Leak Monitoring Systems
for double-walled piping
System description
The leak monitoring

Double-walled piping is permanently monitored using pneumatic leak detecting devices. These regulate the monitoring pressure in the surveillance space and register any changes of pressure which may occur. The surveillance space prevents uncontrolled spillages of the transport medium when leaks occur. The surveillance space must be so constructed that the functioning and operative security of the leak monitoring system (the leak detector) is assured at all times. The size if the surveillance space for each leak detector is limited to 10 m³ acc. to DIN EN 13160.

If the pipe is damaged the alarm is given by acoustic and optical signals.

Definition of leak detection equipment/leak detector

“Leak detection equipment/leak detector” according to the currently valid regulations refers to a device which automatically and under all operating conditions gives warning of leaks in the walls of double-walled piping in which water hazardous (flammable and non-flammable) fluids are transported. The term “leak detection equipment/leak detector” includes all the equipment necessary for the detection of leaks.

The main components are:
- the leak detector/leak monitoring equipment
- the connection between the surveillance space and leak detector
- double-walled piping:
  - FLEXWELL® Safety Pipe
  - BRUGG-STAMANT® Safety Pipe
  - SECON®-X Petrol station pipe
- the surveillance space
- a leak detection medium

The use of this system complies with the most stringent European safety standards (Class 1). Systems of this class give warning of a leak above or below the fluid level in a double-walled protective system. They are constructed on the principles of absolute safety and ensure that spillages of products into the environment cannot occur.

Leak detector

We distinguish two types of differential pressure leak detection equipment: Leak surveillance to detect leaks in double-walled piping on the vacuum principle and on the positive pressure principle.
Leak monitoring for double-walled piping

System description

Approval/suitability

All leak detection equipment/leak detectors in use must comply with the basic criteria laid down for construction and testing standards. All such preconditions which could have a bearing on the functional and operative safety of the system must therefore be observed.

It therefore goes without saying that the conditions for operative use have been tested by the competent authorities and clearly defined and set down in the documents of approval issued by them.

Double-walled piping with leak monitoring is an approved leak detection equipment/leak detector system.

The advantages of the system

Using double-walled FLEXWELL® Safety Pipe with leak monitoring offers, besides a high degree of operative safety, substantial economic advantages:

- the entire system can be easily and simply monitored at any time without interrupting operations
- requirements such as e.g. pressure/volume measurements, pressure tests or route surveys can be dispensed with
- when a leak occurs, operations can normally be continued without interruption; repairs can be planned.
- remote monitoring (LOD) of all operating parameters is possible (24/7).

Example: a fuelling station

Each plant can be assembled to fit the needs of the individual situation by combining elements of several monitoring systems.

Two-line system

A monitoring lead runs from the positive pressure leak detector DLR-G 1-7 to the distributor block and from there to lines 1 and 3.

Ring line

The double-walled pipes 1 and 2 are connected one after the other with a monitoring lead. A test valve PV is installed at the end of the double-walled pipe. If a vacuum leak detector is used, a monitoring lead runs back to the device.

Single-line system

The double-walled line no. 4 is also monitored. A test valve PV is similarly installed at its end.

Operating limits

- pressure range (acc. to pipe system and monitoring)
- maximum monitorable pipe length see Worksheets LDS 8.120 and LDS 8.130
- distributor block 2 – 8 connections

![Diagram of routing plan]
# Leak monitoring for double-walled piping

## Overview of leak detectors

<table>
<thead>
<tr>
<th>Type of leak detector</th>
<th>VLR 410/E</th>
<th>VLX 330/A-Ex</th>
<th>DLR-G ...</th>
<th>DLR-P ...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of pipe</strong></td>
<td></td>
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<tr>
<td>FLEXWELL® Safety Pipe</td>
<td></td>
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<tr>
<td>BRUGG-STAMANT® Safety Pipe</td>
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<tr>
<td>SECON®-X Petrol Station Pipe</td>
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<tr>
<td><strong>Area for installation</strong></td>
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<tr>
<td>Dry and frost-free area</td>
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<tr>
<td><strong>Flashpoint of transport medium</strong></td>
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<td></td>
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<tr>
<td>&lt; 55 °C</td>
<td>–</td>
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<td></td>
<td></td>
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<tr>
<td>&gt; 55 °C</td>
<td>–</td>
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</tr>
<tr>
<td><strong>Max. pipe length see Workshee</strong></td>
<td>LDS 8.120</td>
<td>LDS 8.120</td>
<td>LDS 8.130</td>
<td>LDS 8.130</td>
</tr>
<tr>
<td><strong>Max. operating pressure</strong></td>
<td>25 bar</td>
<td>10 bar</td>
<td>22 bar</td>
<td>1 bar</td>
</tr>
<tr>
<td><strong>Potential-free relay</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td><strong>Remote monitoring option LOD</strong></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Dimensions of housing (BxHxT) in mm</strong></td>
<td>217x266x110</td>
<td>300x200x160</td>
<td>217x266x110</td>
<td>127x266x110</td>
</tr>
<tr>
<td><strong>dimensions detector unit</strong></td>
<td>200x120x90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional criteria for selection</strong></td>
<td>Compact, uncomplicated leak detector for consumer heating oil plants</td>
<td>Leak detector for flammable media with minimum maintenance</td>
<td>Electronic leak detector for all pressure stages</td>
<td>Reliable leak detector for petrol stations low operating pressu</td>
</tr>
</tbody>
</table>
Leak monitoring for double-walled piping
Leak monitoring Online Diagnosis LOD

According to VAUwS the operator of a plant with water-hazardous substances is obliged to provide evidence that the plant is leak-proof and to check the functioning of the safety precautions (leak detector) regularly. In order to optimise these function checks, BRUGG Rohrsysteme GmbH offers a remote monitoring system, LOD.

What is LOD?

Leak monitoring Online Diagnosis, LOD, is a system which for the first time realizes the safe and continuous remote monitoring of a leak detector. Each and every operating parameter is recorded around the clock (24/7), communicated automatically once every 24 hours by mobile telephony to the LOD server where it is analysed. That means that the correct operational functioning of the leak detector is checked every single day.

How does LOD work?

Any alarm is immediately communicated to the system when it occurs and leads directly and automatically to an email or text message being sent to the addresses you have supplied. All alarm messages received are registered by the LOD system, repeated at regular intervals and only deleted after the cause of the alarm has been rectified on site. In this, LOD not only checks all functions of the leak detector but transmits the current pressure in the monitoring system as well as the leak status of the entire plant. This provides a hitherto unattained degree of certainty that the alarm signal will be relayed onwards and the necessary reaction ensured.

Technical details and installation of LOD

The leak detector comes equipped ex works with a pre-installed data transfer module (DTM) and a powerful externally visible rod aerial. The individual DTM is connected to the electronic system of the leak detector and logged in to the LOD via a serial number which identifies it clearly. For installations in areas which have a poor telephony signal, an aerial extension including an angled support is available.

Overview of the data transmitted
- daily report checking on the operation and functioning of the leak detector
- real-time status of pressure in the system; alarm signal if pressure drops
- leak tightness of the entire system consisting of the leak detector and the connected surveillance space
- frequency of pump runs and overall running time of pump for ordering service checks
- responsiveness check of internal sensor (probe or ZD)
- status of an additional digital sensor (if connected to DTM)
- output value of an additional analogue 4 – 20 mbar sensor (if connected to DTM), e.g. readout of residual pressure in gas bottles

Advantages of the system
- it is no longer possible to overlook alarm signals or ignore incoming alarms, alarm equipment can no longer be manipulated
- can also be used for installations in remote locations which are not easily accessible and are only seldom visited, for petrol stations without attendants, standby power supply systems
- safe from manipulation
- maximum possible operating safety
- maintenance checks can be optimally planned through automatic messages to identify service needs
- minimal plant downtime ensured

Availability of LOD

LOD is available in all three DACH countries (Germany, Austria, Switzerland/red coloured). Availability over the rest of Europe (orange coloured) is under preparation.
Leak monitoring for double-walled piping

Use case

A helicopter fuelling station in New York City – safe thanks to explosion-protected vacuum leak monitoring

The Wall Street Heliport, located in lower Manhattan, is used for both tourist excursion flights and business air traffic. On any typical sunny summer day at the height of the tourist season, this heliport will experience more takeoffs and landings than JFK International Airport over the same period of time. In July 2010, during this peak operating season, a new fueling system was installed by BRUGG Pipesystems using BRUGG FLEXWELL®-HL pipe.

The first step was to lay out and connect a 500 ft. length of pipe along the length of the pier, to the first fuel station. The whole length of pipe was then carefully secured to the side of the pier, using a boat and mobile crane located onsite. This was a very complex and difficult process to complete, due to the changing tides, wave action caused by the movement of boat traffic on the East River and the constant helicopter rotors. At this point the piping was placed beneath the deck of the pier, and positioned in a channel between a support beam and the deck, and finally raised through a hole into the pump station – all the while being subjected to the constant waves on the river.

Lastly, an additional length of piping was installed between the tank and the pump station for filling and transferring jet fuel. The final pressure test confirmed that the BRUGG FLEXWELL®-HL piping installation and the vacuum leak detector had no errors or leaks anywhere in the system. The customer will be able to rely on the quality, reliability and durability of this pipe installation for many years to come.

Left: The Wall Street Heliport in Manhattan/New York
Centre: Installation work with no interruption in flight services
Right: the explosion-protected vacuum leak detector next to the pumping station

Again and again BRUGG

“We at Core sell compliance, value and long service life. The BRUGG pipe offers all of these values and stands alone in above ground applications. It also exceeds all the criteria for pipe below ground and under piers.

I don’t know any other double-wall pipe that protects against fires, UV and offers the same durability and flexibility. Core looks forward to many more opportunities with this product.”

Tony Ramos, Core Engineered Solutions
Safe monitoring of the piping in a fuel depot

The rebuilding of the Horny Hricov Terminal has been under discussion since 1997, when the first studies on re-routing the piping from the upper to the lower plant of SLOVNAFT were carried out. The lower SLOVNAFT plant in the Horny Hricov Terminal served as a distribution centre for petrol stations in Central and Eastern Slovakia, while the upper plant was used as the state material reserve. Following a number of changes in the SLOVNAFT refinery, the Horny Hricov Terminal was re-evaluated as the storage facility of the state material reserves of the Slovak Republic. The necessity to re-route the piping between the two plants resulted from the extension of the motorway from Bratislava in the West to Kosice in the East. This motorway ran over the piping connecting the two plants. In order not to hinder operations it was necessary to re-route the piping so that the motorway routing would not have to be taken into consideration in the event of reconstruction work being needed.

The project consists of 13 lines of BRUGG-STAMANT® double-walled safety piping laid below the surface. BRUGG Rohrsysteme GmbH supplied 4,446 m of double-walled piping and 1,611 m of single-walled piping, with dimensions ranging from DN 80 to DN 300. Transport media are petrol, crude oil and gas. DLR-G 8 S positive pressure leak detectors are used.

Presently the piping has been in service trouble-free for over five years.

Further 811 m of BRUGG-STAMANT® safety piping delivered

“We got the contract for the SLOVNAFT project because of already existing know-how and it was an important reference in the Slovak Republic. Thanks to this reference our companies delivered a further 811 m of BRUGG-STAMANT® safety piping in 2010 for the project “Port on the Danube” in Bratislava.

With the need for retrofitting equipment, two more projects are expected on top of this within the next three years.”
Pipe systems for the future
District heating – Industry – Petrol stations – System packages

Your partner for pipe systems
We are the people you should talk to when you need to find efficient solutions for transporting liquid materials. With our project engineers, development department, in-house production unit, and our professional team of fitters, we have the know-how and the resources to look after your projects competently and reliably in the sectors of heating systems, petrol station construction, industrial plant construction, and system packages.

Customer-specific solutions
Brugg is the full service provider in the field of single-wall, double-wall and insulated pipe systems. This know-how allows us to manufacture project-specific customised items.

Give us a call!
Our engineers would be pleased to advise you and find a made-to-measure solution.