

METHANE EMISSION MONITORING

Leak detection at waste water treatment plants

Methane is a potent greenhouse gas. The European Commission intends to come forward shortly with a proposal to update the Urban Waste Water Treatment Directive* and reduce methane emissions in this sector. By accurately controlling and measuring methane emissions from waste water treatment plants, the overall environmental impact can be significantly reduced.

Application

Methane is a very potent greenhouse gas with 84 times the global warming potential of CO₂ over a period of 20 years. As methane decomposes significantly quicker than CO₂, any reduced methane emissions have a faster positive effect on global warming. Efforts to reduce greenhouse gas emissions have also led to increased interest in emission monitoring, as well as recovery and utilization of methane from waste water treatment as a means of reducing the overall carbon footprint of these facilities. This document describes the advantages of monitoring methane emissions at waste water treatment plants, and explains how to locate leaks with help of the IRwin Methane Leak Detector from INFICON.

Traditional Methods

Traditional leak detection aimed to quickly detect toxic and combustible gases before they created dangerous situations, rather than monitoring emissions to reduce the carbon footprint. Emissions from waste water plants contain significant concentrations of gases such as CO, CO₂ and H₂S in addition to high humidity levels. This "contaminants" pose difficulties for most conventional instruments, particularly when attempting to detect minor leaks. Most methane leak detectors available in the market rely on semiconductor-based sensor technology. This sensor technology is fairly broadband and responds to a wide range of VOCs (Volatile Organic Compounds), combustible gases and even changes in humidity, which triggers false alarms. The only way to reduce false alarms would be to significantly increase the alarm threshold. However, a high threshold leads to missed leaks.



The diverse environment of a waste water treatment plant requires the use of different probes. IRwin's modular probe system is designed to meet all needs.

How we do it

The proprietary IR technology in combination with the modular probe system will allow emission monitoring in contaminated backgrounds with ppm to 100 volume percent leak detection and pinpointing.

Robust sensor technology

Turn on the instrument and start looking for leaks within a few minutes

Modular probe system

Change probe depending on the task within a few seconds

Documentation

Results are easily transferred into pdf-reports

* See European Union Methane Action Plan: https://energy.ec.europa.eu/document/download/f9a49150-903e-46a6-aec7-f2c21272e9e0_en?filename=EU_Methane_Action_Plan.pdf

The solution from INFICON

The intrinsically safe IRwin® Methane Leak Detector is an intuitive, robust and fast instrument specially developed for demanding applications where methane leaks need to be identified and pinpointed. The instrument uses a proprietary infrared technology to measure all the way from the ppm range up to 100 vol% CH₄. The technology offers an instrument that is selective to methane and recovers fast after any major gas exposure. These are key features to avoid false alarms and speed up the daily work. Additionally, the IR system is much more stable over time than semiconductor based instruments, which minimizes the need of calibration, maintenance and repair.

IRwin is not significantly affected by the surrounding conditions and gases. The table below shows IRwin compared to a market leader, semi based instrument.

CROSS SENSITIVITY	IRWIN TYPICAL READING	SEMI INSTRUMENT TYPICAL READING
10 ppm H ₂	0 ppm	5 ppm
5 vol% H ₂	0 ppm	>500 ppm**
Tox mix (2.2 vol% CH ₄ , 40 ppm CO, 40 ppm H ₂ S, 2.0 vol% CO ₂)	2.2 vol% CH ₄ is predominant compared to other gases	2.2 vol% CH ₄ is predominant compared to other gases
Dry air (Synthetic air)	0 ppm	0 ppm*
Normal air (20C, 40% rH)	0 ppm	0 ppm
Damp air (steam from hot water)	0 ppm	>25 ppm
Car exhaust	0 ppm	>25 ppm

* Air humidity will affect the performance of a semi-sensor. Dry conditions will slow the response down or even give negative response.

** Recovery time significantly affected. 15-20 minutes to recover back to 0 and slow response after that.

Modular probes system

The diverse environment of a WWTP (buried pipes, accessible elevated pipes, confined spaces with potentially flammable methane levels etc.) requires the use of different probes. IRwin offers an innovative modular probe system that allows operators to switch from one probe to another in a matter of seconds. Furthermore, its lightweight design offers the advantage of carrying several probes at the same time, by simply clipping them onto a belt. Some of IRwin's accessories are unique, such as the bell probe, which draws gas samples through most surfaces, significantly reducing the need for bar holes to pinpoint leaks in buried pipelines.

Advantages of IRwin methane leak detector

As waste water treatment practices continue to evolve and an efficient identification of any leaking methane will play a crucial role, IRwin offers a cost-efficient solution for all types of tasks that the operator might face during the daily operation.

- versatile device
- modular accessories
- easy operation
- low cost of ownership



IRwin Methane Leak Detector
complete with hand probe



Documentation

IRwin features a built-in GPS functionality and a log function to record the daily work with date, time, leak rates etc. Logfiles can be downloaded within seconds and transferred via Bluetooth to either a mobile phone or a computer. All findings can then be easily converted into a report with all leaks clearly marked on a map.