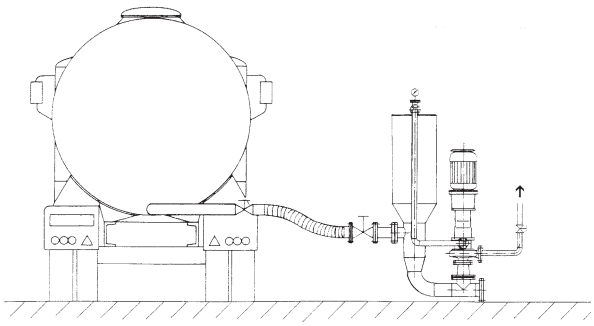


Advantages:

- hermetically sealed
- safe to run dry, maintenance-free
- complete unloading of the tank
- all-purpose pump, even for very contaminated media

typical performance data
Q = 0-30 m³/h
H = 60 m

Unloading of tankers from bottom

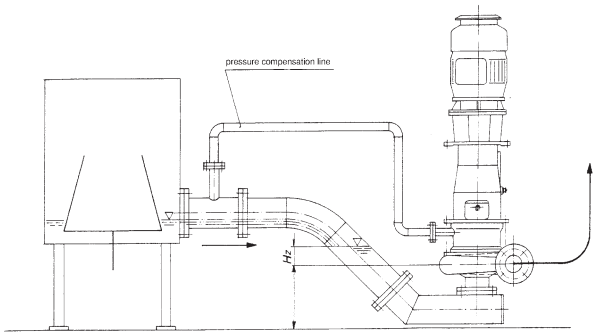


Advantages:

- automatic venting of the suction line
- insensitive to gas bubbles
- complete unloading of the tanker

typical performance data
Q = 50 m³/h
H = 40 m

Centrifuge

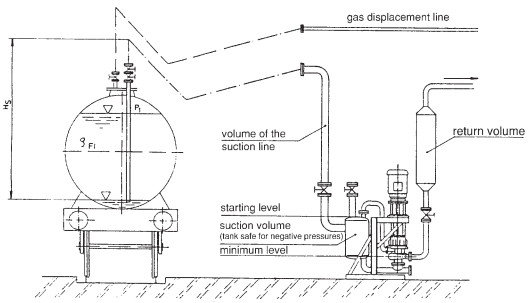


Advantages:

- automatic adjustment to strongly fluctuating amounts
- safe to run dry
- small overall height

typical performance data
Q = 0-5 m³/h
H = 10 m

Unloading of tankers from above

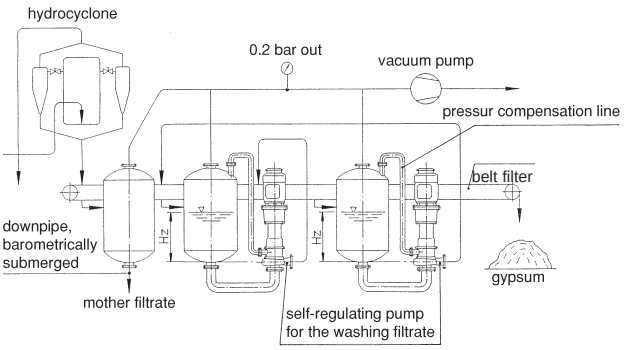


Advantages:

- unloading of „heavy“ media also possible (up to 2.3kg/dm³ successful)
- media close to the boiling point
- no danger of running dry for magnetically coupled pumps unloading residual amounts

typical performance data
Q = 50 m³/h
H = 40 m

Belt filter to dry gypsum



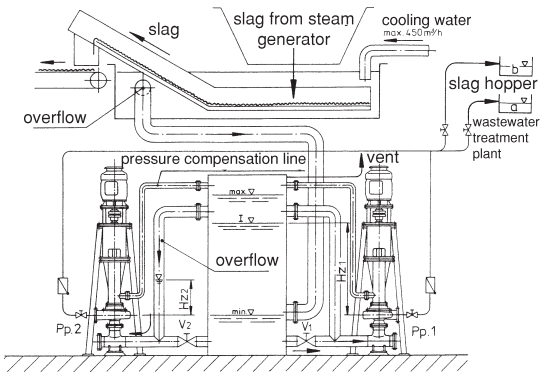
Advantages:

- no control required
- direct pumping from the vacuum of the filtrate separator, i.e. the band filter does not need to install higher
- safe to run dry

typical performance data

Q = 0 - 45 (75) m³/h
H = 15 m

Slag cooling water

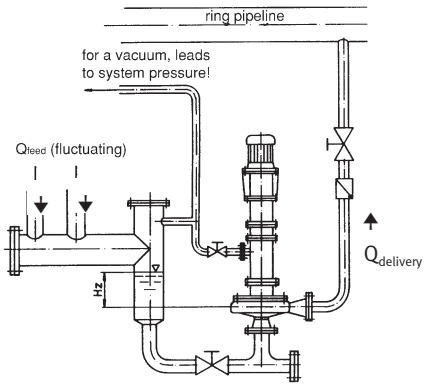


Advantages:

- strongly fluctuating amounts are not a problem
- solid granulates are also transported
- considerable savings in construction costs (no slag water basin, small reservoir is sufficient)

typical performance data
Q = 100 - 400 m³/h
H = 30 m

Condensate return feed



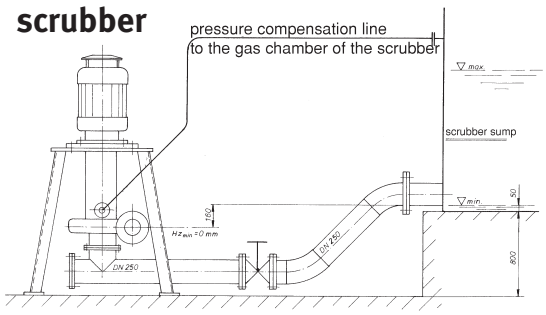
Advantages:

- automatic adjustment to fluctuating feed and counter-pressures
- small pump, as it can be operated at high speeds
- no pressure surges on switching on
- safe to run dry
- no tank to collect condensate necessary
- no control equipment

typical performance data

Q = 0 - 70 m³/h
H = 80 m

Unloading residual liquid in a flue-gas scrubber

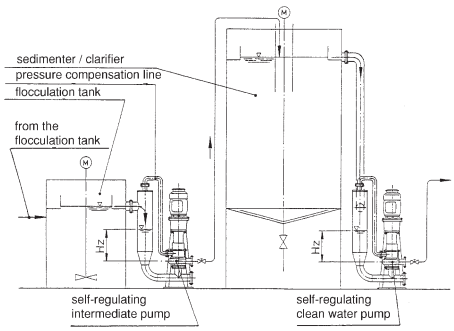


Advantages:

- starts with a large amount
- automatically reduces capacity towards the end
- level of liquid is lowered to the middle of the pump casing (complete draining)
- safe to run dry

typical performance data
Q = 0 - 500 m³/h
H = 20 m

Thickener overflow (sedimenter / clarifier)



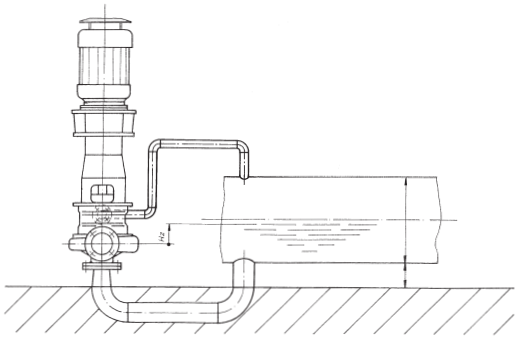
Advantages:

- no reservoir basin/tank necessary
- in spite of strongly fluctuating amounts, no measuring and control equipment is required
- gas entrained in the liquid does not affect the pumping process

typical performance data

Q = 0 - 150 m³/h
H = 20 m

Draining vapour pipelines „Hot-well low-point pump“



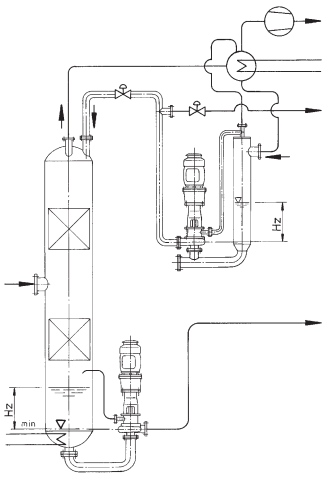
Advantages:

- no NPSH problems
- low overall heights of the pump are possible
- no control problems, even for pumping small amounts

typical performance data

Q = 0 - 3 m³/h
H = 40 m

Stripping column



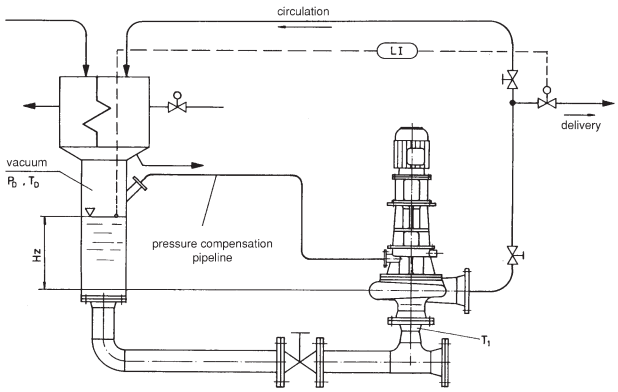
Advantages:

- cavitation-free pumping
- even small amounts can be pumped
- no barometric submersion is necessary

typical performance data

Q = 0 - 5 m³/h
H = 30 m

Evaporation plant



Advantages:

- cavitation-free pumping
- reduction of overall height
- pumping process is not influenced by gas-entrained liquids

typical performance data

Q = 60 - 100 m³/h
H= 30 m

BUNGARTZ

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Horizontal or vertical pumps with semi-open, closed or non-chokable impellers.

Pumps with hydrodynamic seal and ADDITIONAL sealing as follows:

- Stuffing box
- Floating ring seal
- Magnetic coupling
- Special solutions for your problems