



WHITE PAPER

Telecommunications: Protect against hazardous chemicals and confined spaces

▶ The telecommunication industry contains many confined spaces where many hazardous chemicals and noxious gases can collect. With these risks being widely distributed across telecommunications infrastructure, it is imperative that those working within this sector have a clear understanding of the dangers faced during their day to day working life.

Gas detection is not only an important safeguard for workers within the sector from the dangers posed by gas hazards, it is also required from a best practice standpoint, and in some circumstances is necessary for legal compliance. Without the

appropriate knowledge, training and understanding of the risks within the various telecommunications applications, workers and their managers are likely to leave themselves open to a plethora of threats.

Relevant applications

There are many relevant applications here, and therefore those working within them need to be aware of, and prepared for, the various hazards within their environment. In the telecoms sector, even the simplest of above ground termination boxes can create hazards in the form of gases that are generated from the cables running below the ground. Gases such as methane (CH_4), carbon dioxide (CO_2) and hydrogen sulphide (H_2S) can travel through the cable trunking and be emitted when the termination box is opened.

Hub sites and remote buildings are also relevant where cables and trunking may be terminated, there is a risk posed to the worker. An individual who undertakes work within these facilities may be inaccessible and therefore, without appropriate gas detection systems in place, is both at risk from the gases present, and unsupported if exposed.

Confined spaces are abundant in the telecoms industry. Those working underground, or into any space defined as confined, would need the protection given by portable

detection equipment. Often these confined spaces are areas which have been closed, or unentered for a long period of time, meaning that the hazards could be unknown.

Across cable, internet service, satellite and telephone service provision there are many risks. Flammable gas leaks and subsequent explosions are high on the list of dangers. This can occur when methane or hydrogen gas, which is highly flammable, accumulates, and could be from overcharging batteries or seepage from waste sites into neighbouring telecommunications infrastructure. The presence of other harmful gases such as propane or ethylene leaks, is also possible in some places. Wherever these gases build up, specifically in confined spaces, there is a possibility of fire and gas explosions and this risk requires mitigation.



Gas hazards and their dangers

We need to understand why gas hazards are potentially harmful. The three specific gases we will focus on are methane, carbon dioxide and hydrogen sulphide, though other gas types e.g. hydrogen chloride may be present in facilities with electrical cabling.

The primary concern when there is methane present in the air, is flammability, though the displacement of oxygen is also important. Moderate concentrations of methane of only a few percent (4.4%) in air are enough to explode when in contact with an ignition source. High levels of the gas in any space displace the air, and with it oxygen, and can cause anyone within that space to suffer from increased heart rate, breathing, fatigue and emotional outbursts. The less oxygen, the worse the symptoms. Individuals will begin to feel sick, vomit, convulse, lose consciousness and at the very end of the spectrum lapse into a coma, or die.

As well as harming human health, methane is also damaging to the environment as a whole. Methane contributes to ground level ozone which, alongside straining human respiratory systems, also impacts the natural world. It affects the growth of crops, and damages a range of habitats, causing damage to crops, lessening their growing capacity, before causing disease. It also adds to the greenhouse effect warming the planet.

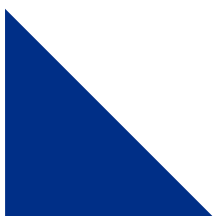
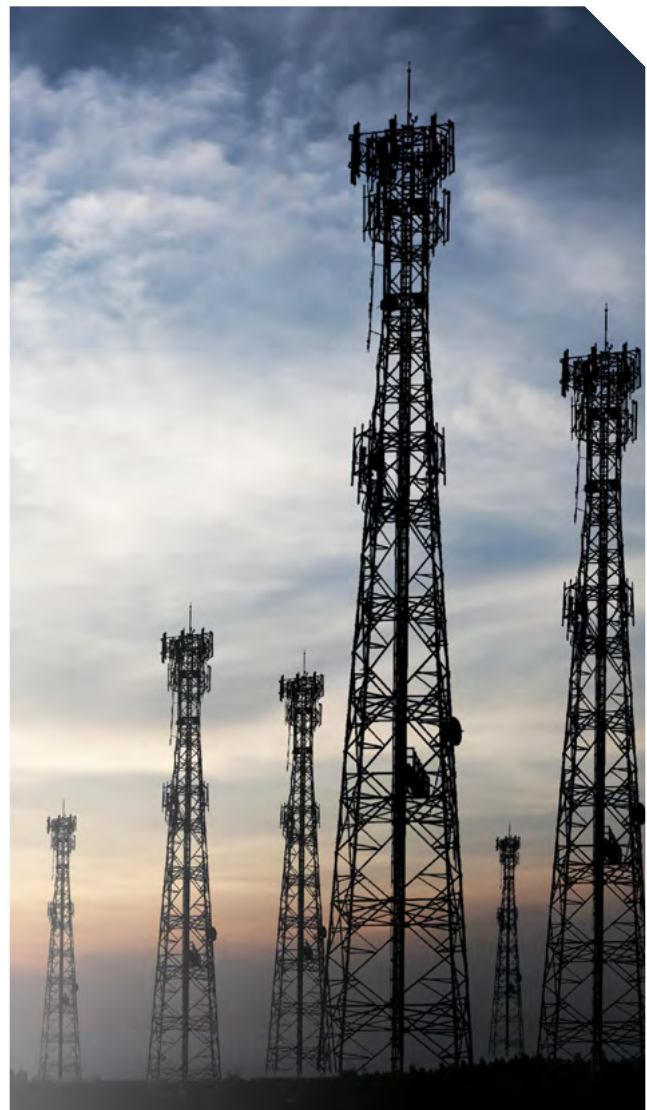
Similarly, carbon dioxide is also harmful to human health and wellbeing, specifically when there are high levels within an environment. Individuals within any space with high concentrations of carbon dioxide will experience migraines, dizziness, perspiration, breathing problems, fatigue, heightened heart rate, and in the most severe cases coma, asphyxiation, and convulsions. Because of this CO₂ has EH40 health limits of 0.5% for 8 hours and 1.5% for 15 minutes. Employees are not allowed to work in conditions exceeding these health limits unless they are using appropriate respirators.

Carbon dioxide emissions are also harmful to the environment, and are the primary greenhouse gas emitted into the environment as a result of human activities. Levels of CO₂ have been increasing over the years, and as a result, retaining the sun's warmth within the earth's atmosphere and causing the planet to heat up – the basic cause of climate change.

Hydrogen sulphide is another toxic gas which is harmful to the environment. When emitted it negatively impacts wildlife around the world. Its toxicity harms habitats, ecosystems and the capacity of the natural environment to thrive as it should.

H₂S sulphide also affects the human respiratory system and eyes. It irritates both systems, and can lead to sleep disorders, headaches, fatigue, strength loss, stomach problems, loss of consciousness and coma. The EH40 limits are 5ppm for 8 hours or 10ppm for 15 minutes. Above this exposure firstly the sense of smell is anaesthetised so you then can't smell the hydrogen sulphide and are unaware of its presence. Then at a higher concentration the nerves telling your lungs to breathe are anaesthetised and that is obviously bad for your health.

With workers at risk of such severe side effects from the presence of these gases, it's imperative to ensure adequate training is given, as well as reliable detection equipment is used.



Within fixed systems there are also other dangers at play that workers need to be both aware of, and prepared for.

Not just gas hazards

It isn't just gas hazards that pose a risk to the individuals working within the array of telecoms applications. Within fixed systems there are also other dangers at play that workers need to be both aware of, and prepared for.

Hub sites, which are defined as central locations acting as a central point for the administering of communication services, are specifically dangerous places. They usually comprise of numerous different buildings, and therefore pose more risks because of the complicated nature of interlinked systems.

The requirement to fit lines and cables, as well as their need for routine maintenance, poses dangers to the workers in the telecoms sector that often spend many hours working at height. These linemen are at risk from wire malfunctions or short circuits, and could be shocked from these strong currents. Alongside shocks, falling from these heights is also a danger and unfortunately does still happen.

Working with electricity is dangerous, especially when the lines being maintained do not have the appropriate electric conductor or are ungrounded.

Working long hours also means workers are exposed to erratic weather conditions. Without the required personal protective equipment, there is the likelihood of individuals developing health issues.

Microwave and RF radiation are also risks in the telecoms sector, due to continually working in the vicinity of electromagnetic waves. Working so close to such powerful radiation can lead to health problems. The link between continued proximity to electromagnetic waves and the development of some health conditions, and chronic fatigue has also been noted.



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Legislation and Regulation

Ensuring compliance with the regulations and guidelines is another way in which those in the telecoms sector can ensure that their operations remain streamlined and support expected standards of health and safety.

In the USA, the Occupational Safety and Health Administration (OSHA) 1910.268 - Telecommunications standard outlines ways in which hazardous materials should be handled within the sector to ensure the safety of those involved. The USA established legislation defines ways in which vehicles transporting large amounts of such materials should operate, and sets limits on the amount allowed to be moved and stored at any given time and site. It relates to the 'work conditions, practices, means, methods, operations, installations and processes performed at telecommunications centres and at telecommunications field installations' and spans the entirety of operations in this sector.

The UK's Health and Safety at Work etc Act 1974 and the Management of Health and Safety at Work Regulations 1999 (MHSW Regulations), cover the legal processes and protocols required to ensure protection from electromagnetic radiation alongside gas hazards, in the telecommunications industry. The legislation expects employers to give their workers the necessary training, guidance and management to keep them safe. This includes conducting risk assessments and "to safeguard so far as is reasonably practicable the health and safety of employees and others".



Crowcon's products monitor the surroundings and help to warn of and thereby help prevent health issues.

Our products

As explored, the importance of gas detection equipment is imperative due to the wide ranging applications in the telecommunications industry, and the likelihood of workers coming into contact with health and environment-harming gases. Crowcon's products monitor the surroundings and help to warn of and thereby help prevent health issues.

The Fixed detection range, spanning [Xgard](#), [Xgard Bright](#), control panels and [Gasmaster](#) can detect flammable gases, toxic gases and oxygen, as well as report their presence and activate alarms or associated equipment when levels are dangerous. With a proven track record within the telecommunications industry, as well as many other industries, Crowcon's fixed detection offering ensures effective gas detection where reliability, dependability and lack of false alarms are imperative.

The Portables range, including [Gasman](#), [Gas-Pro](#), [Tetra 3](#) and [T4](#), offer those on the move the capacity to stay safe from, and aware of, a wide range of sector-specific gas hazards. Whether it's single gas or multi gas hazards that need to be measured, these detectors offer the variety and reliability required. This equipment will also help business's meet their display and certification expectations.

To keep your team safe, meet compliance and legislative requirements, whilst ensuring operational efficiency, gas detection is the key. For more information about which solution works best within your environment, visit our [website](#) or [get in touch](#).

