

Health and Safety Policy Annex S: Confined spaces guidance

Contents

References.....	1
What is a confined space?	1
What are the dangers from confined spaces?	2
What the law says	3
Avoid entering confined spaces	3
Safe systems of work	3
Emergency procedures.....	6
Capabilities of rescuers	6
Guidance flowchart.....	7
Confined space risk assessment, method statement, permit to work.....	8

References

Safe Work in Confined Spaces – Approved Code of Practice (ACOP) L101 as amended

What is a confined space?

It can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions (such as lack of oxygen). Some confined spaces are easy to identify – for example, 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
- vats
- combustion chambers in furnaces and so on
- ductwork
- unventilated or poorly ventilated rooms.

It is not possible to provide a comprehensive list of confined spaces. Some places may become confined spaces when work is carried out, or during their construction, fabrication or subsequent modification.

What are the dangers from confined spaces?

Dangers can arise in confined spaces because of:

- a lack of oxygen. This can occur when:
 - there is a reaction between some soils and the oxygen in the atmosphere
 - following the action of groundwater on chalk and limestone which can produce carbon dioxide and displace normal air
 - in ships' holds, freight containers, lorries and so on, as a result of the cargo reacting with oxygen inside the space
 - inside steel tanks and vessels when rust forms
- poisonous gas, fume or vapour. These can:
 - build up in sewers and manholes and in pits connected to the system
 - enter tanks or vessels from connecting pipes
 - leak into trenches and pits in contaminated land, such as old refuse tips and old gas works
- liquids and solids which can suddenly fill the space, or release gases into it, when disturbed. Free flowing solids such as grain can also partially solidify or 'bridge' in silos, causing blockages which can collapse unexpectedly
- fire and explosions (for example, from flammable vapours or excess oxygen)
- residues left in tanks, vessels and so on, or remaining on internal surfaces, which can give off gas, fume or vapour
- dust which may be present in high concentrations (such as in flour silos)
- hot conditions leading to a dangerous increase in body temperature.

Some of the above conditions may already be present in the confined space. However, some may arise through the work being carried out or because of ineffective isolation of plant nearby (such as leakage from a pipe connected to the confined space). The enclosure and working space may increase other dangers arising through the work being carried out – for example:

- machinery being used may require special precautions, such as provision of dust extraction for a portable grinder or special precautions against electric shock
- gas, fume or vapour can arise from welding or by use of volatile and often flammable solvents, adhesives and so on
- if access to the space is through a restricted entrance, such as a manhole, escape or rescue in an emergency will be more difficult (see emergency procedures).

What the law says

You must carry out a suitable and sufficient assessment of the risks for all work activities for the purpose of deciding what measures are necessary for safety. For work in confined spaces, this means identifying the hazards present, assessing the risks and determining what precautions to take. In most cases, the assessment will include consideration of:

- the task
- the working environment
- working materials and tools
- the suitability of those carrying out the task
- arrangements for emergency rescue.

If your assessment identifies risks of serious injury from work in confined spaces, such as the dangers highlighted above, the Confined Spaces Regulations apply. These regulations contain the following key duties:

- avoid entry to confined spaces (for example, by doing the work from outside)
- if entry to a confined space is unavoidable, follow a safe system of work and put in place adequate emergency arrangements before the work starts.

These duties, and what you need to do, are further described in this document.

Avoid entering confined spaces

You need to check if the work can be done another way so that entry or work in confined spaces is avoided. Better work planning or a different approach can reduce the need for confined space working.

Ask yourself if the intended work is necessary:

- could you modify the confined space itself so that entry is not necessary
- could you have the work done from outside for example
- inspection, sampling and cleaning operations can often be done from outside the space using appropriate equipment and tools
- remote cameras can be used for internal inspection of vessels.

Safe systems of work

If you cannot avoid entry into a confined space, make sure you have a safe system for working inside the space.

Use the results of your risk assessment to help identify the necessary precautions to reduce the risk of injury. These will depend on the nature of the confined space, the associated risk and the work involved.

Make sure that the safe system of work, including the precautions identified, is developed and put into practice. Everyone involved will need to be properly trained and instructed to make sure they know what to do and how to do it safely.

The following checklist is not intended to be exhaustive but includes many of the essential elements to help prepare a safe system of work.

Appointment of a supervisor

Supervisors should be given responsibility to ensure that the necessary precautions are taken, to check safety at each stage and may need to remain present while work is underway.

Are persons suitable for the work?

Do they have suitable experience of the type of work to be carried out and what training have they received? Where risk assessment highlights exceptional constraints as a result of the physical layout, are individuals of suitable build? The competent person may need to consider other factors (such as claustrophobia or fitness to wear breathing apparatus) and medical advice on an individual's suitability may be needed.

Isolation

Mechanical and electrical isolation of equipment is essential if it could otherwise operate, or be operated, inadvertently. If gas, fume or vapour could enter the confined space, physical isolation of pipework and so on needs to be made. In all cases, a check should be made to ensure isolation is effective.

Cleaning before entry

This may be necessary to ensure fumes do not develop from residues and so on while the work is being done.

Check the size of the entrance

Is it big enough to allow workers wearing all the necessary equipment to climb in and out easily and provide ready access and egress in an emergency? For example, the size of the opening may mean choosing airline breathing apparatus in place of self-contained equipment which is bulkier and therefore likely to restrict ready passage.

Provision of ventilation

You may be able to increase the number of openings and therefore improve ventilation. Mechanical ventilation may be necessary to ensure an adequate supply of fresh air. This is essential where portable gas cylinders and diesel-fuelled equipment are used inside the space because of the dangers from build-up of engine exhaust. Warning: carbon monoxide in the exhaust from petrol-fuelled engines is so dangerous that use of such equipment in confined spaces should never be allowed.

Testing the air

This may be necessary to check that it is free from both toxic and flammable vapours and that it is fit to breathe. Testing should be carried out by a competent person using a suitable gas detector which is correctly calibrated.

Where the risk assessment indicates that conditions may change, or as a further precaution, continuous monitoring of the air may be necessary.

Provision of special tools and lighting

Non-sparking tools and specially protected lighting are essential where flammable or potentially explosive atmospheres are likely. In certain confined spaces (such as inside metal tanks), suitable precautions to prevent electric shock include use of extra low voltage equipment (typically less than 25 volts) and, where necessary, residual current devices.

Provision of breathing apparatus

This is essential if the air inside the space cannot be made fit to breathe because of gas, fume or vapour present or lack of oxygen. Never try to sweeten the air in a confined space with oxygen as this can greatly increase the risk of a fire or explosion.

Preparation of emergency arrangements

This will need to cover the necessary equipment, training and practice drills.

Provision of rescue harnesses

Lifelines attached to harnesses should run back to a point outside the confined space.

Communications

An adequate communications system is needed to enable communication between people inside and outside the confined space and to summon help in an emergency.

Check how the alarm is raised

Is it necessary to station someone outside to keep watch and to communicate with anyone inside, raise the alarm quickly in an emergency and take charge of the rescue procedures?

Is a permit to work necessary?

A permit to work ensures a formal check is undertaken to ensure all the elements of a safe system of work are in place before people can enter or work in the confined space. It is also a means of communication between site management, supervisors and those carrying out the hazardous work.

Essential features of a permit to work are:

- clear identification of who may authorise jobs (and any limits to their authority) and who is responsible for specifying the necessary precautions (for example, isolation, air testing and emergency arrangements)
- provision for ensuring that contractors engaged to carry out work are included
- training and instruction in the issue of permits
- monitoring and auditing to ensure that the system works as intended.

Emergency procedures

When things go wrong, people may be exposed to serious and immediate danger. Effective arrangements for raising the alarm and carrying out rescue operations in an emergency are essential.

Contingency plans will depend on the nature of the confined space, the risks identified and, consequently, the likely nature of an emergency rescue.

Emergency arrangements will depend on the risks. You should consider the following:

Communications

How can an emergency be communicated from inside the confined space to people outside so that rescue procedures can start? Don't forget night and shift work, weekends and times when the premises are closed, such as holidays. Also consider what might happen and how the alarm can be raised.

Rescue and resuscitation equipment

Provision of suitable rescue and resuscitation equipment will depend on the likely emergencies identified. Where such equipment is provided for use by rescuers, training in correct operation is essential.

Capabilities of rescuers

They need to be properly trained people, sufficiently fit to carry out their task, ready at hand and capable of using any equipment provided for rescue (for example, breathing apparatus, lifelines and firefighting equipment). Rescuers also need to be protected against the cause of the emergency.

Shut down

It may be necessary to shut down adjacent plant before attempting emergency rescue.

First aid procedures

Trained first aiders need to be available to make proper use of any necessary first aid equipment provided.

Local emergency services

How are the local emergency services (such as Fire Service) made aware of an incident? What information about the dangers in the confined space is given to them on their arrival?

Guidance flowchart

- Confined space risk assessments and method statements approved.
- Before starting work, check for any hazards present (such as lack of oxygen, chemicals or other agents, explosive atmosphere, obstacles).
- As required, establish appropriate control measures (such as forced ventilation, extraction, lighting) and emergency evacuation plans.
- Confirm checks have been carried out to determine a safe atmosphere. (Periodic measurements taken to determine status.)
 - Yes – Has risk been reduced to an acceptable level?
 - Yes – A competent specialist contractor to complete the required works. Ensure emergency evacuation pack is present where appropriate. (Periodic measurements taken to determine status.)
 - No – Relevant tests must be carried out to determine the level of any contaminants and appropriate remedial action to reduce the risk to an acceptable level.
 - No – Relevant tests must be carried out to determine the level of any contaminants and appropriate remedial action to reduce the risk to an acceptable level.

All work in a confined space must have a relevant risk assessment, method statement and, if required, a rescue plan before a permit to work is issued.

Confined space risk assessment, method statement, permit to work

To be completed before entry to any confined space.

Confined space supervisor (print name)	
Confined space supervisor's signature	
Location	
Task	
Date of assessment	
Time of assessment	

The supervisor

Action	Yes	No	Signature
Confirm you have received confined space awareness training			
Confirm you understand hazards in confined spaces			

Hazards and control measures

	Hazard	Yes	No	Risk before (H=high, M=medium, L=low)	Control measures required	Residual risk (H=high, M=medium, L=low)
1.	Is there poor ventilation?					
2.	Is there likely to be low oxygen?					
3.	Is there likely to be high oxygen?					
4.	Are there any toxic gases or vapours?					
5.	Are there any flammable gas or substances?					
6.	Are there any hazardous substances, including asbestos?					

7.	Are there vermin, other animals or biological hazards?					
8.	Is there a risk of gases, fluids or solids entering area?					
9.	Will proposed work change conditions in space?					
10.	Are escape routes more than 200 metres apart?					
11.	Is there sufficient lighting?					
12.	Are there any obstructions, such as pipes, cables, conduits?					
13.	Are any walkways fragile?					
14.	Are there drainage or sewer runs within the space?					
15.	Is there likely to be excessive heat?					
16.	Are ways in and out narrow?					
17.	Other:					
18.	Other:					
19.	Other:					

Method statement

Give a step by step description of how the confined space work will be undertaken.

Rescue plan

Give details of actions to be taken if an operator is unable to leave the confined space unaided.