

Like any other industrial valve steam traps are subject to wear and their correct functioning can be impaired by precipitated solids and dirt deposits.

To assess the performance of a steam trap the following questions have to be answered:

- Does the steam trap work properly?
- If not, does the faulty trap cause a loss of steam (leakage) or banking-up of condensate (obstructed discharge passage)?

Faulty steam traps are a major source of waste in a steam distribution system. A trap that is blowing live steam is the worst offender, but traps that are plugged or stuck closed can also be costly.

The decreased plant efficiency due to loss of energy and additional make-up water results in lost production.

Furthermore, an increase of pressure is liable to arise in condensate systems which will lead to difficulties at all locations where condensate is discharged.

The magnitude of such a steam loss depends on the cross-sectional area of the leak and, at the same time, the amount of discharged condensate. Locations where only small amounts of condensate are formed and discharged, e. g. drainage points in steam lines and tracing systems, are particularly problematical. On the other hand, locations where relatively large amounts of condensate are discharged will not give rise to considerable loss of live steam because of the presence of a large volume of liquid.

Steam traps which are **obstructed or stuck closed** do not cause loss of energy and/or water but reduce – to a greater or lesser extent – the efficiency of heat-transfer equipment and steam users. And waterhammer caused by condensate banking-up leads to considerable physical damage in steam and condensate systems.

Experience shows that installations where no regular trap testing and servicing takes place have a failure rate of defective steam traps in the order of 15 – 25 %. Regular maintenance and trap testing, which should be carried out at least once a year, can strongly reduce the failure rate to 5 %.

Test Systems

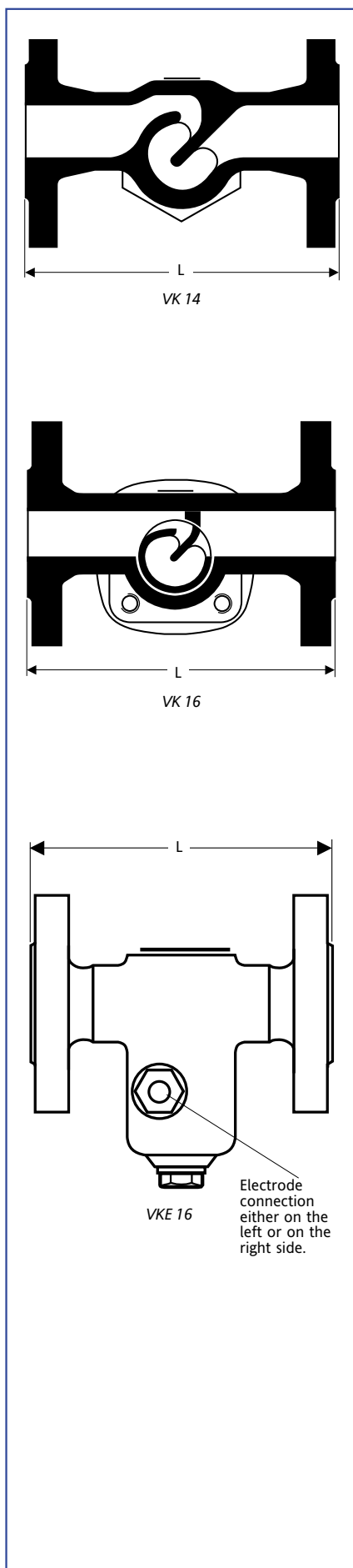
Steam traps can be tested during operation by using **sightglasses, ultrasonic listening devices** or **level meters**.

Sightglasses (Vaposcopes) provide an effective means of observing the flow of liquids in pipework. They are installed upstream of the traps, and allow the assessment of the traps by making their operation visible. A satisfactory trap installation must pass all the water that flows to it without discharging live steam and must not be rendered inoperative by particles of dirt or by an accumulation of air.

Level meters use conductivity to monitor steam trap performance. A test chamber with an integral level electrode is installed upstream of the trap to detect any defective steam trap. The corresponding output signal is displayed at the remote test unit (remote monitoring) or the manual test unit (in-situ monitoring). The system **VKE** checks steam traps for loss of live steam.

Another way to test traps is to use an **ultrasonic listening device** which detects the sound produced by steam flowing through the traps. Depending on the test system used the sound sensed by the device is either graphically represented in the form of a curve (**VKP 30**) or indicated by the deflection on the scale of a meter (**VKP-Ex**).

When using the VKP Ex, the field data specialist has to assess the indicator deflection and, consequently, the operation of the steam trap. The VKP 30, however, can directly track leaks associated with faulty steam traps and provides comprehensive reporting and a complete trap survey history.



Application

Type	
Vaposcope VK 14, VK 16	Sightglass for checking heat exchangers and steam traps (installation upstream of the traps). Visual supervision of flow conditions in condensate lines.
VKE	Test set with level electrode for monitoring steam traps to detect leakage of live steam .
Vapophone VKP-Ex	Ultrasonic detector for detecting steam leakage in steam systems; for monitoring steam traps and stop valves.
TRAPtest VKP 30	Computer-based monitoring, recording and evaluation system for steam traps of all types and makes .

Vaposcope VK

The Vaposcope can be used in horizontal and vertical pipework without any modifications.

Installation upstream of the steam trap.

The application is limited to fluids with pH value 9 (VK 14) or 10 (VK 16). VK 16 comes standard with mica disc.

Test Set VKE

Consisting of:

Test chamber with integral level electrode for steam traps of all types and makes

and:

Remote test unit for simultaneous and continuous monitoring of up to 18 steam traps or:

Manual test unit for monitoring "in situ".

Pressure/Temperature Ratings *)

Type	PN	Material		Max. Pressure/Temperature Rating	
		DIN	ASTM	PMA / TMA	PMA / TMA
VK 14	16	GG-25	A 126 B ¹⁾	16 bar / 120 °C	13 bar / 250 °C
VK 16	40	C 22.8	A 105 ¹⁾	40 bar / 120 °C	28 bar / 300 °C
VKE 16	40	GS-C 25 ²⁾	A 216 - WCB ¹⁾	32 bar / 250 °C ³⁾	21 bar / 400 °C ³⁾
VKE 16A	40	1.4571	TP 316 Ti ¹⁾	40 bar / 120 °C ³⁾	32 bar / 250 °C ³⁾

¹⁾ ASTM nearest equivalent grade is stated for guidance only. Physical and chemical properties comply with DIN grade.

²⁾ Forged steel flange (C 22.8).

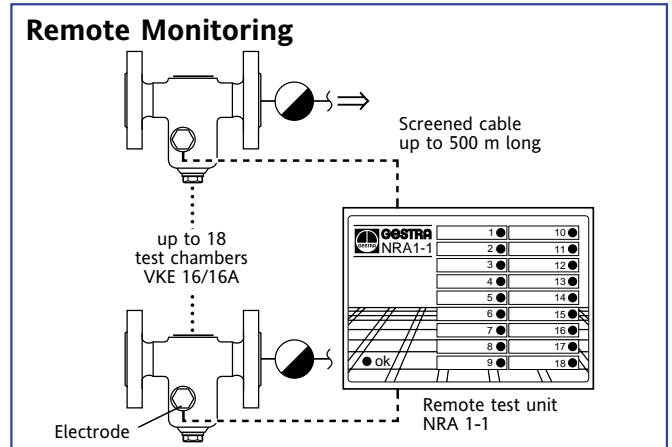
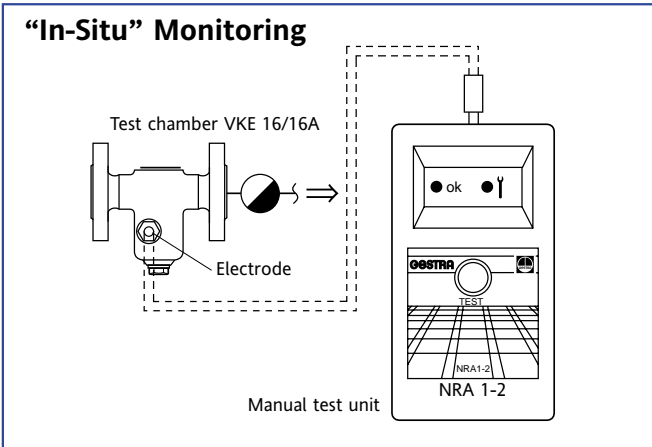
³⁾ Max. working pressure/temperature of the electrodes: 32 bar / 238 °C. Sensitivity of electrodes: 1.5 µS/cm.

*) For more information see data sheet.

Available Connections and Overall Lengths

Type	Connection	Overall length (L) in mm				
		DN 15 1/2"	DN 20 3/4"	DN 25 1"	DN 40 1 1/2"	DN 50 2"
VK 14	Flanged DIN PN 16	130	150	160	200	230
VK 16	Flanged DIN PN 40	150	150	160	230	230
	Flanged ANSI 150	150	150	160	230	230
	Flanged ANSI 300	150	150	160	230	230
	Screwed sockets	95	95	95	130	210
	Socket-weld	95	95	95	130	210
VKE 16	Flanged DIN PN 40	150	150	160	–	–
	Flanged ANSI 150	150	150	160	–	–
	Flanged ANSI 300	150	150	160	–	–
	Screwed sockets	95	95	95	–	–
	Socket-weld	95	95	95	–	–
VKE 16 A	Flanged DIN PN 16	150	150	160	230	230

Test Set VKE



Vapophone Ultrasonic Detector VKP-Ex

The VKP-Ex is used to detect sound in the ultrasonic range as caused by flowing steam through a steam trap.

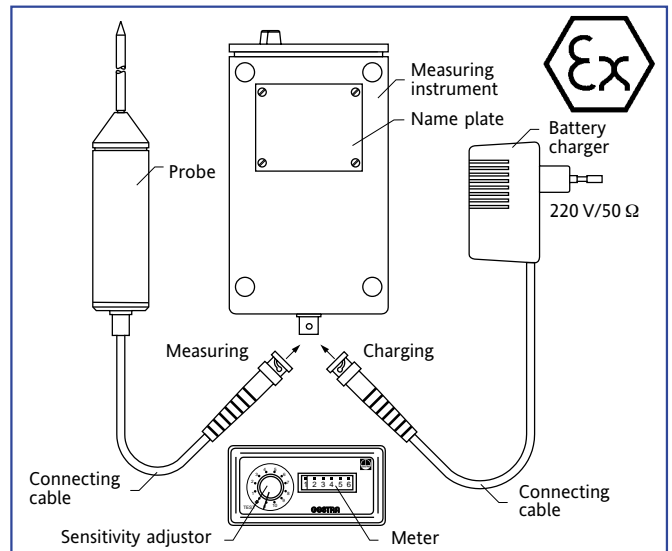
The ultrasonic vibrations are detected by a probe and converted into electric signals which are indicated on the meter of a measuring instrument.

The equipment is **intrinsically safe** in conformity with classification

EEx ib llc T4
(Type-approval no.: PTB Ex-84/2063)

and is suited for application in hazardous locations.

Protection: IP 41



TRAPtest VKP 30¹⁾

Monitoring, Recording and Evaluation System for steam traps of all types and makes

With the aid of the VKP 30 steam traps can be checked for loss of live steam, thus evaluating their performance. All test results determined by the terminal VKPN 30 can be stored, evaluated and managed using a PC.

The system consists of the hand-held terminal VKPN 30, the measuring transducer VKPS 30 and the corresponding software for data management by PC.

Features:

- Easy to use
- No special knowledge required
- Graphic representation of sound level
- Visual display of steam losses
- Data transfer to PC at the click of the mouse
- Automatic evaluation of test jobs
- View/print repair work orders or reports



¹⁾ Design for hazardous locations in preparation