

Application Article 232

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General leakage in fuel storage

Summary

Owners and operators of fuel storage facilities are subject to regulations and codes of practice aimed at preventing leaks of fuel into the environment and ensuring prompt and effective clean-up in the event of a leak. Environmental contamination can come from spills, overfill of storage tanks and corrosion or deterioration of storage tanks – both above and below ground. Reactive action once a major leak has been discovered is costly and can have serious health and environmental implications. Modern PID instruments, however, offer a cost effective means of routinely monitoring facilities, enabling leaks to be detected at the very earliest stages before a minor problem becomes a major incident.



Introduction

Fuel is an inherently hazardous substance, being highly volatile and readily burning within its vapour phase. This makes leaks highly dangerous when sources of ignition are present, so owners and operators of fuel storage facilities employ safety measures to ensure leaks are detected well before the quantities of fuel needed to cause an explosion escape. Just as serious, however, are much smaller leaks which may go undetected for long periods, but which can lead to environmental problems and significant health concerns. Aromatic hydrocarbons such as benzene and toluene are known carcinogens, while other hydrocarbons and petrol additives represent health risks.

The need for regular monitoring

International research in 1990 estimated that of the millions of underground storage tanks containing fuels and chemicals, as many as 25% of them could be leaking to some degree. Similar pictures could be expected across other regions. If hazardous components of petrol such as benzene get into groundwater, then there is a major risk of contamination of water supplies. Above ground, where there is the potential for leaks in storage tanks due to degradation, damage or corrosion, there is the risk of benzene and other chemicals being released into the air.

Benzene is a particularly hazardous chemical: the effects of high exposure include headache, dizziness, nausea and tiredness, while long term exposure of excessive levels is a direct cause of leukaemia. It also attacks the liver, kidneys, lungs, heart and brain, and can cause DNA strand breaks and chromosomal damage. Additives to petrol such as anti-knock chemicals are also known carcinogens. While a leak of petrol likely to cause an explosion would be readily smelled, a small leak might not be noticed yet could still pose a significant health risk: with benzene, legislation governs exposure limits of no higher than 1ppm averaged over an eight hour day, or 5ppm for 15 minutes.

Modern tanks and pipework are fitted with leak detection systems, but it is not always easy to make a financial case for replacing a perfectly serviceable existing tank, and certainly it is extremely costly to replace existing underground storage tanks. Regular monitoring is, therefore, essential to detect any leak before it becomes a major problem.

Facility monitoring using PID VOC detectors

PID instruments such as the PhoCheck Tiger from Ion Science provide a simple and cost-effective solution to regular monitoring of fuel storage facilities. Photoionisation detection (PID) has been proven to be the ideal technology for detecting volatile organic compounds and other hazardous chemicals at ppb levels.

The Ion Science PhoCheck Tiger is a robust, hand-held instrument that provides a dynamic detection range of 1ppb to 20,000ppm, offering the widest detection range of any VOC detector on the market. It employs advanced, patented Fence Electrode technology to provide increased resistance to humidity and contamination. Ready to use instantly, it requires no complex set-up procedures, yet provides the best available VOC detection and software features available.



Ion Science PID detectors have been independently verified as the best performing PID technology available today. The best result will always be a zero contamination result, but regular monitoring means environmental protection is never left to chance.

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