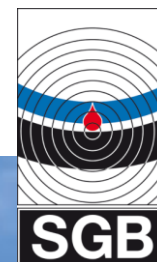


LEAK PREVENTION TECHNOLOGY

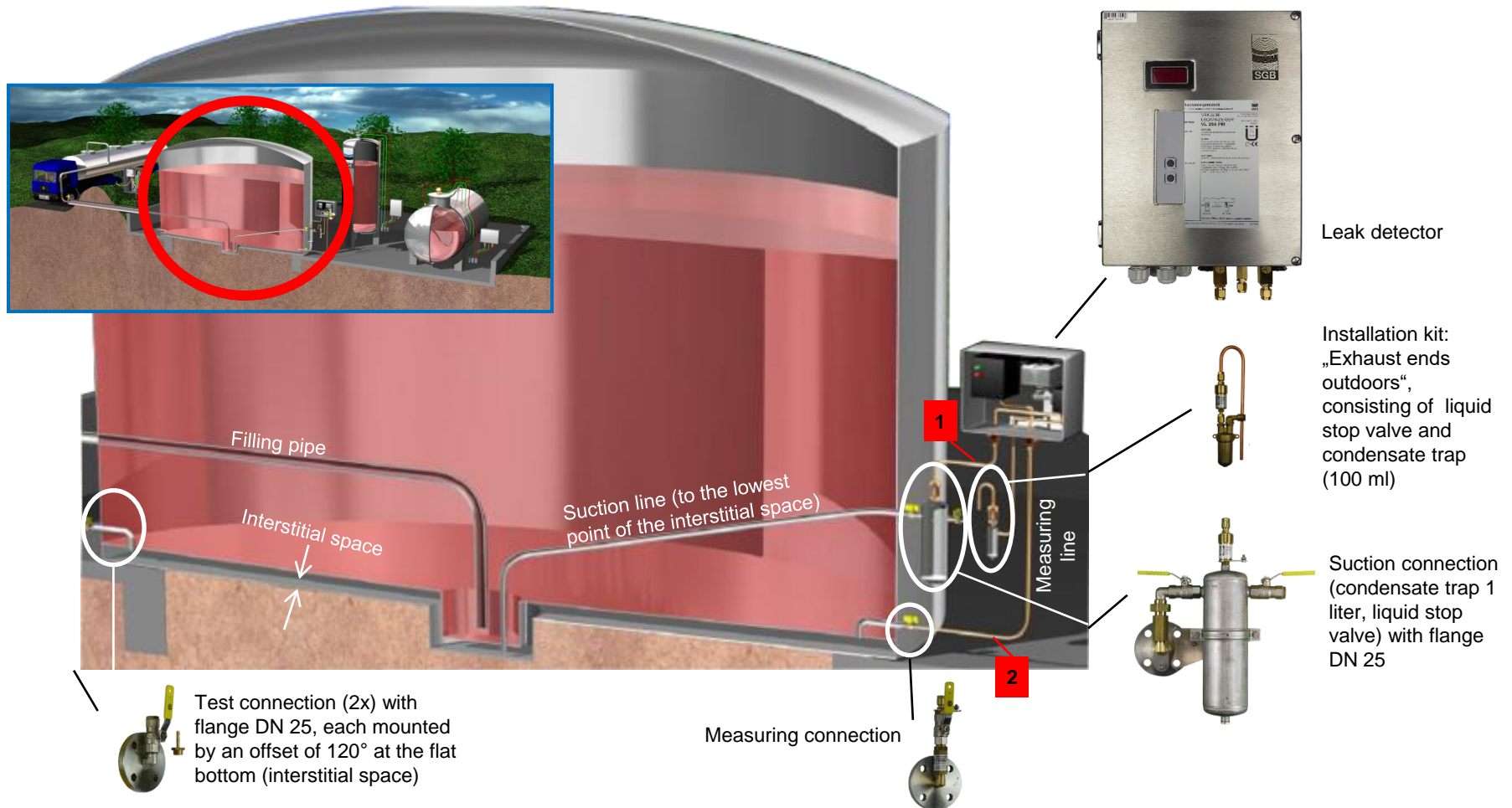
For a clean and protected environment



Leak detection technology for

double bottoms of flat bottom tanks

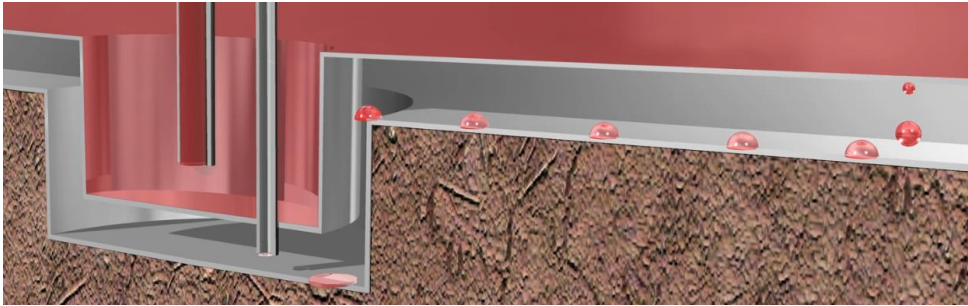
Leak detector connection on flat bottom tank with double bottom



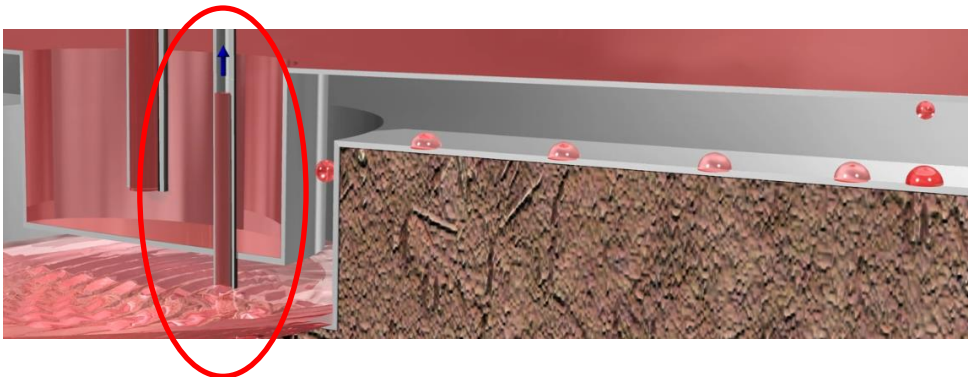
For the connection lines between leak detector and installation kit / tank connections (1 / 2) as for the exhaust kit copper or stainless steel pipe with 8 mm diameter will be used

Principle of vacuum monitoring at flat bottom tanks

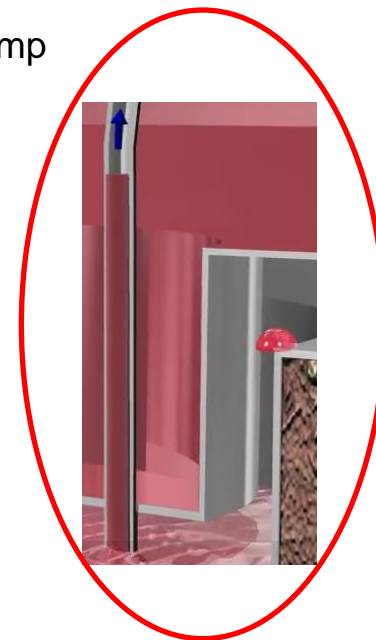
In case of a liquid leak, the liquid enters the interstitial space and collects in the low point of the interstitial space.



The incoming liquid decreases the vacuum, which causes the pump to turn on and evacuate the interstitial space until the operating vacuum is reached.



After some time the liquid is sucked into the suction line.



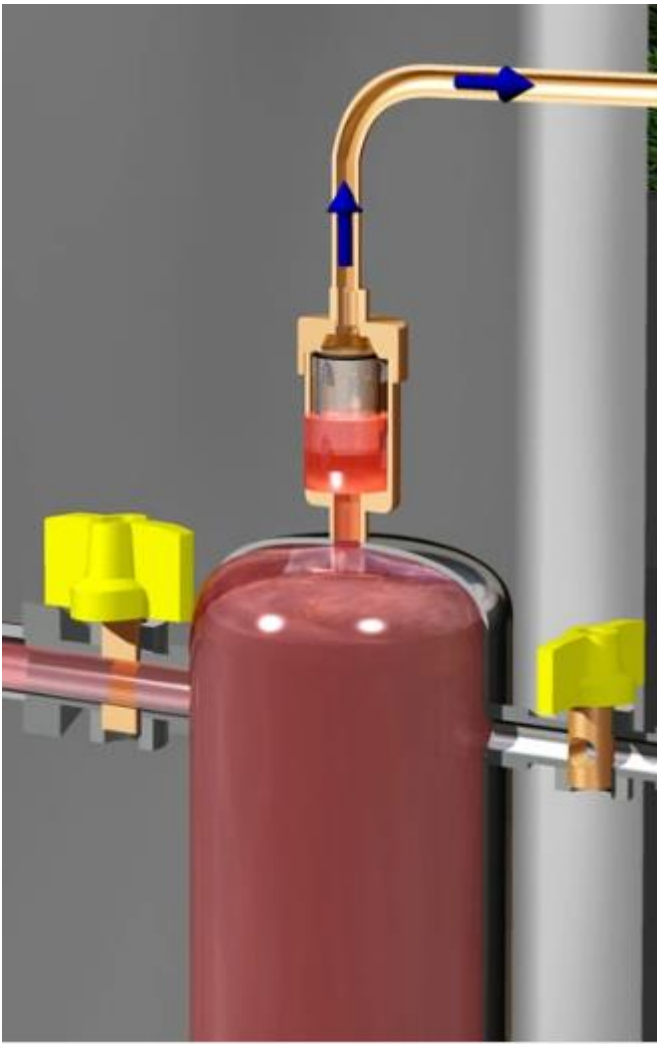
Principle of vacuum monitoring at flat bottom tanks

The liquid enters the condensate trap, which will be filled more and more.



The liquid reaches the liquid stop valve.

Principle of vacuum monitoring at flat bottom tanks



The float switch of the liquid stop valve is pushed upwards, the vacuum pump sucks against the closed liquid stop valve

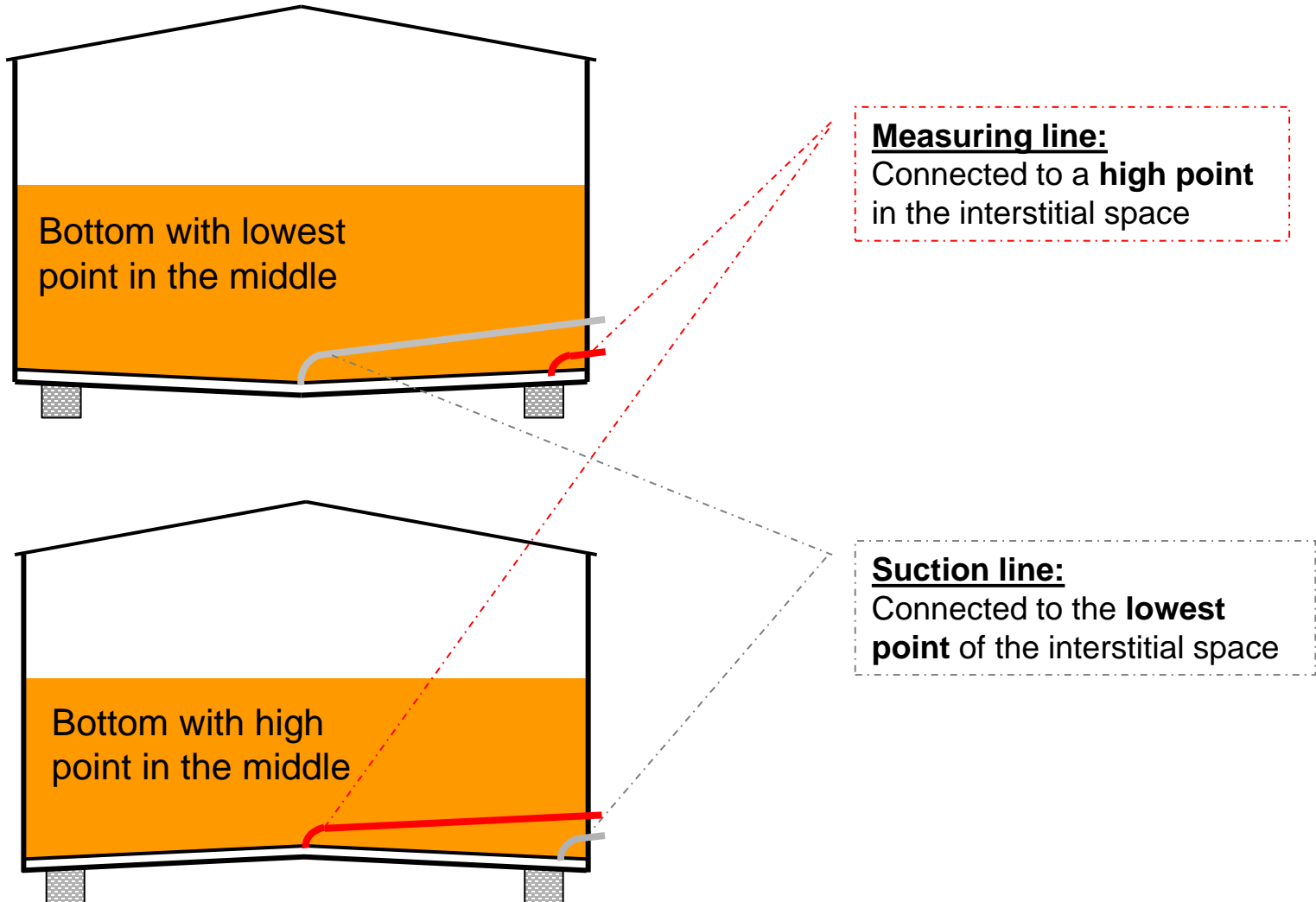
Because of the vacuum that still exists on the measuring line side, additional stored material or water is sucked into the interstitial space and the measuring line.

This causes the vacuum to drop until the “Alarm ON” pressure is reached. This triggers the visual and audible alarms.



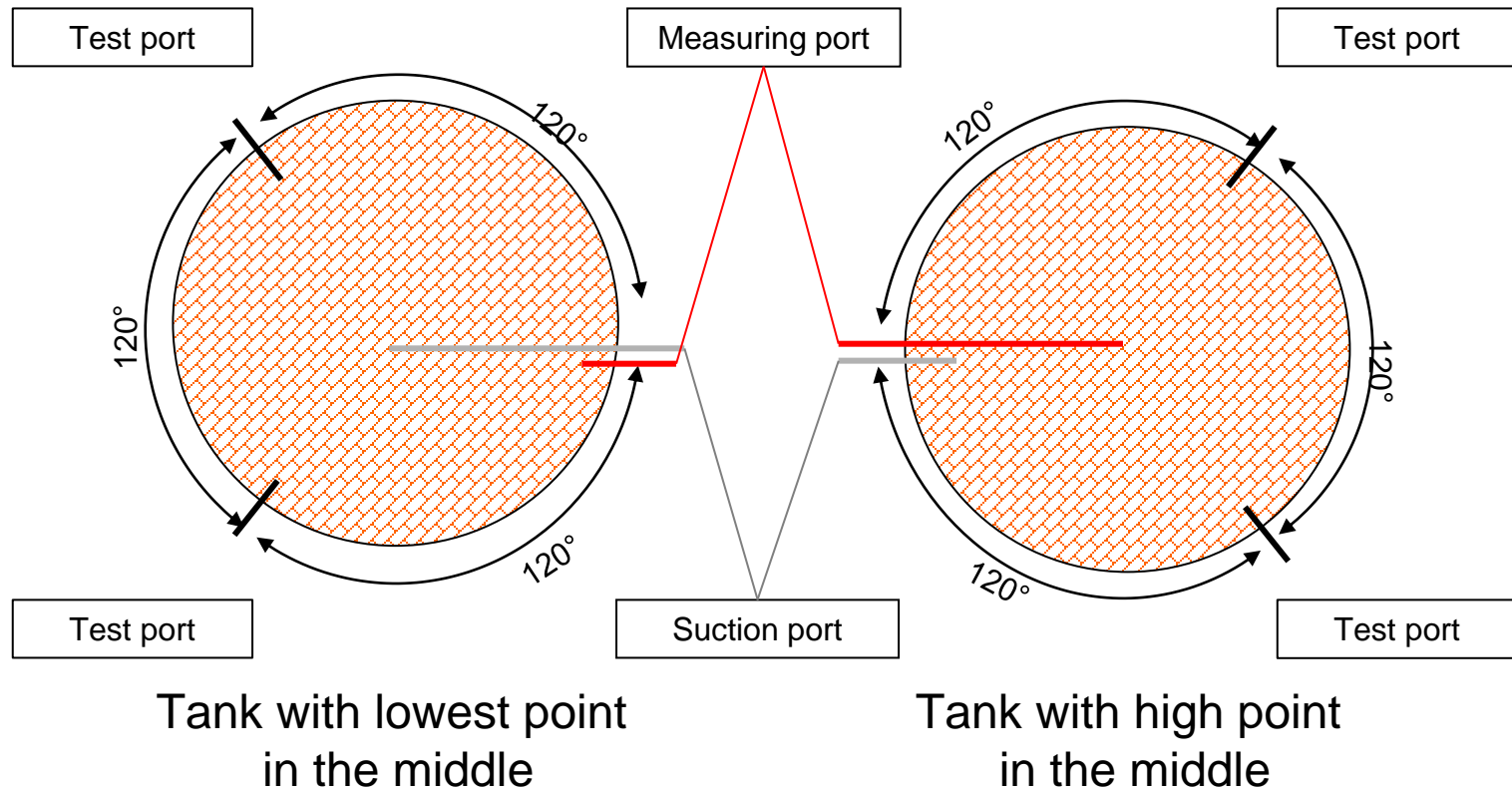
It is also an option to use a liquid sensor in conjunction with solenoid valves instead of the liquid stop valve. The liquid alarm is then triggered when the sensor comes into contact with liquid.

Location of suction- and measuring line



Location of the test ports

Test connections are installed in angles of 120° degree to the suction / measuring connection

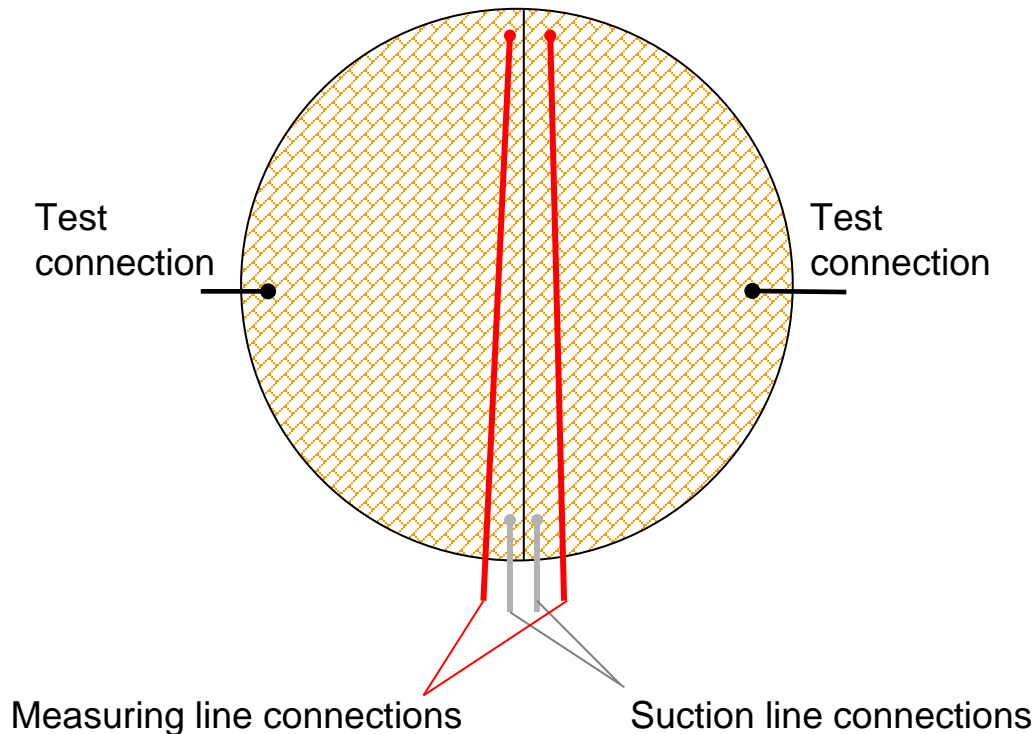


- On tanks with small diameters test connections may not be necessary
- Consider requirements of the approval for the double bottom!

Location of the test ports

Devided bottoms

A division of the double bottom is made, when the volume of the interstitial space exceeds specified limits or when the segmentation can help to facilitate a leak detection.



The double bottom is divided in two parts. The test connections should be arranged in distances as big as possible, to the measuring connection.

The double bottom has a fall to the lower edge of the picture. Each suction connection is directed to the low point.

Consider requirements of the approval for the double bottom!

Vacuum monitoring of flat bottom tanks

Alarm- and operating pressure

According to the EN 13160 the alarm pressure must be at least 255 mbar.

The operating pressure is between 350 and 500 mbar (depending on leak detector)

By the use of vacuum leak detection systems in a case of a leak stored products and their vapors reach into the interstitial space, into the connecting lines or into the leak detector.

Therefore

all used components must be chemically sufficiently resistant to the stored material and its vapors.

and

in case of possible occurrence of potentially explosive atmospheres, the leak detection system must be explosion proofed!

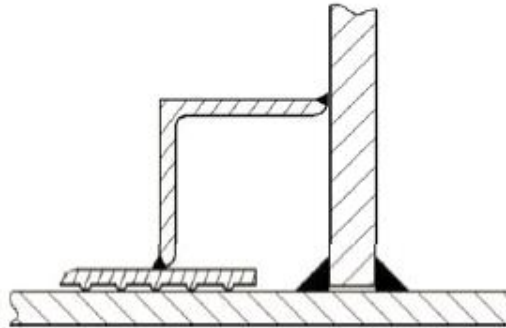
Production of the interstitial space (double bottom)

Basic requirements

- Free passage for air, water and stored product
(Viscosity < 5000 mm²/s, increase gap width with viscous products)
- Sufficiently resistant to water and stored product
(Inappropriate combinations of materials and stored product can lead to chemical reactions with the release of hydrogen)
- Tightness requirement: 0,1 mbar * l/s
- Volume of interstitial space not larger than 8.000 liter (EN 13160). (Better smaller, as easier to test for leaks. 4,000 liters can be tested in 7 hours.)

Production of the interstitial space (double bottom)

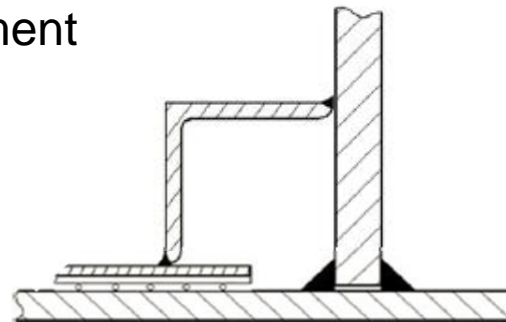
Production of the interstitial space gap with a steel knop sheet



Advantage:

- Small interstitial space crack, therefore large areas with small volume possible
- Partition of interstitial space only from a diameter of 60 m

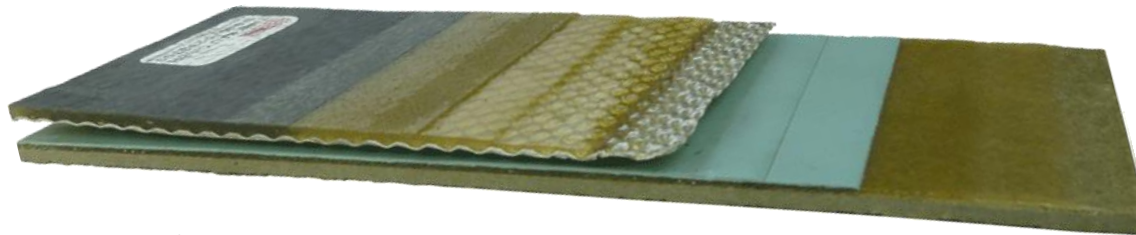
Production of the interstitial space gap with reinforcement steel mesh as brace



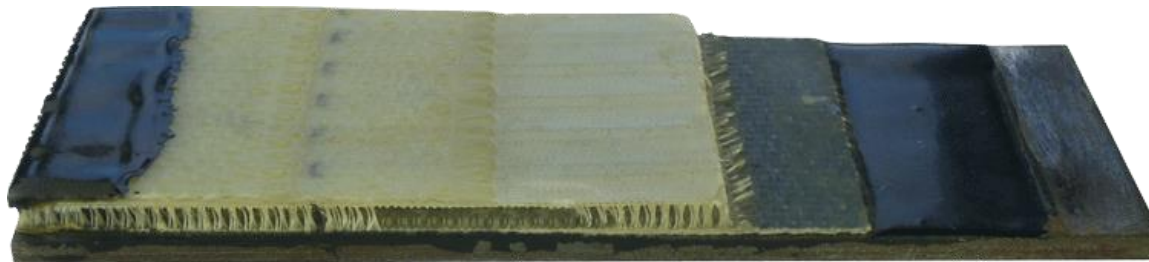
Production of the double bottom

- Leak protection lining, glass-fiber reinforced synthetic resin laminate (design type C)

with aluminium-waterproof foil



With 3-D-fiberglass cloth



- Flexible plastic foil as leak protection lining (design type D)
- Inflexible plastic sheet as leak protection lining (design type E)

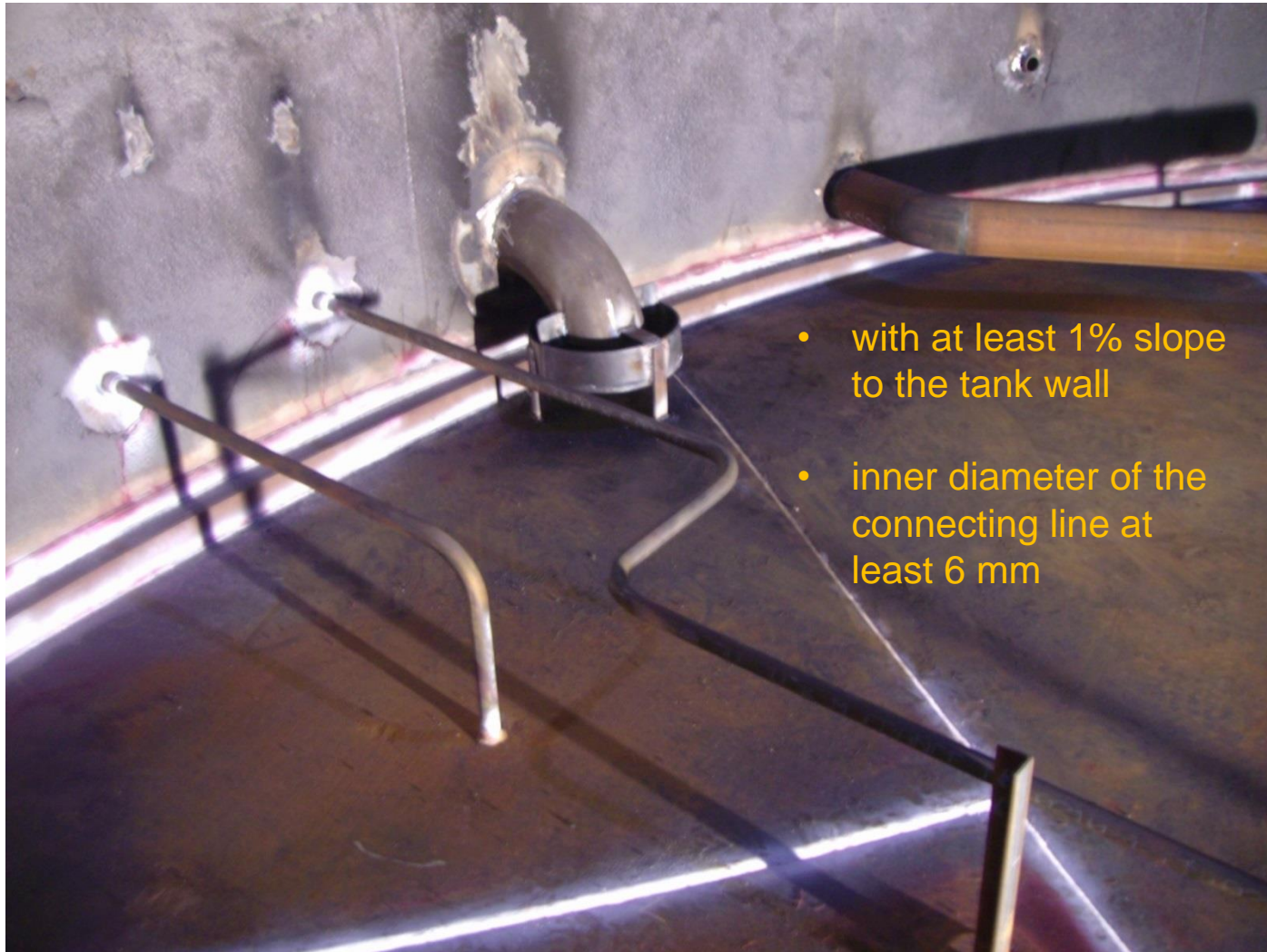
Installation of suction- and measuring-line in an on tank

Leading the pipeline through tank pit



Installation of suction- and measuring-line in and on tank

Suction and measuring line at inner tank



- with at least 1% slope to the tank wall
- inner diameter of the connecting line at least 6 mm

Installation of suction- and measuring-line in an on tank

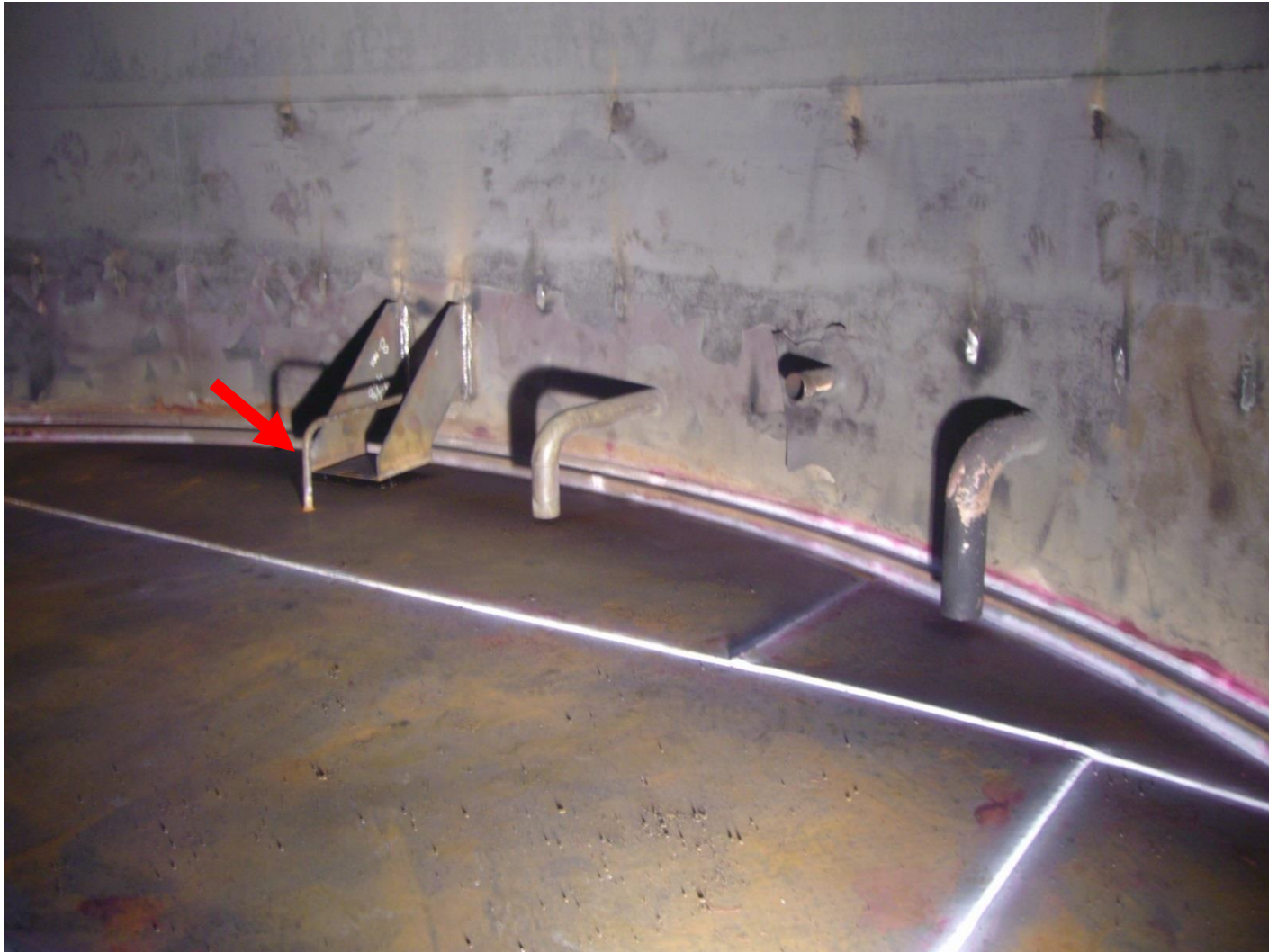
Measuring line to tank center / Measuring line connection at ground



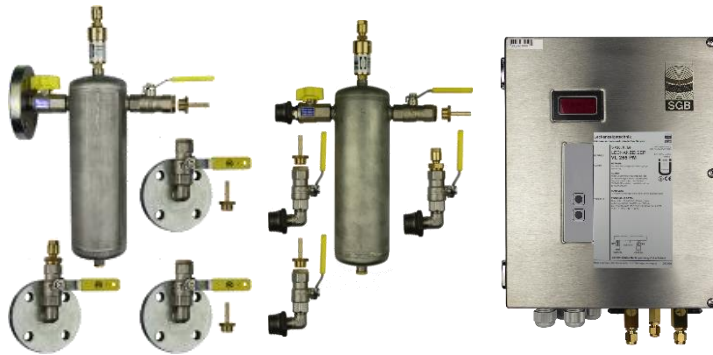
The connection of the measuring line must always be at least 100 mm higher in level than the connection point of the suction line. Otherwise, provide a measuring chamber with a diameter of at least 100 mm and a height necessary to reach the required level difference.

Installation of suction- and measuring-line in an on tank

Test connection



Leak detectors for flat bottom tanks



VL 255 PM

Operating vacuum: Not more than -380 mbar
Functionality of the interstitial space given for -650 mbar

Stored goods: **Water-polluting liquids with a flash point > 55/60°C**, and others, if sufficient resistance of leak detector against stored liquid is given

Types: Brass / stainless steel

VL 255 PMMV

with liquid sensor (up to 100 / 150°C)

Operating vacuum: Not more than -380 mbar
Functionality of the interstitial space given for -650 mbar

Stored goods: **Water-polluting liquids with a flash point > 55/60°C**, highly aggressive stored products such as acids and lyes

Types: Stainless steel

Also usable for heated flat bottom tanks



Leak detectors for flat bottom tanks



VL 330 A-Ex with LAE

Operating vacuum: Not more than -540 mbar

Functionality of the interstitial space given for -750 mbar

Stored goods: Water-polluting liquids with a flash point $> 55/60^{\circ}\text{C}$

and $\leq 55/60^{\circ}\text{C}$, whose (possible) explosive steam-air mixtures can be classified in gas groups II A to II B3 (II C), as well as in temperature codes T1 to T3 (T4)

Types: Brass / stainless steel

VLX 330 Ex

Operating vacuum: not more than -540 mbar

Functionality of the interstitial space given for -750 mbar

Stored goods: Water-polluting liquids with a flash point $> 55/60^{\circ}\text{C}$

and $\leq 55/60^{\circ}\text{C}$, whose (possible) explosive steam-air mixtures can be classified in gas groups II A to II B3 (II C), as well as in temperature codes T1 to T3 (T4)

Types: Brass / stainless steel



Leak detectors for flat bottom tanks



VLXE 330 Ex M / VLXE 330 Ex MMV

Operating vacuum: Not more than -450 mbar

Functionality of the interstitial space given for -700 mbar

Stored goods: Water-polluting liquids with a flash point $> 55/60^{\circ}\text{C}$

and $\leq 55/60^{\circ}\text{C}$, whose (possible) explosive steam-air mixtures can be classified in gas groups II A to II B3 (II B +H₂), as well as in temperature codes T1 to T4

Types: brass / stainless steel

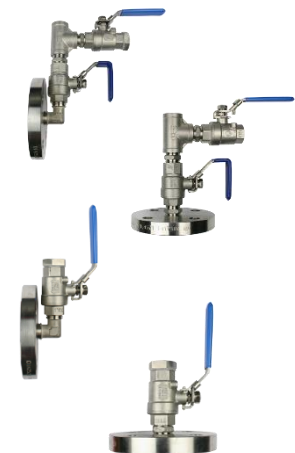
VLX 350 SA-Ex static system without integrated vacuum pump

Operating vacuum: -350 up to -700 mbar

Stored goods: Water-polluting liquids with a flash point $> 55/60^{\circ}\text{C}$

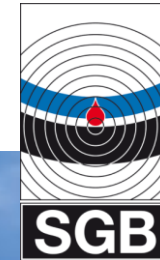
and $\leq 55/60^{\circ}\text{C}$, whose (possible) explosive steam-air mixtures can be classified in gas groups II A, II B or II C as well as in temperature codes T1 to T6

Type: Stainless steel



LEAK PREVENTION TECHNOLOGY

For a clean and protected environment



Any questions? Please contact us:

+49 271 48964-0 sgb@sgb.de