

Leakage Detection and Localization System for Pipelines, Tank Farms and Chemical Sites

Unveiling the hidden leaks at a very early stage avoids severe accidents, detrimental chemical effects on the environment, and significant follow-up costs.

Challenge

Aging effects like corrosion and erosion or other threats like vibrations affecting chemical tanks and pipes will eventually lead to leaks. Although constructional and operational improvements have brought a constant downward trend in pipeline failures in recent years, the average spill size – if one occurs – is still the same as 40 years ago. Most leaks typically start with pinhole corrosion and grow slowly over time until they are causing a severe accident with high impact. Commonly used leakage detection systems based on surveillance of the pipeline’s flow parameters can detect leaks only at high spill rates (that is in the final stage of the leak after a large total spill).

Solution

LEOS® detects and localizes very small leaks at an early stage in large industrial installations, resulting in minimal follow-up costs in case of a leak. Therefore, it contributes to avoiding severe accidents, especially in highly sensitive ecological systems.

The large number of projects already completed shows that LEOS

- is a state-of-the-art solution on the highest technical level and able to detect leakages with the lowest spill rates independent of the operating conditions of the pipeline,
- allows safe and cost-efficient pipeline routing even through ecologically sensitive or densely populated areas,
- contributes to public acceptance, especially in terms of controversial projects,
- covers a wide range of applications and detectable substances.

The performance of the system has been verified by numerous in-situ leak simulation tests:

- Detects typically 1 L/h (liquids) or 100 L/h (gases) after 2 to 24 hours
- Localization better than 0.5% of the tube length
- Requires only vapor phase, no liquid contact
- Works also in water-saturated soil.

LEOS is approved by the U.S. Army Corps of Engineers and Environmental Agencies in Alaska, Germany and other states. So far, all leaks have been detected, even leaks on nearby pipelines have been found.



Typical applications

Customer benefits

LEOS:

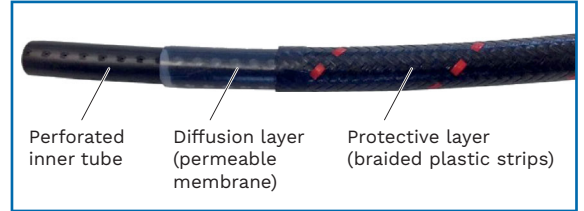
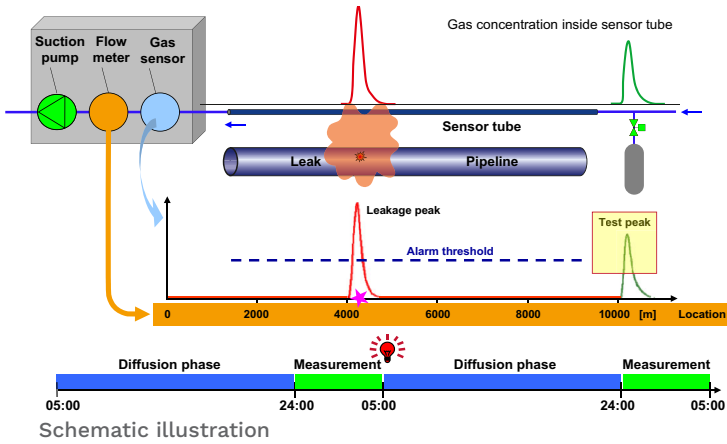
- Saves operating expenses and protects assets
- Reduces capital expenditures by optimizing pipeline routing even through fragile terrain
- Increases reliability and availability by advanced high-sensitivity leakage detection
- Minimizes harmful effects on the environment by leak spills
- Increases project acceptance, especially in highly-sensitive ecological systems (even under arctic conditions).

Technical information

LEOS principle of operation is based on an air-tight “vapor sensing tube” (“sensor tube”) which is permeable for gases and vapors. If there is a leak, the medium carried by the pipeline comes in contact with the sensor tube, penetrates through the tube wall, and forms a local high-vapor concentration inside the tube. In adjustable time intervals, the tube line is automatically purged, and the air-gas mixture is analyzed by a measuring station. If the alarm threshold is exceeded, a “leakage alarm” is triggered, and the leakage is localized based on the air flow and time of signal peak arrival.

Main features

- Large variety of detectable media (gases and liquids)
- System is functionally independent of the pipeline’s operating conditions and the climatic situation
- No contact with liquid phase required
- Works also in water-saturated soil
- Extremely high detection sensitivity
- High accuracy of leak localization
- Automatic integral self-test with every measuring cycle



Permeable “sensor tube”



Key figures

More than **40 years** of operating experience

More than **300 km** of monitored pipelines

45 km maximum length of single tube section

References

North America

- USA (Crude oil)

Western Europe

- Spain (Ethene oxide)
- Norway (Jet fuel)
- Austria (Natural gas)
- Poland (Fuels)
- Germany (Crude oil, gasoline, diesel, jet fuel, gasoil, ethene, propene, butane, carbon monoxide, chlorine)

Eastern Europe and Russia

- Slovakia (Crude oil)

Asia

- China (Natural gas)

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