



نظام الشارقة للسلامة والصحة المهنية  
Occupational Safety & Health Sharjah

حكومة الشارقة  
هيئة الوقاية والسلامة  
Government of Sharjah  
Prevention And Safety Authority



# Code of Practice Management of Confined Spaces

OSHJ-Cop-06

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## 1 Introduction

A confined space has limited or restricted means for entry or exit and is not designed for continuous occupancy. A confined space can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions. Some confined spaces are easy to identify, such as enclosures with limited openings, including but not limited to:

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

Other confined spaces may be less obvious, but can be equally dangerous, including but not limited to:

- Open-topped tanks or chambers;
- Combustion chambers in furnaces;
- 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.

## 2 Purpose and Scope

This Code of Practice (CoP) has been developed to provide information to entities to assist them in complying with the requirements of the Occupational Safety and Health System in Sharjah.

This Code of Practice (CoP) defines the minimum acceptable requirements of the Occupational Safety and Health System in Sharjah, and entities can apply practices higher than, but not lower than those mentioned in this document, as they demonstrate the lowest acceptable level of compliance in the Emirate of Sharjah.

## 3 Definitions and Abbreviations

<b>Entities:</b>	Government Entities: Government departments, authorities or establishments and the like in the Emirate.  Private Entities: Establishments, companies, enterprises and economic activities operating in the Emirate in general.
<b>Risk:</b>	Is the combination of likelihood of the hazard causing the loss and the severity of that loss (consequences).
<b>Risk Assessment:</b>	The systematic identification of workplace hazards and evaluation of the risks associated. This process takes



existing control measures into account and identifies and recommends further control measures where required.

<b>Hazard:</b>	Anything that has the potential to cause harm or loss (injury, disease, ill-health, property damage etc).
<b>Competence:</b>	The combination of training, skills, experience and knowledge that a person has and their ability to apply all of them to perform their work.
<b>Confined Space:</b>	A confined space has limited or restricted means for entry or exit and is not designed for continuous occupancy. Confined spaces include, but are not limited to, tanks, vessels, silos, storage bins, hoppers, vaults, pits, manholes, tunnels, equipment housings, ductwork, pipelines, etc.
<b>Free Flowing Solid:</b>	Is any substance consisting of solid particles and which is of, or is capable of being in, a flowing or running consistency, and includes flour, grain, sugar, sand or other similar material.
<b>Safe System of Work:</b>	A formal procedure that results from systematic analysing of a task in order to identify all the hazards. It defines safe methods to ensure that hazards are eliminated or risks reduced
<b>Work Equipment:</b>	Is any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not).
<b>Use of Work Equipment:</b>	Means any activity involving work equipment and includes starting, stopping, programming, setting, transporting, repairing, modifying, maintaining, servicing and cleaning.

## 4 Roles and Responsibilities

### 4.1 Entity Responsibilities

- Ensure effective procedures are in place to manage confined space work activities;
- Identify all foreseeable hazards involving confined space work, these hazards shall be recorded;
- Ensure all foreseen hazards are risk assessed and effective control measures identified;
- Ensure resources are available to implement adequate control measures required for confined space work activities;
- Ensure health issues related to confined space work are identified and adequately managed;
- Provide adequate information, instruction, supervision and training for employees involved in confined space work;
- Ensure equipment provided for confined space work activities is adequately selected for the task;
- Ensure confined space equipment is inspected, maintained and used safely;



- Ensure safety devices are in place, routinely checked and maintained and checked after any repairs or modifications by a competent person;
- Ensure employees working in confined space are competent;
- Have an adequate emergency response procedure in place;
- Provide rescue equipment to be used in emergencies which is adequately maintained, inspected and available for the planned work activities.

## 4.2 Employee Responsibilities

- Not endanger themselves or others;
- Those involved in confined space work inspect work equipment before each use and report any defects;
- Follow precautionary control measures to ensure work activities are performed safely;
- Cooperate with the entity and receive safety information, instruction, supervision and training.

## 5 Requirements

The entity shall wherever possible avoid the entry into confined space when planning any work activities inside a confined space. The priority shall be always to avoid confined space entry when choosing control measures through adequate risk assessments. If it is not reasonably practicable to prevent entry into a confined space the entity shall assess the risks connected with employees entering or working in the space and also to others who could be affected by the work. The entity must ensure the risk assessor understands the risks involved, be experienced and familiar with the relevant processes, plant and equipment and be competent to devise a safe system of work.

### 5.1 Identification of Confined Spaces

The entity shall ensure that all confined spaces are identified and necessary safety signage provided to warn employees and others. The entry into confined spaces shall be strictly prohibited by establishing an adequate safe system of work. The work activities that require confined space entry shall be identified and assessed adequately by a competent person.

### 5.2 Risk Assessment

The entity shall carry out a suitable and sufficient assessment of the risks for work activities in a confined space to decide what control measures are necessary.

The risk assessment shall identify all the foreseeable risks related to the work activities and any risks introduced due to the work activities being performed in the confined space, including but not limited to:

- The scope and duration of the work;
- Access and egress;
- The physical dimensions of the working environment;
- The risk of oxygen deficiency and enrichment;

- The risk from previous contents, residues and contamination;
- The risk of fire and explosion;
- Hazards that arise from the work;
- Isolation of the confined space;
- Working materials and tools;
- Personal protective equipment (PPE) and respiratory protective equipment (RPE);
- The suitability and competence of the employees carrying out the task;
- Arrangements for emergency response and rescue.

If the risk assessment identifies risks of serious injury from work in confined spaces, then the entity shall:

- Avoid entry to confined spaces;
- Limit the time within the confined space;
- Put in place adequate emergency arrangements before the work starts.

Further information on risk assessment can be found in OSHJ-CoP-01: Risk Management and Control

### 5.3 Safe Systems of Work

The entity shall ensure that once all the significant risks have been identified and it cannot be considered reasonably practicable to carry out the work without entering the confined space, then it will be necessary to develop a safe system of working. The precautions required to create a safe system of work will depend on the nature of the confined space and the hazards identified during the risk assessment.

If confined space entry is required, then a safe system of work will be required, taking into account the following factors, including but not limited to:

- Gas purging;
- Provide supervision;
- Competence for confined spaces working;
- Communication methods and procedures;
- Testing and monitoring of the confined space atmosphere to detect:
  - Hazards generated during the work;
  - Contaminants generated during the work.
- Type of ventilation;
- Removal of residues;
- Isolation from gases and other hazardous materials;



- Liquids and other flowing materials;
- Isolation from mechanical and electrical equipment;
- Selection and use of suitable equipment;
- Personal protective equipment (PPE) and respiratory protective equipment (RPE);
- Portable gas cylinders and internal combustion engines used:
  - Inside the confined space;
  - Near to the entrance of the confined space.
- Gas supplied by pipes and hoses;
- Access and egress;
- Fire prevention and control;
- Lighting inside the confined space;
- Ignition sources;
- Limiting duration of exposure;
- Emergency response and rescue procedure;
- Training.

Once the safe system of work has been developed it shall be documented, implemented, monitored and maintained.

#### **5.4 Permit to Work**

The entity shall ensure that where confined space work activities are to be conducted and there is a reasonably foreseeable risk of serious injury in entering or working in the confined space, the confined space work must be conducted under a written permit to work system.

A written permit to work system should result in a higher standard of safety and supervision.

The confined space work permit system shall also apply to contractors and subcontractors. Confined space work shall not be carried out unless it is authorised and properly supervised by an experienced person who is competent and has knowledge of the work to be carried out, the risks involved and the precautions to be taken.

Further information on permit to work can be found in OSHJ-GL-16: Permit to Work.

#### **5.5 Access and Egress**

The entity shall ensure that confined spaces have safe access and egress openings that are large enough to let employees and equipment through easily. Openings must be large enough to allow for rescue operations to be performed, including sufficient space for rescue personnel wearing breathing apparatus to enter and exit the confined space. Wherever possible, access and egress openings should provide quick and unobstructed access. Practice drills should be held to check that entry and rescue procedures are adequate.

The size of openings to confined spaces needs to be adequate as does access through all divisions, partitions or obstructions within such spaces. Clear safety signs to prohibit unauthorised entry should be prominently displayed next to access openings.

## 5.6 Communication

The entity shall ensure that a system of communication is used, it can be based on speech, sirens, telephone, radio etc., it is important that all messages can be communicated easily, rapidly and between relevant people and are easily understood. Consideration must be given as to whether people wearing breathing apparatus can be understood, or if a process, such as grinding metal, can silence an oral warning. The communication system should also cover the need for those outside the space to raise the alarm and activate emergency rescue procedures.

An adequate communication system shall be established and should enable communication, including but not limited to:

- Between those inside the confined space;
- Between those inside the confined space and those outside;
- To summon help in case of emergency.

Telephone and radios and other equipment should be specially protected so that they do not present a source of ignition where there is a risk of flammable or potentially explosive atmospheres.

## 5.7 Testing and Monitoring the Atmosphere

The entity shall ensure the atmosphere within a confined space is tested by a competent person prior to anyone entering it. Testing shall be for concentration of oxygen, combustible gases or vapours and toxic gases or vapours and shall ensure that as a minimum:

- Atmospheric oxygen concentration levels are between 19.5% and 23.5%;
- The concentration of any toxic gas as determined by the testing required is less than the permissible exposure limit (PEL).

Information concerning previous contents may indicate that the atmosphere may be contaminated. Testing will also be required where the atmosphere was known to be contaminated previously, was ventilated as a consequence, and needs to be tested to check the result.

Where the atmosphere in the confined space may not be safe to breathe and requires testing, the findings of the risk assessment should indicate whether testing should be carried out on each occasion that the confined space is re-entered, even where the atmosphere initially was found to be safe to breathe.

Regular monitoring of the atmosphere will be necessary to check that there is no change in the atmosphere while the work is being carried out, particularly where there is a known possibility of adverse changes in the atmosphere during the works.

The conditions should be continuously monitored when, such as forced ventilation is being used, and where the work activity could give rise to changes in the atmosphere. The exact testing, retesting and monitoring requirements should be identified in the risk assessment and defined by a competent person within the safe system of work.



## 5.8 Ventilation of Confined Spaces

The entity shall ensure that ventilation for all confined spaces is provided. This may be by natural ventilation, such as the opening of manholes or covers to allow fresh air to circulate, or by the means of forced ventilation.

Higher rates of air exchange can be achieved by the use of air movers, induction fans or extractor fans, along with trunking provided so that there is an adequate supply of fresh air to replace the used air. Fresh air should be drawn from a point where it is not contaminated either by used air or other pollutants.

Oxygen should never be introduced into a space to clean the air as this can lead to oxygen enrichment and therefore increase combustibility with some materials and some substances which may be liable to spontaneous combustion.

The ventilation method must take account of the layout of the space, the position of openings and the properties of the contaminants, so that circulation of air for ventilation is effective. Pockets of gas or vapours may collect in complicated spaces, in this instance more complex ventilation systems may be required.

Ventilation of the confined space shall ensure that as a minimum:

- Atmospheric oxygen concentration levels are between 19.5% and 23.5%;
- The concentration of any toxic gas as determined by the testing required is less than the permissible exposure limit (PEL).

## 5.9 Removal of Residues

Cleaning or removal of residues is often the purpose of confined space work. The entity shall ensure, where required, residues shall be removed to allow other work to be undertaken safely.

There are a variety of methods for cleaning the inside of confined spaces to remove hazardous solids, liquids or gas. Cold water washing, hot water washing and steaming will remove many contaminants, while solvents or neutralising agents may be necessary for others. If hot water or steam is used, with or without a solvent, precautions must be taken to ensure that adequate ventilation exists for steam pressure and that condensation does not build up to unacceptable levels.

When steam or solvents are used, these may in themselves create a toxic, suffocating or flammable hazard; even though a space has been cleaned, it must not be entered until it has been tested.

Additional precautions must be taken when dealing with any sludge or heavy deposits, which may release hazardous gases or fumes when disturbed.

## 5.10 Isolation from Gases, Liquids, Flowing Materials, Mechanical and Electrical Equipment

The entity shall ensure confined spaces are isolated from ingress of substances, plant and equipment that could pose a risk to those working within the space.

Electrical isolation must never rely on a switch or fuse. The switchgear or fuse holder must be locked off and the key lodged with the person conducting the work or the authorised person who issued the permit to work.

Mechanical isolation of pipe work should not rely on a single valve or on a non-return valve; these may let substances enter and create a hazard. Where possible, a section of pipe should be removed or a blank or spade should be put into a flange between the valve and the confined space.

### 5.11 Selection and Use of Suitable Equipment

The entity shall ensure employees are provided with information, instruction, supervision and training on how to select and use the equipment. Specific information shall include, but is not limited to:

- Information on any risks that could not be eliminated through control measures;
- The safety features or devices fitted to the equipment and how to use them;
- Requirements for maintenance and repair;
- Requirements for special tools to use or maintain the equipment;
- Personal protective equipment and/or respiratory protective equipment required to be worn when operating the equipment;
- Emergency plan and arrangements.

If there is any possibility of flammable gas existing in a confined space, all tools and equipment including lighting and electrical equipment must be of a non-sparking material. Smoking and naked lights must be strictly prohibited. Control measures shall be implemented to avoid the generation of static electricity with the consequent risk of sparks. Earthing should be considered to prevent static charge build up.

Specially designed low voltage portable lights, while offering protection against electrocution, could still present ignition sources and are not in themselves safer in flammable or potentially explosive atmospheres.

### 5.12 Portable Gas Cylinders and Internal Combustion Engines

The entity shall ensure petrol type internal combustion engines are never used, in or near confined spaces. Diesel and gas fuelled internal combustion engines are as dangerous as petrol fuelled and should not be used unless stringent precautions are taken. Very high levels of ventilation are required, and no engines should be re-fuelled within the space.

Gas cylinders should not normally be used in confined spaces unless special precautions are taken. Gas equipment and pipelines such as welding sets, must be rigorously examined for gas leaks before entry, they should not be left unattended and should be removed when not being used, especially at the end of work periods.

### 5.13 Gas Supplies by Pipes and Hoses

The entity shall ensure the use of hoses and pipes to convey flammable gases or oxygen into confined spaces are restricted or controlled to minimise the risks. Supply valves to the hoses and pipes must be shut off before the hoses and pipes are moved. Hoses and pipes should be removed at the end of working periods. Where hoses and pipes cannot be removed, they should be disconnected from the gas supply at a point outside the space and their contents safely vented.

## 5.14 Personal Protective Equipment (PPE)

So far as is reasonably practicable the entity shall ensure that a confined space is safe to work in without the need for PPE and RPE which should be a last resort, except for rescue work including the work of the emergency services.

A risk assessment of the workplace shall be conducted to decide which, if any, PPE should be required. In deciding which type to issue, the entity shall take into account the risk that the PPE will fit the wearer and allow them to work comfortably. If more than one task is to be performed, the entity should ensure that the PPE is compatible and of use for every task that is to be undertaken.

Whilst the entity shall ensure that any PPE supplied must be worn, the employee in turn shall ensure that they wear the equipment provided.

Further information on PPE can be found in OSHJ-GL-07: Personal Protective Equipment

## 5.15 Respiratory Protective Equipment (RPE)

The entity shall ensure that where RPE is provided or used in connection with confined space entry or for emergency or rescue, it shall be suitable for the purpose for which it is intended to be used, correctly selected and matched both to the job and the wearer.

There are two general types of RPE, based on the principle by which protection is provided to the user. The two types are:

- Respirators;
- Breathing apparatus.

Respirators are devices that rely on filtering contaminants from workplace air before it is inhaled by the user. Respirators are not designed to be used in atmospheres with oxygen deficiency, such as where the concentration of oxygen is below 19.5% or where the concentration of unknown contaminants have not been evaluated.

Filtering face pieces are commonly known as disposable respirators or face masks, they either entirely or substantially consist of filter material. There are two types of these respirators, that are:

- Intended to be used for a maximum of a single shift and not reusable; or
- Intended to be used for more than a single shift and reusable.

Breathing apparatus, which gives an independent supply of breathable air, such as fresh air hose, compressed airline and self-contained breathing apparatus. Breathing apparatus may be used in a confined space or where the concentration of oxygen is below 19.5% or where the concentration of unknown contaminants has not been evaluated.

The key factors to consider in the selection and use of respiratory protective equipment are:

- What type of contaminant the user must be protected against;
- The form of the contaminant;
- How toxic the contaminant is;
- The concentration of the contaminant;

- The duration of exposure to the contaminant;
- The individual sensitivity to the contaminant;
- Fit testing.

## 6 Training

The entity shall ensure that employees involved in confined space work activities are competent and have received formal training on the safe system of work.

The entity shall provide training in languages and in a format that employees understand, including but not limited to:

- Understanding the work to be undertaken, the hazards and the control measures;
- Safe systems of work, permit to work systems and risk assessment;
- The safe selection, inspection, use and maintenance of confined space work equipment and the risks associated with using the equipment and the control measures to be implemented to reduce these risks;
- Use of PPE, RPE and rescue equipment;
- Fire, rescue and emergency response procedures.

Periodic refresher training shall be conducted to ensure employees competency is maintained, including but not limited to:

- Where training certification has expired;
- Where identified as part of a training needs analysis;
- Where risk assessment findings identify training as a measure to control risks;
- Where there is a change in legal requirements;
- Where incident investigation findings recommend refresher training.

Regular refresher training in emergency procedures is essential and practice drills including emergency rescues will help identify whether access and egress procedures are satisfactory.

The entity must record and maintain accurate training records of OSH training provided to employees.

Further information on training can be found in OSHJ-GL-26: Training and Competence.

## 7 Emergency Preparedness and Response

The entity shall be prepared for emergencies, an emergency plan is a document containing the actions the entity will take in an emergency. Performing confined space work activities require the entity to have a robust plan to deal with emergencies.

The entity shall ensure the following, including but not limited to:

- If conducted under permit to work the emergency arrangements must be in place prior to the commencement of the confined space work;

- Warning signs with information on what to do in an emergency are clearly and prominently displayed in Arabic, English and any other relevant language;
- Emergency response personnel are available who can take charge and make decisions on behalf of the entity during an emergency and liaise with emergency services;
- Emergency response personnel are available who are familiar with rescue procedures to ensure the prompt rescue of employees from a confined space;
- Adequate rescue equipment, firefighting and first aid equipment is available for the type of confined space work being conducted;
- Employees are trained in emergency response, including information of first aid arrangements and where first-aiders, first aid equipment and facilities are located;
- Employees are appointed as first-aiders and available at each location and each working shift where confined space work is being conducted.

Further information on first aid can be found in OSHJ-CoP-16: First Aid at Work.

Further information on emergency plans can be found in OSHJ-CoP-18: Emergency Preparedness and Response.

## 8 References

OSHJ-CoP-01: Risk Management and Control

OSHJ-CoP-16: First Aid at Work

OSHJ-CoP-18: Emergency Preparedness and Response

OSHJ-GL-07: Personal Protective Equipment

OSHJ-GL-16: Permit to Work

OSHJ-GL-26: Training and Competence

## 9 Document Amendment Record

<b>TITLE</b>	Management of Confined Spaces		
<b>DOCUMENT AMENDMENT RECORD</b>			
<b>Version</b>	<b>Revision Date</b>	<b>Amendment Details</b>	<b>Pages Affected</b>
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