

Guidance for the Evaluation of Method Statements for Entry into Confined Spaces

What is a Confined Space?

Confined Spaces can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions (eg lack of oxygen). It is important to recognise however that just because a space has a limited access or egress it may not be a **Confined Space** if there is no significant risk of death or major injury from hazardous substances or dangerous conditions. These areas are referred to as **Restricted Spaces**.

Some confined spaces are fairly easy to identify, eg enclosures with limited openings:

- Storage tanks;
- Silos;
- Reaction vessels;
- Enclosed drains;
- Sewers.

Others may be less obvious, but can be equally dangerous, for example:

- Open topped chambers;
- Combustion chambers in boilers;
- Ductwork;
- Unventilated or poorly ventilated rooms.

Some places may become confined spaces when work is carried out, or during their construction, fabrication or subsequent modification.

Confined and Restricted Spaces Register

Coventry University maintains a register all areas within its estate which are either Confined Spaces or Restricted Spaces. This register should be referred to when evaluating method statements for entry into these areas, as the register will identify what hazards are present that have defined the area as confined or restricted.

Hazards in Confined Spaces

In order for an area to be considered as a confined space, a specified list of dangerous occurrences must be reasonably foreseeable;

Asphyxiation of personnel due to lack of oxygen – this could be caused by working in a small space for a period of time without sufficient air changes using up oxygen or by the oxygen in the space being depleted by chemical processes such as corrosion.

Asphyxiation of personnel due to the presence of poisonous gas, fume or vapour – this could be caused by residues of hazardous substances in storage tanks or vats, leaks from pipe work in tunnels and ducts, or valves being accidentally opened whilst personnel are working in spaces where gas, fume or vapour is stored.

Asphyxiation of personnel due to free flowing solids – this could be caused by slippage of soil into an excavation or duct, the flow of stored substances such as powder into work areas or the flow of sewage into drains and intercepting chambers.

Drowning of Personnel – this could be caused by the unexpected ingress of water into any space that is being worked in such as; drains, service ducts with water distribution pipes in, cellars and tunnels below the water table. Water from natural sources and from distribution pipe work should be considered.

Loss of consciousness of personnel due to excessive heat – this could be caused by naturally occurring geothermal conditions whilst working underground or the rise of temperature in confined spaces due to the presence of heating pipes, steam pipes and boilers. Heat rise in roof spaces due to solar gain should also be considered.

Fire or explosions – caused by the presence of flammable gas or fume in sufficient quantities to be within the substances lower and upper explosion limit. Fire caused by the ignition of flammable material from cutting, welding and other hot work may cause smoke generation which could put personnel at risk. Oxygen enriched atmospheres due to chemical reactions or use of oxy-gas equipment can create additional hazards.

Precautions for Confined Spaces

As a **minimum** the following precaution should be applied to all confined space work;

1. The entry into the confined space must be subject to the University's Permit to Work System; no other local arrangements or contractors systems should be accepted. There permit must not be issued until a suitable and sufficient risk assessment and safe system of work has been supplied by the company or individuals undertaking the work.
2. The entry into the confined space should involve a minimum of two people, at least one of which should remain outside of the space for the **entire duration** of the task.
3. The whole activity should be supervised by an individual who has the responsibility to ensure that all of the necessary precautions are implemented and must have received training in working in confined spaces.
4. All staff undertaking the work in the confined space must have been trained in the requirements of the Confined Spaces Regulations 1997 and the hazards and controls required when working in confined spaces
5. There should be a suitable rescue plan developed in writing and in place to recover workers who become injured or unconscious during the work; this must not rely on the fire service, University security or any other emergency services.
6. Before entry into the space measurements should be taken to confirm that the oxygen in the area is sufficient to support personnel working in the space, this should be undertaken using calibrated oxygen monitoring equipment and the results should be recorded. Certificates confirming their calibration should be sought.
7. There must be a suitable method of communication between those working in the space and those who may need to instigate a rescue from outside of the space. This could be through unaided voice communication if the distance is small enough or by radio and or mobile telephone where distances are greater. Where communication is needed where a risk of fire or explosion exists communication devices must be suitably constructed to prevent the generation of ignition sources; i.e. intrinsically safe.
8. Safe access and egress to the confined space should be identified in the safe system of work; this may need to provision of ladders and rope access systems. Clear and conspicuous safety signage must identify that entry into areas left open for access is prohibited.
9. Suitable lighting should be available during the task either from existing lighting in the area or supplementary lighting installed during the task. In either case emergency lighting should be available to aid escape in the event of a power failure.

Other Precautions

Depending on the nature of the risk the following precautions will need to be included in the method statement produced by those entering the confined space;

1. The testing of the atmosphere for the presence of known toxic substances in the form of fumes, gas or vapour this should be undertaken using calibrated monitoring equipment and the results should be recorded. Certificates confirming their calibration should be sought.
2. The wearing of personal gas detectors by personnel if the presence of known toxic substances in the form of fumes, gas or vapour could become present in the space during the works. These should be calibrated and certificates confirming their calibration should be sought.
3. Purging areas where a known toxic substance in the form of fumes, gas or vapour will be present in the area. Purging can be undertaken using the forced flow of air or other where flammable gasses and vapours are present by using inert gasses such as nitrogen.
4. Forced ventilation to increase airflow and maintain oxygen levels for those working in a confined space, or exhaust ventilation to remove the presence of known toxic substances in the form of fumes, gas or vapour.
5. The cleaning and removal of residues of hazardous substances which may give off toxic vapours or fume during the work in the confined space.
6. The isolation of gasses and liquids that could flow into the space. Isolation requires the physical disconnection of services in such a way that they cannot be accidentally reconnected. This will usually require using blanking plates, closing and locking off valves or disconnecting and removing pipe work leading to the space. Any devices used to lock off valves should only be removable by those working in and controlling the space.
7. Isolation of mechanical and electrical equipment. Isolation requires the physical disconnection of the flow of power to the equipment in such a way that they cannot be accidentally reenergised. This will usually require isolation and locking off of the plant at the distribution board or at the local isolation switch. Any devices used to lock off equipment should only be removable by those working in and controlling the space.
8. The use of intrinsically safe and spark proof electrical equipment in areas where known flammable substance in the form of dust, fumes, gas or vapour could be present. The use of spark proof tools such as copper and aluminium tools. Tools powered by internal combustion engines should not be permitted in any confined space.
9. The wearing of Personal Protective Equipment (PPE) such as overalls, safety footwear, gloves, and dust masks. Consideration should be given the specification of PPE where a flammable atmosphere may exist as clothing could generate static electricity which could ignite flammable dust, gasses, fumes or vapours.
10. The wearing of Respiratory Protective Equipment (RPE) such as dust masks, respirators, air fed respirators and self-contained breathing apparatus. All RPE should be face fit tested to the worker and be subject to pre-use inspections. Self-contained breathing apparatus should only be used by trained and competent workers and be subject to a formal inspection. Certificates confirming their inspection should be sought.
11. Where flammable atmospheres exist or where known flammable substance in the form of dust, fumes, gas or vapour could be present the earthing and cross bonding of metal items to prevent static discharges. Consideration should also be given to materials that can generate static such as plastics and other man made materials.

12. The prevention of smoking within a reasonable proximity of the entrance to confined spaces where flammable atmospheres exist or where known flammable substance in the form of dust, fumes, gas or vapour could be present.
13. Limiting the time each person works in the confined space particularly where heat accumulations has been assessed as an issue or where comfort issues caused by wearing PPE and RPE are likely to cause individual health issues.

Further Guidance

Further Guidance on safe working in confined spaces is available from the Safety and Risk Management Team, Confined Space Authorisers in the Estates Department and the HSE's guidance note L101 – Safe work in confined spaces. Confined Spaces Regulations 1997 which can be downloaded from the HSE web site <http://www.hse.gov.uk/pubns/priced/l101.pdf>