

WATER LEAK DETECTION

How to locate water leaks with the hydrogen method

Leaking water networks are a major concern in many areas. Undetected leaks can result into water waste, financial losses and inconvenience for the end user. By promptly identifying and repairing leaks, you can significantly reduce wastes, prevent damages and have a positive economic and environmental impact.

Application

Utility companies undertake regular surveys of their water pipe networks to check for leaks. Using tracer gas to detect water leaks is an excellent method primarily when leaks are difficult to find (small leaks) or when water is intermittently distributed or distributed through plastic pipes. This document describes the advantages of hydrogen as tracer gas for leak detection on water pipes, drained or in service, and explains how to locate leaks with help of the [XRS9012 Hydrogen Leak Detector](#) from INFICON.

Traditional Methods

Several methods are used to locate leaks on water distribution systems, each with its own advantages and limitations. The choice of method depends on factors such as the type of pipe, the water pressure, the expected leak location, the area to inspect and the resources available. Traditional leak location technologies include acoustic leak detection methods, visual inspection, thermal imaging and the use of ground penetrating radars. While there are many methods available, not all of them are suitable for all situations. Locating leaks in very deep pipes can be difficult, loud background noise can interfere with the detection of acoustic signals, and most of the technologies used are not sensitive enough to detect small leaks. Professional leak detection services typically use a combination of these technologies to effectively locate and repair water pipe leaks.



The consequences of unattended leaks can be both costly and disruptive. Early detection helps prevent such damage and the associated repair expenses.

Hydrogen method

Locating leaks with hydrogen tracer gas requires the use of an inexpensive gas mixture (95%N₂/5%H₂). This gas mixture is environmentally friendly, non-toxic (approved as food additive), non-flammable, non-corrosive and available at most common gas suppliers.

Inject the gas

Fill the pipe with tracer gas and ensure it has reached the entire pipe length by measuring gas in the far end

Locate the leak

Walk along the pipe and detect any gas in the surface. Clear alarm indications will guide to the leak point

Verify the repair

Repair the leak and verify. No need to vent tracer gas after leak location

The solution from INFICON

Another common method is injecting tracer gas into the pipe system and let leak detectors detect the gas escaping from the leak. The tracer gas method to detect water leaks is an excellent tool primarily when:

- leaks are small or difficult to find
- water is distributed through non-metallic pipes
- pipes are limited in size and volume (sub-mains and service pipes)
- pinpointing must be precise

Preparation

Information about the location of the pipe, its size and length are important factors for a successful leak detection. Preparation for leak detection begins by emptying the pipe. Isolate the section to test, inject the gas at low pressure (0,5 - 1 bar) in one end and release it in the other end. Thus will ensure the entire pipe length is filled with tracer gas. Wait until the gas rises to the surface. The time required for preparation can vary considerably depending on the soil material and the depth of the pipe.

MATERIAL	DEPTH	TIME*
Dry sand	1m	20 min
Dry soil/wet sand	1m	1h
Wet soil/dry clay	1m	4h
Wet clay	1m	12h
Asphalt	5cm	up to several hours
Concrete	20cm	several hours

*Approximate time for gas to come to the surface can vary significantly depending on ground and pipe conditions.

Leak location

Walk the pipe searching for leaks with help of the XRS9012 hydrogen leak detector and the surface probe 8612. By creating a small vacuum, the bell probe effectively draws air samples from the ground and facilitates leak location. Walk along the path, stopping approximately every 50 cm to draw new samples. The unit is selective to hydrogen and will detect gas from very small leaks, even through asphalt and concrete. As soon as the leak is approached, sound and LED indicators on the unit's display will alert the operator and guide him to the precise leak position (typically ± 1 m). The solution from INFICON is suitable for distribution and service pipes up to 30 cm in diameter.

Advantages of leak location with hydrogen tracer gas

- fast leak localization
- precise pinpointing
- minimized disruption and costs
- use of a renewable tracer gas



The **XRS9012 Hydrogen Leak Detector** features a wide range of accessories for leak detection on live and emptied pipes, indoors and outdoors, and in all types of materials. The unit can also be used as a complement to already existing tools when looking for a known leak.

Locating leaks on live pipes (in service)

Locating leaks on pipes out of service is easier and more efficient. However, to minimize service interruptions and inconvenience to connected customers, utilities may prefer to perform leak location on pipes in service. Although the procedure is the same, the following should be considered when planning leak location:

- More attention to be paid to gas injection
- Longer time for gas to fill the pipe (measure the gas in the far end or check the color of the water to determine if gas has reached the entire pipe. Milk colored water indicates the presence of tracer gas)
- Delayed surface indication of leak

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