GESTRA Steam Systems

GESTRA Information A 1.8

Drainage of Rotary Cylinders

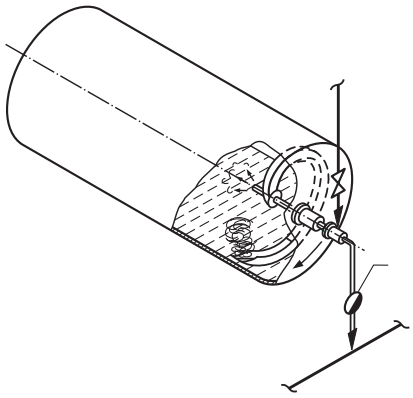

Fig.1:
Cylinder drainage with rotary scoop

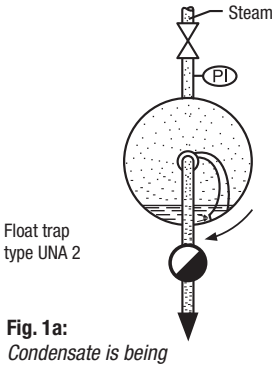

Fig. 1a:
Condensate is being discharged.

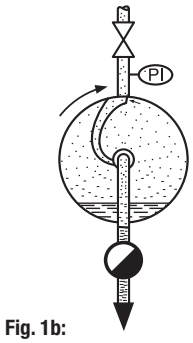

Fig. 1b:
Scoop and pipe are filling with steam.

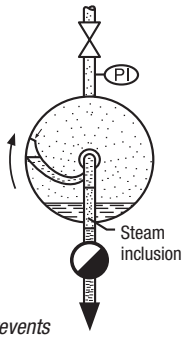

Fig. 1c:
Steam prevents condensate flow towards the trap until it has condensed.

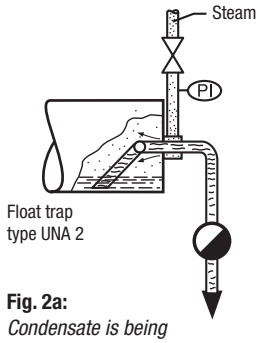

Fig. 2a:
Condensate is being discharged.

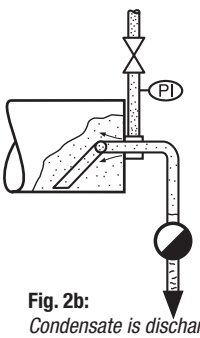

Fig. 2b:
Condensate is discharged, siphon pipe fills with steam.

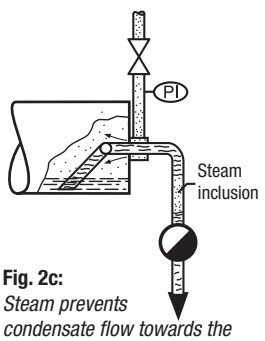

Fig. 2c:
Steam prevents condensate flow towards the trap until is has condensed.

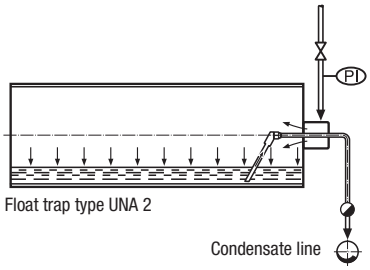

Fig. 2:
Cylinder drainage with stationary siphon.

Steam-heated rotary cylinders and drums are used in many industries for heating and drying purposes, as, for example, in the chemical and foodstuff industries, and especially in paper mills.

The drainage of rotary cylinders requires special equipment to discharge the condensate from the cylinders. The cylinders are equipped with specific devices which depend on the speed of the cylinders. The steam trap has to be selected accordingly.

Slow-speed drying cylinders operating with a so-called "condensate puddle" are frequently fitted with a **rotary** scoop (see **Fig. 1**).

During each rotation, the scoop in the cylinder passes once through the puddle, so that the condensate is lifted.

When the scoop emerges from the puddle, steam will flow into the scoop and push the condensate towards the steam trap.

Consequently the pipe leading to the trap is also filled with steam. During the next rotation of the scoop the condensate will therefore be blocked in the cylinder. Not until the steam approaching the trap has condensed, can condensate flow again from the cylinder.

Fig. 1a, 1b, and **1c** give a schematic representation of this process.

The stationary siphon shown in **Fig. 2** is mainly used for slow-speed cylinders.

The steam pressure in the cylinder pushes the condensate via the syphon to the steam trap. In this case too, steam will enter the siphon and the condensate line and prevent the condensate from flowing off, until the steam cushion has condensed (see **Fig. 2a**, **2b**, and **2c**).

The above explains that with the scoop as well as with the siphon, interruptions in the condensate discharge are inevitable. This fact can, however, not be assigned to the steam traps. They are designed to prevent the steam from escaping. Both thermostatic and float traps are closed in the presence of steam.

To ensure perfect drainage of the drying cylinders steam traps are therefore required to include a reliable system to eliminate steam locking.

We know from a long experience that the GESTRA float trap type UNA 2 is best suited for the drainage of rotary drying cylinders.

To prevent the disturbances described above due to air/steam accumulations, the UNA 2 trap for the use with rotary cylinders is fitted with an internal bypass pipe. The steam enclosed in the scoop or siphon pipe can bleed off through this pipe even when the trap is closed, so that the condensate is discharged correctly.

For discharging the air from the closed steam/condensate system, an air-collecting pipe is fitted at the highest point of the float trap, and a thermostatic trap type MK 36/51 mounted on top of the pipe as an air vent (see **Fig. 3**).

The internal bypass pipe is fitted at our works; the $^3/_8$" air-collecting pipe and the MK 36/51 air vent have to be installed on site.

High-speed drying cylinders with condensate rimming are without exception equipped with rotary siphons (see **Fig. 4**).

In this case the condensate is pushed against the centrifugal force towards the steam trap by the steam pressure. Due to the strongly insulating effect of the water rim, the rim has to be kept as thin as possible (≤ 2 mm).

For the drainage of high-speed drying cylinders, so-called blow-through steam is used. It must therefore be possible to adjust the steam trap to the required blow-through steam flow-rate.

For this purpose the UNA 2 float trap is fitted with an external bypass and an adjustable bypass valve (needle valve), (see **Fig. 5**).

The required blow-through steam flowrate is then manually adjusted with the aid of the needle valve and a Vaposcope sightglass installed upstream of the UNA 2 trap permitting visual supervision of the flow conditions (see **Fig. 6**).

The Duplex control unit of the UNA 2 float trap includes an automatic thermostatic air vent formed by bellows. When the trap body is cold, the thermostatic bellows contract, and open the rolling ball valve of the trap. During start-up large air quantities can escape unhindered from the drying cylinders.

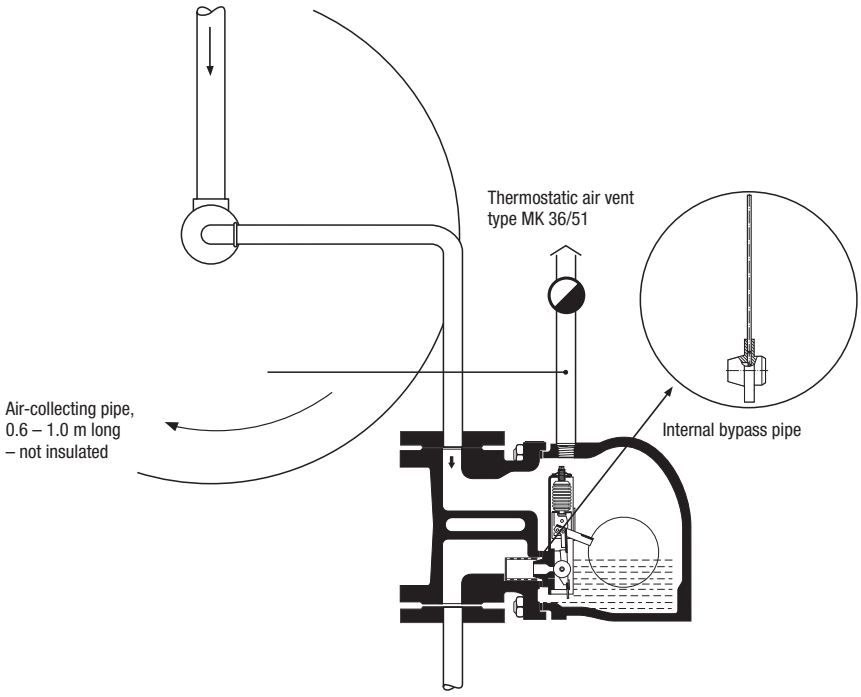

Fig. 3:
GESTRA float trap type UNA 2 Duplex with internal bypass and vent pipe for rotary cylinder drainage

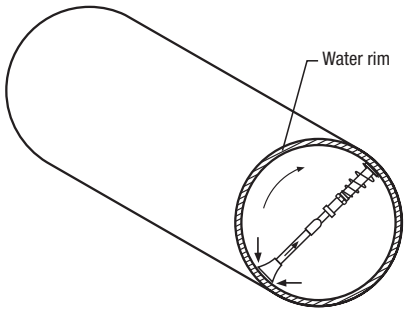

Fig. 4:
Cylinder drainage with rotary siphon

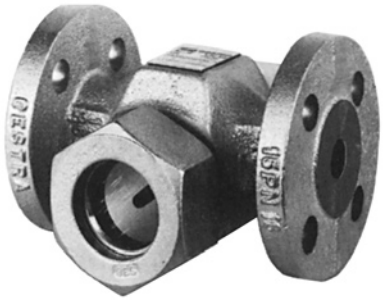

Fig. 6:
GESTRA VAPOSCOPE VK

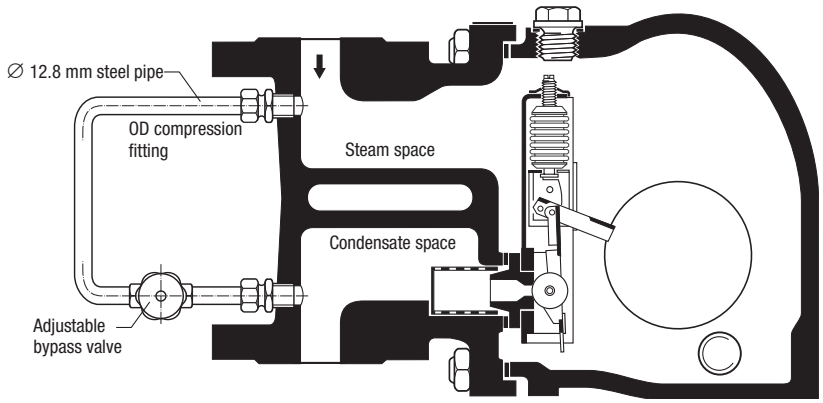

Fig. 5:
GESTRA float trap type UNA 2 Duplex with external bypass

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