Focus on safety, for a clean environment

Proven leak detection systems for tanks and pipelines in ...

... Oil heating systems

... Petrol stations

... Storage tanks, industry

According to DIN EN 13160-2 / Class I with DIBt Approval
Contacts for ASF Leak Detection Systems

Technical Support,  
Product Management

Richard Moser  
Product Manager

ASF Leak Detection Systems
www.asf-leckanzeiger.de  
www.gd-thomas.com

Gardner Denver Thomas GmbH  
Benzstraße 28  
Gewerbegebiet Nord  
82178 Puchheim  
Germany
Phone +49 89 80900-1410  
Fax +49 89 80900-1179
Mobile +49 176 1124 5517  
richard.moser@gardnerdenver.com

Technical Sales:

Uwe Heuser  
Sales Engineer

ASF Leak Detection Systems
www.asf-leckanzeiger.de  
www.gd-thomas.com

Gardner Denver Thomas GmbH  
Benzstraße 28  
Gewerbegebiet Nord  
82178 Puchheim  
Germany
Phone +49 89 80900-1132  
Fax +49 89 80900-1179
Mobile +49 176 1124 5517  
uwe.heuser@gardnerdenver.com

Application Support:

Tomas Tichon  
Product Specialist

ASF Leak Detection Systems
www.asf-leckanzeiger.de  
www.gd-thomas.com

Gardner Denver Thomas GmbH  
Benzstraße 28  
Gewerbegebiet Nord  
82178 Puchheim  
Germany
Phone +49 89 80900-1172  
Fax +49 89 80900-1179
Mobile +49 176 1124 5517  
tomas.tichon@gardnerdenver.com

Further Information:  
www.asf-leckanzeiger.de  
www.thomas-leak-detection.com
ABOUT US

Focus on Safety, for a clean environment

Since five decades, nearly 1 million ASF leak detectors have been installed in consumer heating oil facilities, gas stations, tank farms and industrial plants. This confirms the reliability of our products for monitoring of water-polluting liquids in double-walled tanks and piping.

All our leak detection systems working on the pressure or vacuum principle are corresponding with DIN EN13160 Class 1, and are approved by the DIBt (German Institute for Building Technology).

Since the merger with Gardner Denver, Inc. in 2005 and formation of the Thomas Products Division, we are part of one of the world's largest manufacturer and supplier of pump solutions for various applications.

The environmental protection is one of the main activities of the company. With high standards and application specific product solutions, we contribute to the active protection of our environment.

Best customer relations

We make a point to fulfil the expectations and needs of our customers in the best possible manner. This applies to the regional working specialists as well as to international organized companies.

Our customers are tank service companies, manufacturers of leak protection linings, petrol stations and industrial plant building companies, planners, real estate managing companies, tank manufacturers, petroleum industry and companies working in the waste and recycling business.

We see it for granted to support our customers with service and trainings on the selection, installation and service of our leak detection equipment, so they are able to serve the respective end customers properly and professionally.

Our Locations

Gardner Denver Thomas GmbH
Benzstrasse 28
82178 Puchheim / Germany

In our head office near Munich around 75 employees are supporting our operations with all necessary central functions.

Gardner Denver Thomas GmbH
Karatasstrasse 4
87700 Memmingen / Germany

The new plant in the Allgäu region has started production in the year 2004. With 200 employees and 5,000 m² production area, different pump versions as well as the ASF leak detection systems are produced in this facility on highest quality and safety standards.

The production is organized by following the GARDNER DENVER's LEAN principles, which guarantees high efficiency, transparency and best fulfilment of customer's demands. Particular importance we attach to a clean and ergonomic working environment.
Overview Leak Detection System
Working on the Pressure-/Vacuum Principle (Class I)

Pic 1: Pressure leak detector connected to a double walled steel tank
Pic 2: Vacuum leak detector connected to a single walled tank with a protective lining system and suction line installed down to the lowest point of the bottom

Components:

1. Pressure leak detector (e.g. type D9)
2. Visual indicators, e.g. green operating light, red alarm light
3. Switch to turn alarm buzzer OFF
4. Connector at the measuring line for the test pressure gauge
5. Test and ventilation valve at the pressure/suction line
6. Air dryer (only for pressure leak detectors)
7. Measuring line – red coloured
8. Pressure line – white coloured or transparent
9. Condensate vessels at each lowest point of the connecting tubes
10. Outer wall of the tank
11. Inner wall of the tank
12. Interstitial (monitoring) space
13. Vacuum leak detector (e.g. type IV F)
14. Suction line - white coloured or transparent
15. Exhaust line – green coloured (only required at vacuum leak detection systems)
16. Liquid barrier (only required at vacuum leak detection systems)
17. Intermediate layer – approved, made of styrofoam or fleece layer
18. Suction line installed down to the bottom of the tank, must not be perforated
19. Bottom suction line along the perpendicular axis, have to be perforated
20. Leak protection liner
**Alarm function pressure leak detector:**

- **Only air leakage**
  Air is pressed into the tank, pressure level is decreasing in the monitoring space.
  At the set point “Pump ON”, the pump starts and pressurizes the monitoring space up to the pressure level “Pump OFF”.
  If the leakage rate is higher than the flow rate of the pump, the pressure level changes to the “Alarm ON” set point.

**Alarm function vacuum leak detector:**

- **Air leakage**
  Air is sucked into the monitoring space, pressure level in the monitoring space is changing.
  At the set point “Pump ON”, the pump starts and evacuates the monitoring space up to the vacuum level “Pump OFF”.
  If the leakage rate is higher than the flow rate of the pump, the pressure level changes to the “Alarm ON” set point.

- **Liquid leakage**
  Liquid is sucked into the monitoring space.
  Because of the reduced volume inside the monitoring space, the pressure level is changing.
  At the set point “Pump ON”, the pump starts and evacuates the monitoring space up to the vacuum level “Pump OFF”.
  Liquid is still sucked into the monitoring space.
  When the liquid level reaches the suction line connector on the top of the tank, liquid fills the suction line, the flow stop valve will be closed.
  The pump is still running, but without connection to the measuring line of the leak detector. Because there is still vacuum in the measuring line, liquid is also sucked into the measuring line till the volume and pressure level in the measuring line reaches the “Alarm ON” point.
General Information about Leak Detection Systems

In Germany leak detection systems based on three different laws:

- Law for products, installed in buildings → approval of the systems by the DIBT institute required
- Law for water protection → only special certified companies are allowed to make installations, service and repair on leak detection systems
- Regulations for safety for materials → e.g. actions required for explosion protection

Technical details for leak detection systems described in EU regulation EN 13160 Part 1 to 7

This regulation distinguishes five different classes of systems

Alarm signal before liquid is dropped into the environment
Class1 – Pressure and vacuum systems (like ASF systems)

At the time of alarm signal, leaking fluid can be diffused into the environment
Class2 – Monitoring space controled by liquid
Class3 – Liqiud sensors, e.g. placed in sumps
Class4 – Leak detection by controlling the filling level of the tank
Class5 – Sensors placed in the soil

Selection of requirements for leak detection systems:

- Visual and acoustic alarm signal
- Systems within ex zones must have special explosion protection
- Acoustic signal designed for continous operation, also with switch off function
- The visual alarm signal must not be switched off
- No switch or connector in the power cord allowed
- Max. monitoring space for tanks 8m³, for tubes 10m³ (because of handling and service, we recommend max. 4m³ each leak detector
- Pump flow rate 85 +/-15 l/h at alarm set point
- Colors for tubings: Measuring line → red, pressure or suction line → white, exhaust line (only on vacuum systems) → green
- Alarm pressure minimum 30mbar more than the maximum pressure, generated by the fluid level (hydrostatic pressure) at the tank bottom (e.g. tank DIN 6608, max. diameter 2,90m, density 1 kg/dm³ > ALARM ON set point > 320mbar), or the suction line of the leak detector is installed down to the lowest point of the monitoring space.
- Alarm pressure for tube systems have to be minimum 1 bar above the operation pressure of the tube

Stand 09/2010
<table>
<thead>
<tr>
<th>General features for the use of Pressure Leak Detectors</th>
<th>General features for the use of Vacuum Leak Detectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Less installation effort than for vacuum systems (no exhaust pipe no water trap is necessary).</td>
<td>- Tanks with a protective lining system as well as large and high tanks can be monitored with vacuum leak detector systems. The suction pipe to the leak detector has to be placed at the lowest point of the monitoring space.</td>
</tr>
<tr>
<td>- With manifold systems multiple monitoring spaces of underground tanks can be monitored at the same time by one leak detector.</td>
<td>- For monitoring of flammable liquids with flashing point ≤ 55°C, leak detectors with protection against explosion have to be used.</td>
</tr>
<tr>
<td>- Considering the required guideline on protection against explosion, flammable liquids with flashing point ≤ 55°C can be monitored by pressure systems.</td>
<td>- With vacuum leak detector systems only one leak detector can be used for each single monitoring space.</td>
</tr>
<tr>
<td>- The permitted operating pressure and monitoring pressure of the tanks and the pipes have to be considered.</td>
<td>- The leak detector and the connecting pipes have to be checked to the resistance against the stored medium.</td>
</tr>
<tr>
<td>- The monitoring medium (air or nitrogen) of the leak detector has to have a minimum air humidity. This can be managed by the use of air dryer which have to be serviced adequately. At higher operating pressure, usually nitrogen is used.</td>
<td>- Tanks with flexible lining and plastic pipes can be monitored with vacuum leak detectors.</td>
</tr>
<tr>
<td>- The reaction behaviour of the monitoring medium together with the stored liquid has to be considered. If necessary an inert gas has to be used as monitoring medium.</td>
<td>- Double walled tanks, which have been monitored by liquid leak detection systems (DIN EN 13160, class II system) in the past can be monitored by vacuum leak detectors. A certain volume of the monitoring liquid has to be removed from the monitoring space.</td>
</tr>
<tr>
<td>- By monitoring double walled pipes with higher operating pressure, the guidelines according to item 3 passage 3 of the EU pressure equipment directive have to be considered.</td>
<td>- A water trap has to be installed into the suction pipe.</td>
</tr>
<tr>
<td>- The specific approval documents of the leak detector, the tank and the pipeline have to be considered. This also applies to the operating limits in terms of the density of the stored liquid and the maximum allowable pressure in the control room.</td>
<td>- The exhaust air of the leak detector has to be fitted with an exhaust pipe. If it is not possible to lead the exhaust pipe back into the tank (for example tanks operated by pressure) a liquid trap has to be installed in the exhaust.</td>
</tr>
<tr>
<td></td>
<td>- If it is not possible to install the monitoring pipe or the pressure pipe with a constant slope base, then additional water traps have to be installed at each low point of each pipe.</td>
</tr>
<tr>
<td></td>
<td>- The specific approval documents of the leak detector, the tank and the pipeline have to be considered. This also applies to the operating limits in terms of the density of the stored liquid and the maximum allowable pressure in the control room.</td>
</tr>
</tbody>
</table>
New Generation of Leak Detectors

Our redesigned leak detectors will be launched into the market, starting mid of 2012.

Main design features of the new generation:

- Safety-related design and functional optic
- Protection against unauthorized access to the unit
- Construction for optimised maintenance and lifetime
- Proven and reliable components
- Similar spare part concept old new design

With nearly 50 years experience in leak detection systems as well as one of the global leading companies in pump technologies, we focus to combine safety, design to function and customer’s demands in a most practical manner.

Further details see on www.thomas-leak-detection.com
Rugged design with **clear instructions** as well as displays on the front panel. An **switched OFF buzzer is clearly indicated** by a yellow light.

The **documentation** is stored for long-term availability in the housing. The color-marking (yellow, red, green) has a brand recognition to the existing ASF leak detectors.

**Easy interchangeability** with already installed units because of similar fixations and electrical supply.

There are **two additional cable ducts integrated** on the top side for further connections.

**Similar supply of spare parts old-new** units because there are used proven components inside.

**Potential free contact** in many types of standard or for easy retrofitting.

The **safety-related design** features provide an **optimum operation safety** to the enduser as well as to the installation and service specialist.

**Unauthorized access not possible without recognition.** The front panel with fixed service flap can be secured with the lower housing part. So there is open accessibility to the test valves and to the front cover screw.

An opened and lockable service flap provides free access to the tube connections.

Robust **3-way test valves** allow a time-saving and convenient function testing of the device or the entire leak detector system.

**Inadvertent and undetected misalignment of the test valves is thus excluded.**

After completion of the work on the system, the service flap can only be closed completely if the 3 way test valves are in the position of normal operation.

The product features described above apply equally to the ASF vacuum and pressure leak detectors.

**The air dryer** on the pressure leak detectors D9 and D29 **can be changed easily by a bajonet coupling.**
## Übersicht Leckanzeiger / Pressure Leak Detectors

<table>
<thead>
<tr>
<th>Type</th>
<th>Einsatzbereiche; Eigenschaften / Application *</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9</td>
<td>Zulassung Z-65.23-109 EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A DIN 6624 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>DIN 6619 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>DIN 6623 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>FP&gt;55°C / R10,R11(F) R12 (F+), Al, All, AII</td>
</tr>
<tr>
<td></td>
<td>Druck / Pressure Alarm ≥ 330 mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>Unter- / oberirdisch Under / above ground</td>
</tr>
</tbody>
</table>

| D29  | Zulassung Z-65.26-410 Betriebsdruck ≤ 0,1 bar |
|      | FP>55°C / R10,R11(F) R12 (F+), Al, All, AII |
|      | Druck / Pressure Alarm: 1,1 bar |
|      | Pumpe |
|      | Unter- / oberirdisch Under / above ground |

| D25  | Zulassung Z-65.26-250 Betriebsdruck ≤ 16 bar |
|      | FP>55°C / R10,R11(F) R12 (F+), Al, All, AII |
|      | Nur unterirdisch Only underground |

| D26  | Zulassung Z-65.26-249 Betriebsdruck ≤ 17 bar |
|      | FP>55°C / R10,R11(F) R12 (F+), Al, All, AII |
|      | N2 |
|      | Automatic |
|      | Unter- / oberirdisch Under / above ground |

* Weitere Details – siehe Dokumentation / Montageanleitung des jeweiligen Leckanzeigers / Further application details see in the product documentation and installation instruction.
<table>
<thead>
<tr>
<th>Type</th>
<th>Einsatzbereiche; Eigenschaften / Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV F</td>
<td>Tankinnenhülle Tank with Lining</td>
</tr>
<tr>
<td></td>
<td>Zulassung Z-65.22-2</td>
</tr>
<tr>
<td></td>
<td>Tiefpunkt / down to tank bottom</td>
</tr>
<tr>
<td></td>
<td>Nur / only FP &gt;55°C, AIII</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -34mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A</td>
</tr>
<tr>
<td></td>
<td>Working Pressure ≤ 3 bar</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>ONLY FP &gt;55°C, AIII</td>
</tr>
<tr>
<td>III F</td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Zulassung Z-65.22-2</td>
</tr>
<tr>
<td></td>
<td>Flachbodentank Flat Bottom Tank (DIN 4119)</td>
</tr>
<tr>
<td></td>
<td>Nur / only FP &gt;55°C, AIII</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A</td>
</tr>
<tr>
<td></td>
<td>Working Pressure ≤ 3 bar</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>ONLY FP &gt;55°C, AIII</td>
</tr>
<tr>
<td>V8</td>
<td>Stainless Steel Standard DIN 6601</td>
</tr>
<tr>
<td></td>
<td>Zulassung Z-65.22-5</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Flachbodentank Flat Bottom Tank (DIN 4119)</td>
</tr>
<tr>
<td></td>
<td>Nur / only FP &gt;55°C, AIII</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A</td>
</tr>
<tr>
<td></td>
<td>Working Pressure ≤ 3 bar</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>ONLY FP &gt;55°C, AIII</td>
</tr>
<tr>
<td>V13</td>
<td>Stainless Steel Option DIN 6601</td>
</tr>
<tr>
<td></td>
<td>Zulassung Z-65.22-143</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Flachbodentank Flat Bottom Tank (DIN 4119)</td>
</tr>
<tr>
<td></td>
<td>Nur / only FP &gt;55°C, AIII</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A</td>
</tr>
<tr>
<td></td>
<td>Working Pressure ≤ 3 bar</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>ONLY FP &gt;55°C, AIII</td>
</tr>
<tr>
<td>V33</td>
<td>Stainless Steel Standard DIN 6601</td>
</tr>
<tr>
<td></td>
<td>Zulassung Z-65.22-6</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Flachbodentank Flat Bottom Tank (DIN 4119)</td>
</tr>
<tr>
<td></td>
<td>Nur / only FP &gt;55°C, AIII</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>Pumpe</td>
</tr>
<tr>
<td></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td></td>
<td>EN 12285-2 / DIN 6616/Form A</td>
</tr>
<tr>
<td></td>
<td>Working Pressure ≤ 3 bar</td>
</tr>
<tr>
<td></td>
<td>Vacuum Alarm ≥ -330mbar</td>
</tr>
<tr>
<td></td>
<td>ONLY FP &gt;55°C, AIII</td>
</tr>
</tbody>
</table>

* Weitere Details – siehe Dokumentation / Montageanleitung des jeweiligen Leckanzeigers / Further application details see in the product documentation and installation instruction
<table>
<thead>
<tr>
<th>Type</th>
<th>Einsatzbereiche; Eigenschaften / Application *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V80Ex H</strong></td>
<td>EN 12285-1 / DIN 6608 / Teil 2</td>
</tr>
<tr>
<td>Zulassung</td>
<td>Z-65.22-217</td>
</tr>
<tr>
<td>PTB 99</td>
<td>ATEX 2037 X</td>
</tr>
<tr>
<td><em>V80Ex N</em></td>
<td>Zulassung</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Zulassung</td>
<td>Z-65.22-398</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Zulassung</td>
<td>Z-65.22-399</td>
</tr>
</tbody>
</table>

* Weitere Details – siehe Dokumentation / Montageanleitung des jeweiligen Leckanzeigers / Further application details see in the product documentation and installation instruction
Accessory Programm:

We also offer a wide range of accessories to connect our leak detectors to the different tanks or pipes, as well as other installation components to complete the leak detection system, e.g. water separators, flame arrestors, liquid barriers, enclosure with external alarm signal, heatings, valves, filters, test equipment.

<table>
<thead>
<tr>
<th>Flame Arrestor</th>
<th>Liquid Barrier</th>
<th>Test Equipment</th>
</tr>
</thead>
</table>

Further information see: [www.asf-leckanzeiger.de](http://www.asf-leckanzeiger.de).
Leak Detectors

Data Sheets
LEAK DETECTOR TYPE D9 – PRESSURE PRINCIPLE
- without / with Manifold

Field of application:
- Underground and aboveground double-walled tanks with a monitoring space permitted to an pressure up to 0.6 bar.
- With an appropriate manifold system, up to 6 underground tanks can be monitored with one leak detector - the overall monitoring space volume may not exceed 8 m³.
- Tanks without leak detection fluid in the monitoring space.

Stored liquids: Water-endangering liquids, also with a flash point ≤ 55° C

Approval: General Design Permit (DIBT) No. Z-65.23-109
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure.
It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the pressure principle. Visual and audible alarms are triggered by a pressure drop as a result of leaks in the tank walls, above or below the liquid level. Ambient air is drawn by the pump through an integrated air dryer and pumped with a max. relative humidity of 10% into the monitoring space. Small system leakages are balanced by the pump automatically.
An integrated pressure valve on the pump protects the tank against damage ($P_{ÜS}$).

Switching values:
- Pump “off” $P_{Poff}$ 450
- Pump “on” $P_{Pon}$ 375
- Alarm “on” $P_{Aon}$ 325
- Alarm “off” $P_{Aoff}$ 410
- ÜSV “open” $P_{ÜS}$ 490
(All values are approximate)

Drying beads: Pay attention to the right size of the air dryer.

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE D29 – PRESSURE PRINCIPLE

Field of application:
- Underground / aboveground double-walled pipes with an appropriate monitoring space, operated at ambient pressure.
- With an appropriate manifold system, up to 6 underground pipes can be monitored with one leak detector - the overall monitoring space volume may not exceed 10 m³.

Stored liquids: Water-endangering liquids, also with a flash point ≤ 55°C

Approval: General Design Permit (DIBT) No. Z-65.26-410
Tested by TÜV Nord, Hamburg

Assembly site: Within dry, frost-protected area, or outside into a protective enclosure. It is not allowed to install the leak detector in an ex-zone!

Function: The leak detector works on the pressure principle. Visual and audible alarms are triggered by a pressure drop as a result of leaks in the pipe. Ambient air is drawn by the pump through an integrated air dryer and pumped with a max. relative humidity of 10% into the monitoring space. Small system leakages are balanced by the pump automatically. An integrated pressure valve on the pump protects the system against damage ($P_{US}$).

Switching values: in bar
- Pump "off" $P_{Poff}$ 1,5
- Pump "on" $P_{Pon}$ 1,3
- Alarm "on" $P_{Aon}$ 1,1
- Alarm "off" $P_{Aoff}$ 1,4
- ÜSV "open" $P_{USV}$ 1,65
(All values are approximate)

Drying beads: Pay attention to the right size of the air dryer.

Note: Detailed data in the documentation / assembly instruction.

Standard: EU Standard for Leak Detection Systems Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE D25 – PRESSURE PRINCIPLE
- Nitrogen

Field of application:
- Double-walled underground pipes with an appropriate monitoring space and max. operating pressure of 16 bar.
- Operated without stationary nitrogen bottle
- With an appropriate manifold system, up to 8 underground pipes can be monitored with one leak detector, the overall monitoring space volume may not exceed 10 m³.

Stored liquids: Water-endangering liquids, also with a flash point $\leq 55^\circ$ C

Approval: General Design Permit (DIBT) No. Z-65.26-250
Tested by TÜV Nord, Hamburg

Assembly site: Within a dry, frost-protected area, or outside in a protective enclosure. It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the pressure principle. Visual and audible alarms are triggered by a pressure drop as a result of leaks in the pipe.
Nitrogen is led from an external bottle to the leak detector and into the monitoring space, up to the adjusted monitoring pressure. Afterwards, the external bottle will be disconnected from the leak detector.
Max. operating pressure of the pipe: 16 bar
Max. allowed monitoring pressure: 21 bar
The alarm ON has be adjusted at least 1 bar over the operating pressure of the pipe.

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE D26- PRESSURE PRINCIPLE - Nitrogen

Field of application:
- Double-walled underground or aboveground pipes with an appropriate monitoring space and max. operating pressure of 17bar\(^1\)
- For operation with stationary nitrogen bottle or external supply.
- With an appropriate manifold system, up to 8 underground or aboveground pipes can be monitored with one leak detector - the overall monitoring space volume may not exceed 1.2 m\(^3\).

Stored liquids: Water-endangering liquids, also with a flash point \(\leq 55^\circ\) C

Approval: General Design Permit (DIBT) No. Z-65.26-249
Tested by TÜV Nord, Hamburg

Assembly site: Within dry, frost-protected area, or outside into a protective enclosure. It is not allowed to install the leak detector in an ex – zone.!

Function: The leak detector works on the pressure principle. Visual and audible alarms are triggered by a pressure drop as a result of leaks in the pipe. Nitrogen is led from an external bottle to the leak detector and into the monitoring space, up to the adjusted monitoring pressure. Small system leakages are balanced by the system.
Max. operating pressure of the pipe: 17bar
Max. allowed monitoring pressure: 21bar
The alarm ON has be adjusted at least 2 bar over the operating pressure of the pipe.

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems Class 1, EN 13160 part 1 to 7

1) Type D26/4 only for underground pipes.
LEAK DETECTOR TYPE “VAKUMATIK IIIF”
VACUUM PRINCIPLE

Field of application:

- The leak detector is applicable for double-walled tanks (providing the monitoring space is suitable for the connection of the leak detector).
- Tanks, which have been monitored by liquid controlled leak detection so far, can be monitored via the version IIIF in the future. A certain amount of the liquid in the monitoring space has to be removed.
- The viscosity of the stored liquid has to be considered (height and diameter of the tank)

Stored liquids: Water-endangering liquids regarding approved listing, with a flash point > 55°C

Approval: General Design Permit (DBT) No. Z-65.22-2
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure. It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Others constructions are using a separate exhaust line with an additional liquid barrier. Small system leakages are balanced by the pump automatically.

Switching values:

<table>
<thead>
<tr>
<th>Switching</th>
<th>Value in mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump “off”</td>
<td>( P_{Poff} ) -450</td>
</tr>
<tr>
<td>Pump “on”</td>
<td>( P_{Pon} ) -375</td>
</tr>
<tr>
<td>Alarm “on”</td>
<td>( P_{Aon} ) -325</td>
</tr>
<tr>
<td>Alarm “off”</td>
<td>( P_{Aoff} ) -410</td>
</tr>
</tbody>
</table>

(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE “VAKUMATIK IV F”
VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for single-walled tanks with a lining system and the suction line down to the bottom of the tank
- The viscosity of the stored media has to be considered (height and diameter of the tank)

Stored liquids: Water-endangering liquids regarding approved listing, with a flash point > 55°C

Approval: General Design Permit (DIBT) No. Z-65.22-2
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure.
It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Others constructions are using a separate exhaust line with an additional liquid barrier. Small system leakages are balanced by the pump automatically.

Switching values:
in mbar
Pump “off” \( P_{\text{Poff}} \) -80
Pump “on” \( P_{\text{Pon}} \) -65
Alarm “on” \( P_{\text{Aon}} \) -34
Alarm “off” \( P_{\text{Aoff}} \) -50
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V8 — VACUUM PRINCIPLE
- for flat base tanks and double walled pipes

Field of application:
- The leak detector is applicable for double-walled bottoms, or flat base tanks (providing the monitoring space is suitable for the connection of the leak detector).
- It is also applicable for double-walled pipes with an operating pressure of max. 3bar.

Stored liquids: Water-endangering liquids regarding approved listing, with a flash point > 55°C

Approval: General Design Permit (DIBT) No. Z-65.22-5
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure.
It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the vacuum principle.
Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level.
The vacuum pump draws air from the monitoring space through suction line.
Normally, the exhaust air is pumped back into the tank. Others constructions are using a separate exhaust line with an additional liquid barrier.
Small system leakages are balanced by the pump automatically.

Switching values: in mbar
Pump “off” $P_{\text{Poff}}$ -450
Pump “on” $P_{\text{Pon}}$ -375
Alarm “on” $P_{\text{Aon}}$ -325
Alarm “off” $P_{\text{Aoff}}$ -410
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V13 — VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for double-walled tanks (providing the monitoring space is suitable for the connection of the leak detector).
- It is also applicable for tanks made of concrete with a lining system.
- This type of leak detector is mainly used in the chemical industry.
- All parts of the leak detector, which may come in contact with the stored liquid are made of high resistance materials.
- The viscosity of the stored media is to be considered (height and diameter of the tank).

Stored liquids: Water-endangering liquids regarding approved listing, with a flash point > 100°C

Approval: General Design Permit (DIBT) No. Z-65.22-143
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure. It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Small system leakages are balanced by the pump automatically.

Switching values:

<table>
<thead>
<tr>
<th>Function</th>
<th>Switching Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump &quot;off&quot;</td>
<td>( P_{P_{\text{off}}} \approx -450 ) mbar</td>
</tr>
<tr>
<td>Pump &quot;on&quot;</td>
<td>( P_{P_{\text{on}}} \approx -375 ) mbar</td>
</tr>
<tr>
<td>Alarm &quot;on&quot;</td>
<td>( P_{A_{\text{on}}} \approx -325 ) mbar</td>
</tr>
<tr>
<td>Alarm &quot;off&quot;</td>
<td>( P_{A_{\text{off}}} \approx -410 ) mbar</td>
</tr>
</tbody>
</table>

(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V33 – VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for double-walled tanks (providing the monitoring space is suitable for the connection of the leak detector).
- The leak detector is applicable for single-walled tanks, with a lining system and suction line down to the bottom of the tank.
- The leak detector is applicable for double-walled bottoms, or flat base tanks (providing the monitoring space is suitable for the connection of the leak detector).
- All parts of the leak detector, which may come in contact with the stored liquid are made of high resistance materials (e.g. stainless steel).
- The viscosity of the stored media is to be considered (height and diameter of the tank)

Stored liquids: Water-endangering liquids regarding approved listings (e.g. DIN6601) with a flash point > 55°C

Approval: General Design Permit (DIBT) No. Z-65.22-6
Tested by TÜV Nord, Hamburg

Assembly place: Within dry, frost-protected area, or outside into a protective enclosure.
It is not allowed to install the leak detector in an ex - zone!

Function: The leak detector works on the vacuum principle.
Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level.
The vacuum pump draws air from the monitoring space through suction line.
Normally, the exhaust air is pumped back into the tank.
Small system leakages are balanced by the pump automatically.

Switching values: in mbar
Pump “off” $P_{\text{Poff}}$ -450
Pump “on” $P_{\text{Pon}}$ -375
Alarm “on” $P_{\text{Aon}}$ -325
Alarm “off” $P_{\text{Aoff}}$ -410
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V80 EX – Version “H”

VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for double-walled tanks, for double-walled bottoms, or flat base tanks (providing the monitoring space is suitable for the connection of the leak detector).
- The viscosity of the store media is to be considered (height and diameter of the tank).
- It is also be applicable for double-walled pipes with max. operating pressure of 6bar.

Stored liquids: Water-endangering liquids regarding approved listing, also with a flash point ≤ 55° C, temperature class T4, explosion group IIA, (IIB-option)

Approval: General Design Permit (DIBT) No. Z-65.22-217
Tested by TÜV Nord, Hamburg
ATEX Certificate PTB99 ATEX 2037 X

Assembly site: The mechanical enclosure can be installed in the ex zones 1 and 2. The switch enclosure must be installed outside the ex zones, in dry, frost-protected areas or outside into a protective enclosure.

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level.
The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Small system leakages are balanced by the pump automatically.

Switching values: in mbar
Pump “off” $P_{\text{Poff}}$ -450
Pump “on” $P_{\text{Pon}}$ -375
Alarm “on” $P_{\text{Aon}}$ -325
Alarm “off” $P_{\text{Aoff}}$ -410
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V80 EX – Version “N”

VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for single-walled tanks, with a lining system and a suction line to the bottom of the tank.
- It is applicable for double-walled tanks with the suction line to the bottom of the tank.
- The viscosity of the stored media is to be considered (dimensions of the tank).

Stored liquids: Water-endangering liquids regarding approved listing, also with a flash point ≤ 55° C, temperature class T4, explosions group IIA, (IIB-option)

Approval: General Design Permit (DIBT) No. Z-65.22-217
Tested by TÜV Nord, Hamburg
ATEX Certificate PTB99 ATEX 2037 X

Assembly site: The mechanical enclosure can be installed in the ex zones 1 and 2. The switch enclosure must be installed outside the ex zones, in dry, frost-protected areas or outside into a protective enclosure.

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Small system leakages are balanced by the pump automatically.

Switching values: in mbar
- Pump “off” $P_{Poff}$ -80
- Pump “on” $P_{Pon}$ -65
- Alarm “on” $P_{Aon}$ -34
- Alarm “off” $P_{Aoff}$ -50
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V90 – Version “H”

VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for double-walled tanks, for double-walled bottoms, or flat base tanks (providing the monitoring space is suitable for the connection of the leak detector).
- The viscosity of the store media is to be considered (height and diameter of the tank).
- It is also applicable for double-walled pipes with max. operating pressure of 6bar for liquids with flame point >55°C, for flame point <55°C only for pipes operated at ambient pressure.

Stored liquids: Water-endangering liquids regarding approved listing, also with a flash point \( \leq 55^\circ \text{C} \), temperature class T4, explosion group IIA, (IIB-option)

Approval: General Design Permit (DIBT) No. Z-65.22-399 ; Z-65.25-400
Tested by TÜV Nord, Hamburg

Assembly site: The leak detector fulfils the requirements for the Ex protection guidelines temperature class T4 and explosion group IIA/B, but must be installed outside of Ex zones, in dry, frost-protected and well ventilated areas.

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Small system leakages are balanced by the pump automatically.

Switching values: in mbar
- Pump “off” \( P_{\text{Poff}} \) -450
- Pump “on” \( P_{\text{Pon}} \) -375
- Alarm “on” \( P_{\text{Aon}} \) -325
- Alarm “off” \( P_{\text{Aoff}} \) -410
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
LEAK DETECTOR TYPE V90 – Version “N”

VACUUM PRINCIPLE

Field of application:
- The leak detector is applicable for single-walled tanks, with a lining system and a suction line to the bottom of the tank.
- It is applicable for double-walled tanks with the suction line to the bottom of the tank.
- The viscosity of the stored media is to be considered (dimensions of the tank).

Stored liquids: Water-endangering liquids regarding approved listing, also with a flash point ≤ 55°C, temperature class T4, explosion group IIA, (IIB-option)

Approval: General Design Permit (DIBT) No. Z-65.22-399
Tested by TÜV Nord, Hamburg

Assembly site: The leak detector fulfills the requirements for the Ex protection guidelines temperature class T4 and explosion group IIA/B, but must be installed outside of Ex zones, in dry, frost-protected and well ventilated areas.

Function: The leak detector works on the vacuum principle. Visual and audible alarms are triggered by a pressure increase as a result of leaks in the tank walls, above or below the liquid level. The vacuum pump draws air from the monitoring space through suction line. Normally, the exhaust air is pumped back into the tank. Small system leakages are balanced by the pump automatically.

Switching values: in mbar
Pump “off” $P_{Poff}$ -80
Pump “on” $P_{Pon}$ -65
Alarm “on” $P_{Aon}$ -34
Alarm “off” $P_{Aoff}$ -50
(All values are approximate)

Note: Detailed data in the documentation / assembly instructions.

Standard: EU Standard for Leak Detection Systems
Class 1- EN 13160 part 1 to 7
Manufacturer:

Gardner Denver Thomas GmbH
Benzstrasse 28
82178 Puchheim
Germany

Telefon: +49 (0) 89 80900 – 1170
Fax: +49 (0) 89 80900 – 1179
Mail: info@asf-leckanzeiger.de
Internet: www.asf-leckanzeiger.de
www.thomas-leak-detection.com