Gas Detection in Confined Spaces: What You Need to Know!

Concerned about Confined Spaces? Worried about Gas Detection?
More injuries occur in confined spaces as a result of atmospheric conditions than any other issue. Multiple studies have shown this can account for up to 56% of reported injuries[1]. For this reason, safe working procedures and standards for confined spaces necessarily focus on atmospheric monitoring.

Know the hazards
Atmospheres contain a mixture of gases and vapours. Depending of their concentration some are good (such as oxygen) when others are dangerous for health (such as carbon monoxide). In our atmosphere the good normally outweigh the bad, but in confined spaces this is not always the case.

The three risks
When monitoring a work atmosphere, three potential hazards are generally considered:

- Oxygen depletion
- Toxic gases or vapours
- Combustible gases or vapours

Each hazard behaves differently and poses different risks:

- Asphyxiation
- Poisoning
- Explosion/fire

In a simple world, actions can be planned around each observed risk but, when these risks occur in combination, it is not so simple. In fact, many gases have multiple guises or may be hardly noticeable and, as a result, actions can be different based on circumstances.

To illustrate more clearly
Carbon dioxide (CO_2) is generally assumed to be part of the overall atmosphere (0.03 Vol%) and is a gas most people are familiar with. Inerting activities using non-flammable products such as carbon dioxide (CO_2), may displace oxygen within confined spaces.
Most would consider carbon dioxide only an asphyxiate capable of displacing oxygen but it is also a toxic. Without this knowledge some have used oxygen depletion measurement as a measure of safety in respect of carbon dioxide. This is dangerous and has led to fatalities (EN 60079-29-2 clearly states – oxygen detectors must never be used to indicate displacement by CO_2).

Hydrogen sulphide (H_2S) is colourless and smells like rotten eggs; however, the odour cannot be taken as a warning, as smell sensitivity disappears quickly after breathing only a small quantity of H_2S. This gas is often found in sewers, sewage treatment facilities and in petrochemical operations. In addition, H_2S is flammable and explosive in high concentrations. Sudden poisoning may cause unconsciousness and respiratory arrest.

Carbon monoxide (CO) is a colourless, odourless gas generated by combustion of common fuels with insufficient air supply or where combustion is incomplete. CO is often released by accident, through improper maintenance or adjustment of confined space burners and by internal combustion engines. Known as the silent killer, CO poisoning may occur suddenly. Depending upon concentration, CO exposure can lead to headache, dizziness, nausea and death.

[1] https://ohsonline.com/Articles/2018/08/01/We-Must-Change-the-Statistics-of-Confined-Space-Injuries-and-Fatalities.aspx