

Working in a confined space

Asphyxiation, entrapment, physical injury, engulfment and poisoning – these are just some of the hazards that are faced by those working in a confined space. Learn to recognise the hazards!



Often containing a lethal concoction of substances, a confined space can be defined as any chamber, tank, vat, pit, pipe, flue, tunnel, excavation, digester, pumping well or station. Similarly, it can be a sewer, shaft, underground utility duct, boiler, hopper, silo, borehole, steam condenser, culvert, manhole, septic tank, cellar or bunker.

In fact, any area can become a confined space under certain conditions. For instance, an open ditch or open-topped vault becomes a confined space if air circulation inside is poor and a gas that is heavier than air accumulates at the bottom. Equally, a structure or irregular shape becomes confined if pockets of gas or vapour accumulate where air circulation is restricted.

Understanding the hazards

Wherever they might be, confined spaces share a wide variety of potential hazards. Access is usually limited, they are often poorly ventilated and not only can they contain gases and other harmful substances, but escape of rescue from them can be difficult.

The seriousness of the hazard is dependent upon a number of factors such as the location itself and the nature of any work carried out at that location.

The dangers can be dramatically increased, however, if a combination of hazards exists.

Toxic gases or vapours, for instance, can poison or suffocate whilst any work is in progress such as cleaning, welding and painting – which can produce dangerous fumes. It is also possible that toxic gases and vapours created during previous work might still be present upon re-entry, even at a much later date.

A build up of flammable gases or vapours can also burn or explode. In addition, some applications, such as oxy-propane cutting, may create an excess of oxygen which would increase the danger of spontaneous combustion.

An atmosphere containing less than 21% oxygen is known as being oxygen deficient – and can be life-threatening. Caused by oxidation, rusting, fire, growth of bacteria, or displacement of the oxygen by another gas, oxygen deficiency will initially cause drowsiness. It can also lead to euphoria, a “happy” state which usually prevents the victim from realising the dangers before it is too late.

Discarded syringes and bacterial infections can be a major problem in sewers and waterways, as is Leptospirosis, a reportable disease that is usually contracted following exposure to rat urine and disease-carrying rodents.

Engulfment is another major concern. Anyone sinking into or becoming covered by coal, sawdust, flour, grain or sugar can suffocate in a matter of minutes.

Safety through knowledge

The most frequent causes of serious accidents are that people do not always recognise a confined space hazard when they see one. Whilst some gases and materials have distinctive smells, others have no odour whatsoever. For this reason, there are two basic rules when approaching a confined space: always check the atmosphere prior to entry and do not enter unless an observer is present. For absolute safety, everyone should always assume that hazards are present until they know otherwise.

Not only is it essential that the atmosphere is tested before entering the confined area, but monitoring should continue throughout any rescue operation. The confined space should be isolated and all points of access secured.

Armed with portable gas detection instrument, appropriate protective clothing and respiratory protection, everyone entering a confined space should be supported by an observer who remains outside at all times. Likewise, the supporter should be equipped with harness, lifeline and protective equipment, ready to react in case of emergency.

Safe, effective training can help to overcome many of the fears and concerns associated with confined space applications, and typically features simulated training scenarios using manholes, crawl galleries, water, smoke and dimly lit conditions.

Draeger offers a series of confined space training courses at its purpose-built training centre in Blyth (UK). Covering everything from identifying a confined space and its hazards through to examination, assessment and treatment of casualties, the courses also include how to carry out a rescue. Draeger also provides training on the selection, use and care of respiratory protective equipment, as well as the selection and use of gas detection equipment.

Draeger's X-am 3000 is a two or four multi gas detector, ideally suited for confined space monitoring and sampling.