

**Compliance code**

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# **Confined spaces**

Edition 2

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This compliance code (**Code**) provides practical guidance for those who have duties or obligations in relation to confined spaces under the *Occupational Health and Safety Act 2004* (**OHS Act**) and *Occupational Health and Safety Regulations 2017* (**OHS Regulations**).

The Code was developed by WorkSafe Victoria (WorkSafe). Representatives of employers and employees were consulted during its preparation. It was made under the OHS Act and approved by Robin Scott MP, Minister for Finance.

Duty holders under the OHS Act and OHS Regulations should use the Code together with this legislation. This Code replaces the Confined spaces compliance code 2008 which is no longer in force and effect.

While the guidance provided in the Code is not mandatory, a duty holder who complies with the Code will – to the extent it deals with their duties or obligations under the OHS Act and OHS Regulations – be taken to have complied with those duties or obligations.

If conditions at the workplace or the way work is done raise different or additional risks not covered by the Code, compliance must be achieved by other means. WorkSafe publishes guidance to assist with this at **[worksafe.vic.gov.au](https://www.worksafe.vic.gov.au)**.

Failure to observe the Code may be used as evidence in proceedings for an offence under the OHS Act or OHS Regulations. However, a duty holder will not fail to meet their legal duty simply because they have not followed the Code.

A WorkSafe inspector may cite the Code in a direction or condition in an improvement notice or prohibition notice as a means of achieving compliance.

A health and safety representative (**HSR**) may cite the Code in a provisional improvement notice when providing directions on how to remedy an alleged contravention of the OHS Act or OHS Regulations.

Approval for the Code may be varied or revoked by the Minister. To confirm the Code is current and in force, go to **[worksafe.vic.gov.au](https://www.worksafe.vic.gov.au)**.

# Part 1 – Introduction

## Purpose

1. The purpose of this Code is to provide practical guidance to duty holders about how to comply with their duties under the OHS Act and Part 3.4 of the OHS Regulations associated with **confined spaces** (see paragraphs 6–7 of this Code).

## Scope

2. This Code provides information for duty holders about meeting their obligations under Part 3.4 of the OHS Regulations, as well as providing information about how to identify hazards and control risks associated with working in a confined space. This Code also provides information for duty holders about compliance with the OHS Act, where relevant (for example, an employer's duty to consult with employees).
3. It is not possible for this Code to deal with every risk associated with work in a confined space a duty holder may encounter at their workplace. The guidance in the Code needs to be considered with regard to the particular characteristics and circumstances of the workplace.

## Application

4. This Code applies to employers, employees and self-employed persons in any workplace in Victoria which has a confined space, and to designers, manufacturers and suppliers of plant that includes, or is intended to include, a confined space. Additionally it may be useful for HSRs.

**Note:** The word **must** indicates a legal requirement that has to be complied with. The words **need(s) to** are used to indicate a recommended course of action in accordance with duties and obligations under Victoria's health and safety legislation. The word **should** is used to indicate a recommended optional course of action.

## Background

5. Confined spaces present a unique occupational health and safety problem because any associated hazards may not be readily apparent. Confined spaces usually have poor ventilation and may be of small volume, so hazardous atmospheres can accumulate quickly. Work in a confined space can involve the risk of serious injury or death by exposing employees to harmful atmospheric contaminants or engulfment. Employees from many different occupations and industries may be required to enter and work in a confined space that contains a hazardous work environment. Many hazards, such as toxic gases and vapours, can also be exacerbated in a confined space. See **Appendix B** for examples of incidents that have occurred.

## What is a confined space?

6. A confined space is determined by the hazards associated with a set of specific circumstances (restricted entry or exit, hazardous atmospheres or risk of engulfment) and not just because work is performed in an enclosed small space. The effect of physical or chemical agents may be exacerbated in a confined space.

7. Under the OHS Regulations, a confined space means a space in any vat, tank, pit, pipe, duct, flue, oven, chimney, silo, reaction vessel, container, receptacle, underground sewer or well, or any shaft, trench, tunnel or other similar enclosed or partially enclosed structure, which meets the following conditions:

- it is entered, or is intended to be, or is likely to be, entered by any person; and

**Note:** Entry to a confined space occurs when a part of the body enters the space and there is a risk the person may be overcome or incapacitated by the conditions within the space.

- it has a limited or restricted means of entry or exit that makes it physically difficult for a person to enter or exit the space; and
- it is, or is intended to be, at normal atmospheric pressure while any person is in the space; and
- it contains (or is likely or intended to contain):
  - an atmosphere that has a harmful level of any contaminant, or
  - an atmosphere that does not have a safe oxygen level, or
  - any stored substance that could cause engulfment (other than liquids); and

- is not a shaft, trench or tunnel that is a mine or is part of the workings of a mine. [OHS Regulations r5](#)

See paragraphs 42–43 for more information on how to determine whether a space is a confined space.

8. The risks of working in confined spaces include:

- loss of consciousness, injury or death, due to the immediate effects of airborne contaminants
- serious injury or death from fire or explosion caused by the ignition of flammable contaminants
- asphyxiation resulting from oxygen deficiency
- asphyxiation resulting from engulfment by stored solids (such as grain, sand, flour or fertiliser).

9. Examples of potential confined spaces include:

- storage tanks, tank cars, process vessels, pressure vessels, silos and other tank-like compartments
- pits and degreasers
- pipes, sewers, sewer pump stations, wet and dry wells, shafts and tunnels
- shipboard spaces entered through small hatchways or access points, cargo tanks, ballast or oil tanks, or void spaces.

10. Many other types of structures may also meet the definition of a confined space.

11. Some structures may become confined spaces when work that generates atmospheric contaminants is carried out, or during their construction, fabrication or subsequent modification.

# Part 1 – Introduction

12. It is important to note that temporary control measures such as providing temporary ventilation or achieving a satisfactory pre-entry gas test may not alter the designation of a space as a 'confined space'.

**Note:** When construction work, as defined by regulation 321 of the OHS Regulations, involving a confined space is performed, it is high risk construction work. Employers may have additional specific duties in relation to the work. See [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au) for more information about high risk construction work.

## Who has duties?

13. **Employers** must provide and maintain, so far as is reasonably practicable, a working environment for their employees that is safe and without risks to health. [OHS Act s21](#)  
To ensure that employers provide a working environment that is safe and without risks to health, they must eliminate risks to health and safety so far as is reasonably practicable, and if it is not reasonably practicable to eliminate the risks to health and safety, reduce those risks so far as is reasonably practicable. [OHS Act s20](#)

For information about what *reasonably practicable* means when complying with Part 3 of the OHS Act or the OHS Regulations, see the WorkSafe Position – *How WorkSafe applies the law in relation to reasonably practicable* at [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au).

14. Employers must, so far as is reasonably practicable, monitor conditions at any workplace under the employer's management and control. [OHS Act s22\(1\)\(b\)](#)

15. Employers must also ensure, so far as is reasonably practicable, that persons other than employees are not exposed to risks to their health or safety arising from the business activities undertaken by the employer. [OHS Act s23](#)
16. An employer's duties under section 21 and section 35 of the OHS Act extend to independent contractors engaged by the employer and any employees of an independent contractor working in the workplace. However, these extended duties are limited to matters over which the employer has control or would have control if there was not an agreement in place purporting to limit or remove that control. [OHS Act s21\(3\) and s35\(2\)](#)
17. Regulations that set out the way an employer complies with their duties to employees under section 21 and section 35 of the OHS Act also apply with respect to independent contractors engaged by the employer and any employees of the independent contractors in relation to matters over which the employer has control. [OHS Regulations r8\(1\)](#)
18. Employers also have a number of specific risk control duties under the OHS Regulations relating to work in a confined space, for example ensuring appropriate signage is in place and that employees are issued with permits before entering the confined space (see Part 3 of this Code). [OHS Regulations r61 and r63](#)
19. If employers design or modify their workplace, including any tool, machinery or equipment used, they may also take on additional duties under the OHS Act. It is therefore recommended that employers read Part 2 of this Code which applies to designers, manufacturers and suppliers. [OHS Act s27–30](#)

# Part 1 – Introduction

20. **A self-employed person** must ensure, so far as is reasonably practicable, that persons are not exposed to risks to their health or safety arising from the business activities of the self-employed person. OHS Act s24 and OHS Regulations r11
21. **Employees**, while at work, have a duty to take reasonable care for their own health and safety and that of others who may be affected by their acts or omissions in the workplace. Employees must also cooperate with their employer's efforts to make the workplace safe (for example by following any information, instruction or training provided). OHS Act s25(1)
22. **Designers and manufacturers** of plant that includes, or is intended to include, a confined space, have a duty to design (designer duty) and manufacture (manufacturer duty) the plant so that the need for a person to enter the space is eliminated or reduced so far as is reasonably practicable. This includes controlling any risks associated with the means of entry to and exit from the confined space (see Part 2 of this Code). OHS Regulations r51 and r52
23. **Suppliers** of plant that includes, or is intended to include, a confined space that is intended to be used at a workplace must ensure, so far as is reasonably practicable, that the plant they supply is safe and without risks to health, if used for a purpose for which it was designed, manufactured or supplied. In addition, suppliers must provide each person to whom they supply the plant with adequate information about how to use it safely. OHS Act s30
24. Suppliers of plant that includes, or is intended to include, a confined space must ensure, so far as is reasonably practicable, that the plant to be supplied has been designed and manufactured in accordance with the OHS Regulations. OHS Regulations r53

## The risk management process

25. This Code outlines a **risk management process** (see diagram 1) to help employers comply with their duties under the OHS Act and OHS Regulations. It involves the following steps:
  - **Identifying** hazards associated with work in a confined space (see Part 3.1 of this Code)
  - **Assessing**, where necessary, any risks associated with work in a confined space (if unsure of appropriate risk controls) (see Part 3.2 of this Code)
  - **Controlling** risks associated with work in confined spaces (see Parts 3.3 and 3.4 of this Code)
  - **Monitoring, reviewing**, and where necessary, **revising** risk controls (see Part 3.3 of this Code)

**Note:** There are certain circumstances where each step of the risk management process needs to occur. See Parts 2 and 3 of this Code for further information.

Diagram 1 – The risk management process



# Part 1 – Introduction

## Consultation

26. Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. This duty to consult also extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control (see paragraph 16). [OHS Act s35](#)

**Note:** The characteristics of the workplace will have an impact on the way consultation is undertaken. For example, consider:

- the size and structure of the business
- the nature of the work
- work arrangements (such as shift work)
- characteristics of employees (such as language or literacy).

See [worksafe.vic.gov.au](http://worksafe.vic.gov.au) for more information on consultation.

27. An employer has a duty to consult with employees (including HSRs) when identifying or assessing hazards or risks to health or safety at the workplace, making decisions about measures to control such risks and proposing changes that may affect the health or safety of employees at the workplace. [OHS Act s35](#)
28. It is important to consult with your employees as early as possible at each step of the risk management process, including when planning to:
- introduce new work or change existing work
  - select new plant
  - refurbish, renovate or redesign existing workplaces
  - carry out work in a new environment.

29. Employers who are required to consult on a matter must share information about the matter with employees, including relevant contractors and HSRs, give them a reasonable opportunity to express their views, and take those views into account before making a decision. If employees are represented by an HSR, the consultation must involve that HSR (with or without the involvement of the employees directly). If the employer and the employees have agreed to procedures for undertaking consultation, the consultation must be undertaken in accordance with those procedures. [OHS Act s35](#)
30. Employers also need to encourage employees and contractors to report any problems immediately so that risks can be managed before an injury occurs.
31. Employees and contractors may have practical suggestions or potential solutions that can be implemented.

## Information, instruction, training and supervision

32. Employers must provide employees with any necessary information, instruction, training or supervision to enable them to perform their work in a way that is safe and without risks to health. [OHS Act s21\(2\)\(e\)](#) This duty also extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control.
33. The mix of information, instruction, training and supervision required will depend on the frequency and type of hazards in the workplace, and how much employees already know about the risks and necessary risk control measures.

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34. Information, instruction and training must cover the nature of hazards associated with work in a confined space, including the need for risk control measures and how to properly use them. **OHS Regulations r73** For example, ensuring employees understand the hazards associated with working in a confined space, how to follow safety procedures and how to use risk control measures implemented for their protection.
35. Employers must provide supervision where such supervision is necessary for safe work. **OHS Act s21(2)(e)** For example, employers need to supervise employees in relation to entry and exit of a confined space. This is particularly important with employees who are more vulnerable in their work areas, such as new, inexperienced or young employees.
36. Where the employees undertaking the work are new or inexperienced, such as young workers, it is often necessary to provide additional supervision.
37. An employer must ensure, in relation to work in a confined space, that the relevant employees are given information, instruction and training in:
  - the nature of any hazards associated with the confined space
  - the need for, and proper use of, measures to control risk
  - the selection, use, fit, testing and storage of any personal protective equipment (PPE)
  - the contents of any relevant confined space entry permit, and
  - emergency procedures, which may include rescue and first aid procedures in confined spaces. **OHS Regulations r73**
38. In addition, when providing information, instruction and training to employees and independent contractors to ensure work in a confined space is able to be performed in a manner that is safe and without risks to health, it is important to include information about:
  - entering or working in confined spaces
  - the importance of reporting hazards
  - the importance of following risk controls
  - the requirement to be given an entry permit prior to entering a confined space
  - the importance of continuous communication between those inside the confined space with those outside the confined space
  - the importance of maintaining equipment used in relation to work in confined spaces.
39. Training programs should be practical and 'hands on'. The structure, content and delivery of the training needs to take into account any special requirements of the employees and independent contractors being trained (eg specific skills or experience, disability, language, literacy and age).
40. Employers need to review their training program regularly and also when:
  - there is change to work processes, plant or equipment
  - there is an incident
  - new control measures are implemented
  - there is a request by an HSR
  - changes are made to relevant legislation, or
  - any other issues impact on the way the work is performed.

Employers should also keep records of induction and training given to employees.

41. Refresher training needs to be provided as appropriate for a particular workplace. The frequency of refresher training should be determined having regard to how often employees and independent contractors are required to carry out tasks associated with entry to or work in confined spaces.

## How to determine whether a space is a confined space

42. A confined space is determined by its structure and a specific set of circumstances. This may include restricted entry or exit, hazardous atmospheres or risk of engulfment. When work is performed in an enclosed small space it does not necessarily mean it is a confined space. See paragraph 7 for a full definition.
43. Use the questions in flow chart 1 to determine whether a space is a 'confined space' for the purposes of the OHS Regulations. Examples of both confined spaces and spaces that are not confined spaces are available in table 1, which applies the confined space definition to various circumstances.

### Example 1 – When does a structure become a confined space?

A structure may or may not be a confined space depending on the circumstances when the space is entered.

For example, the intended use of the space and the possible presence of atmospheric contaminants will determine whether a space is defined as a confined space under Part 3.4 of the OHS Regulations.

A new, clean road tanker that is not intended to contain an atmosphere with a harmful level of any contaminant is not considered a confined space under the OHS Regulations, even if a person enters it. However, a road tanker that has previously contained a harmful atmosphere and is required to be entered for maintenance purposes is a confined space, unless it has been purged or cleaned and no longer contains a harmful atmosphere.

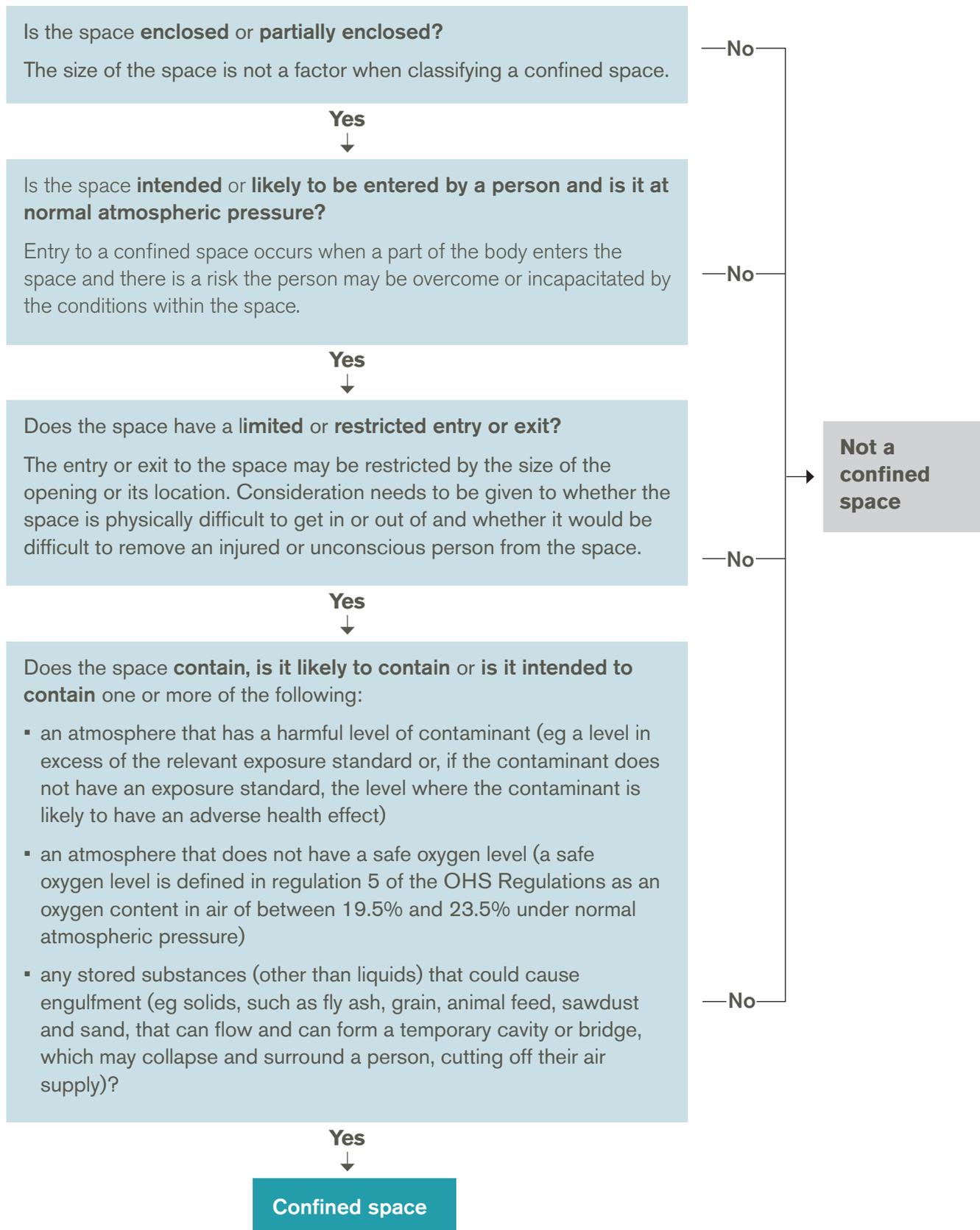
### Example 2 – Is the space safe to enter?

If the space is not a confined space under the OHS Regulations, it does not necessarily mean that the space is safe to enter. It is important to note that the general duties under the OHS Act may still apply.

For example, a cool room would not ordinarily be a confined space as it would not have a restricted means of entry or exit. However, using an LPG forklift inside a cool room can be a risk to health because of a dangerous build-up of carbon monoxide gas. In this case the space is still not a confined space under the OHS Regulations because it does not have a restricted means of entry or exit. In both of these circumstances, the general duties under the OHS Act apply.

# Part 1 – Introduction

## Flow chart 1 – Is the space a confined space?



# Part 1 – Introduction

**Table 1 – Is the space a confined space?**

- (i) An answer of no to any of the questions below does not necessarily mean that the space is safe to enter. The general provisions of the *Occupational Health and Safety Act 2004* may apply.
- (ii) Where there is any uncertainty as to whether the confined space criteria is met, either:
  - seek more information as required, or
  - consider the criteria to be met and apply Part 3.4 of the OHS Regulations.

Description of space	Confined space criteria						Confined space?  If the answer to A, B, C and at least one of the questions in D is yes, then the space is a confined space.
	A Is the space enclosed or partially enclosed?	B Is it likely to be entered and is it at normal atmospheric pressure?	C Does the space have a limited or restricted entry or exit?	D Does the space contain, or is it intended to contain:			
				a harmful level of atmospheric contaminants?	an unsafe oxygen level?	substances that could cause engulfment?	
Sewer with access via a vertical ladder	✓	✓	✓	✓	✓	✗	Yes
Dislodging grain from a silo with sole access through a manhole at the top of the silo	✓	✓	✓	✗	✗	✓	Yes
Stocktake using LPG forklifts in a fruit cool store	✓	✓	✗	✓	✗	✗	No
Cleaning spilled cadmium pigment powder in a shipping container	✓	✓	✗	✗	✗	✗	No
Inspecting a fuel tank in the wing of an aircraft	✓	✓	✓	✓	✗	✗	Yes
Dislodging a sludge blockage in a drain pit	✓	✓	✓	✓	✓	✗	Yes
Internal inspection of a new, clean tank prior to commissioning	✓	✓	✓	✗	✗	✗	No
Internal inspection of an empty cement silo through a door at ground level	✓	✓	✗	✗	✗	✗	No
Blood pit with access via a vertical ladder	✓	✓	✓	✓	✓	✗	Yes

# Part 2 – Duties of designers, manufacturers and suppliers

44. The design and manufacture of any plant that includes or is intended to include a confined space can significantly improve safety in relation to the risks associated with entry into the confined space. A safe and effective design can prevent hazards and eliminate or reduce many of the risks associated with work in the confined space before it is introduced into the workplace. All phases of the life of plant, from design and use through to demolition and disposal, should be considered when designing plant that includes, or is intended to include, a confined space.

## Eliminating or reducing the need for entering the confined space

45. Under the OHS Regulations, designers and manufacturers of plant that includes or is intended to include a confined space must eliminate the need for any person to enter the space, so far as is reasonably practicable. If this is not reasonably practicable, the need for any person to enter the space must be reduced so far as is reasonably practicable. **OHS Regulations r51 and r52** Where relevant, the following features should be incorporated at the design and installation stages:
- outlets and facilities for cleaning, to eliminate the need for entry
  - durable lining materials that require minimal cleaning and do not react with other materials likely to be contained in the confined space
  - a structure and mechanical parts that provide for safe and easy maintenance, to reduce the need for any person to enter.

## Entry and exit

46. If it is not reasonably practicable to eliminate the need for entering the confined space, designers and manufacturers must ensure that any risk associated with the means of entry to and exit from the space is eliminated, so far as is reasonably practicable, or if elimination is not reasonably practicable, the risk is reduced so far as is reasonably practicable. **OHS Regulations r51 and r52** Entry to and exit from a confined space is safer when openings are comparably larger than the persons and equipment that are likely to require access.
47. Where relevant, the following features should be incorporated at the design, manufacture and installation stages of plant with a confined space:
- entrances and exits large enough to allow people wearing protective clothing and equipment (including rescue equipment) to pass through
  - a safe means of access to and within the confined space (including fixed ladders, platforms and walkways). The designer or manufacturer should consider any relevant Australian Standards (for example, *AS 1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation*)

# Part 2 – Duties of designers, manufacturers and suppliers

- entrances and exits unobstructed by any fittings or equipment that could impede rescue. The means of entry to and exit from a confined space needs to be kept clear and free from any encumbrances during work in the confined space. Where things such as electrical cables, leads, hoses and ventilation ducts are required to pass through an access hole, a second access hole may be needed
  - enough entrances and exits to provide sufficient access to the confined space. For example, the spacing of access holes on sewers, where the absence of such access holes over considerable lengths may affect both the degree of natural ventilation and the ease with which a person can be rescued.
  - any hazards and risks associated with entry into the confined space which were identified by the designer or manufacturer
  - the risk controls necessary to ensure work in and around the confined space is safe
  - the systems of work and competencies necessary for safe work in and around the confined space
  - any necessary testing or inspections required to ensure work can be safely undertaken.
50. See the Plant compliance code for more information about duties for suppliers of plant.

## Suppliers

48. Suppliers of plant that includes or is intended to include a confined space must ensure, so far as is reasonably practicable, that the plant has been designed and manufactured in accordance with the OHS Regulations, before the plant is supplied.  
**OHS Regulations r53**
49. Before plant with a confined space is supplied, such as when buying or procuring plant, suppliers should confirm that:
- the need for any person to enter the space has been eliminated so far as is reasonably practicable, or
  - if it is not reasonably practicable to eliminate the need for entering the space, any risk associated with the means of entry to and exit from the space has been reduced so far as is reasonably practicable, in relation to:
    - the safe installation, use and where relevant, dismantling of the confined space

# Part 3 – Duties of employers

## Part 3.1 – Hazard identification

51. An employer or self-employed person must, so far as is reasonably practicable, identify all hazards associated with work in a confined space. **OHS Regulations r55** All hazards, including those associated with entry or exit, need to be identified before anyone enters the space.
52. The types of substances previously stored in the confined space (for any length of time) will indicate the sorts of hazards that may be present, such as a lack of oxygen, atmospheric contaminants or flammable atmospheres. Other hazards may arise from processes, products, by-products, waste and work activities in or around the confined space.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies when, for example, making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. See page 7. **OHS Act s35**

### Generic hazard identification

53. Where the employer is responsible for similar confined spaces in a number of different work areas or workplaces, a single (or generic) hazard identification may be undertaken for a class of confined spaces rather than each individual confined space if:
  - all the confined spaces in the class are similar; and

- the identification carried out for the class of confined spaces does not result in any employee being subject to any greater, additional or different risk to health or safety than if the identification were carried out for each individual confined space. **OHS Regulations r55(2)**

## Hazards associated with the nature of work in a confined space

### Restricted means of entry or exit

54. Small entrances and exits make it very difficult to rescue injured persons or to get equipment (such as respirators needed in spaces with hazardous atmospheres) in or out of a confined space. In some cases, entrances and exits may be very large but difficult to access. For example, access to pits or openings high up in silos may require the use of ladders, hoists or other devices and therefore escape or rescue operations from such spaces may be very difficult in emergency situations. Consideration should be given to the:
  - size, location and access to entrances and exits
  - nature of work and equipment required
  - physical environment, including obstructions and fittings
  - equipment used to assist with safe entry and exit
  - emergency and rescue requirements, including whether entrances and exits are adequate to enable employees to be rescued quickly.

# Part 3 – Duties of employers

## Harmful atmospheric contaminants

55. The following table provides some examples of harmful atmospheres that may be present in a confined space, and how they may be created.

**Table 2 – Sources of harmful atmospheric contaminants**

Source	Examples
The substance stored in the space or its by-products	<ul style="list-style-type: none"> <li>▪ build-up of hydrogen sulphide in sewers and pits</li> <li>▪ release of toxic substances, such as hydrogen sulphide, in a tank of decomposing organic material, especially when the material is disturbed</li> </ul>
Work performed in the confined space	<ul style="list-style-type: none"> <li>▪ use of paints, adhesives, solvents or cleaning solutions</li> <li>▪ welding or brazing with metals capable of producing toxic fumes</li> <li>▪ exhaust fumes from engines used in the space</li> <li>▪ painting or moulding glass-reinforced plastics</li> </ul>
Release of atmospheric contaminants	<ul style="list-style-type: none"> <li>▪ disturbing sludge, slurry or other deposits, or removing scale</li> </ul>
Manufacturing process	<ul style="list-style-type: none"> <li>▪ residues left in tanks or remaining on internal surfaces, which can give off gas or vapour</li> </ul>
Entry and accumulation of gases and liquids from adjacent plant, installations, services or processes	<ul style="list-style-type: none"> <li>▪ contamination of underground confined spaces by substances from plant many metres away</li> <li>▪ carbon monoxide from the exhaust of LPG-powered forklifts operating in or close to the confined space</li> </ul>

## Unsafe oxygen level

56. Under normal atmospheric pressure air usually contains 21 per cent oxygen. However, oxygen levels between 19.5 per cent and 23.5 per cent by volume are considered to be safe.

57. Some situations can cause the level of oxygen to dramatically decrease, leading to an oxygen deficient atmosphere and possible asphyxiation. For example, this may occur if oxygen in the atmosphere is:

- displaced by gases produced during biological processes, such as methane in a sewer
- displaced during purging with an inert gas to remove flammable or toxic fumes

- depleted inside metal tanks and vessels through surface oxidation (for example, when rust forms)
- consumed during combustion of flammable substances
- absorbed or reacts with grains, chemicals or soils in sealed silos.

58. Too much oxygen can increase the risk of fire or explosion. Oxygen-enriched atmospheres may occur if:

- chemical reactions cause the production of oxygen (for example, certain reactions with hydrogen peroxide)
- there is a leak of oxygen from poorly designed or maintained oxygen storage equipment.

# Part 3 – Duties of employers

## Engulfment

59. Engulfment means to be swallowed up in or be immersed by material, which may result in asphyxiation. Examples of stored materials that may pose a risk of engulfment include plastics, sand, fertiliser, grain, coal, coal products, fly ash and animal feed.
60. These materials can form an artificial crust or bridge when a container of stored material is emptied from below, leaving the top layer in place. Employees walking on this crust or bridge may be engulfed if it collapses (see figure 1).

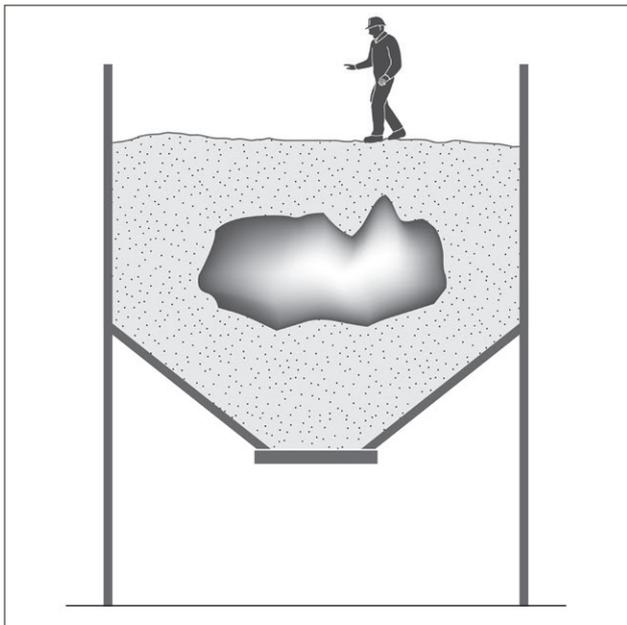


Figure 1 – 'Bridging' may result in engulfment

## Other hazards associated with confined spaces

### Uncontrolled introduction of substances

61. The uncontrolled introduction of substances (eg steam, water or other liquids, gases or solids) may result in drowning, being overcome by fumes or other harm, depending on the nature of the substance.
62. Plant such as vehicles and LPG-forklifts operating close to the opening of a confined space can cause a build-up of exhaust gases, such as carbon monoxide, in the space.

### Fire and explosion

63. A fire or explosion requires the presence of three elements: an ignition source, air and a fuel (eg gas or vapour) capable of igniting. An atmosphere in which a flammable gas or vapour is likely to exceed five per cent of its lower explosive limit (LEL) is considered to be a hazardous atmosphere under the OHS Regulations. An employer or self-employed person must ensure that during work in a confined space, so far as is reasonably practicable, the concentration of any flammable gas or vapour in the atmosphere of the space is below five per cent of its LEL. If that is not reasonably practicable, then the requirements set out in regulation 60(1)(b) of the OHS Regulations must be complied with. [OHS Regulations r60](#)

**Lower explosive limit (LEL)** is the concentration of a flammable gas or vapour in air below which the propagation of a flame does not occur on contact with an ignition source.

# Part 3 – Duties of employers

64. If there is a likelihood of fire or explosion in a confined space, an employer or self-employed person must ensure that no source of ignition is introduced to the space, whether introduced from within or outside the space. **OHS Regulations r59** For example, potential ignition sources inside and outside the space may include:

- open flames and hot surfaces
- electrical equipment
- internal combustion engines
- metal tools striking metal surfaces
- spark-producing equipment such as grinding wheels
- static electricity.

65. Flammable atmospheres in confined spaces may result from the evaporation of a flammable residue, flammable materials used in the space, a chemical reaction (for example, the formation of methane in sewers), or from the presence of combustible dust (for example, in flour silos).

66. If an ignition source, (for example, a sparking or electrical tool) is introduced into a space containing a flammable atmosphere, an explosion is likely to result. See more information on fire and explosion at paragraphs 135–137.

## Biological hazards

67. Contact with micro-organisms (eg viruses, bacteria or fungi) may result in infectious diseases, dermatitis or lung conditions such as hypersensitivity pneumonitis. Sewers, grain silos and manure pits are examples of confined spaces where biological hazards may be present.

## Mechanical hazards

68. Exposure to mechanical hazards associated with plant may result in entanglement, crushing, cutting or piercing injuries. Sources of mechanical hazards include

plant such as augers, agitators, blenders, mixers and stirrers.

## Electrical hazards

69. Electrical hazards may cause electrocution, shocks or burns and can arise from cables, transformers, capacitors, relays, exposed terminals and wet surfaces where electrical circuits and electrically powered plant are used.

## Skin contact with hazardous substances

70. The nature of a confined space can increase the likelihood of skin contact with surface contaminants. Skin contact with hazardous substances may result in immediate health effects (eg burns, irritation or allergic dermatitis) or longer-term systemic effects.

## Noise

71. Noise generated in a confined space from the use of plant, the work method or process may be amplified due to reflections off hard surfaces. Exposure to excessive noise may result in hearing loss, tinnitus and other non-auditory health effects. Excessive noise may also prevent employees from hearing warning signals and distract them from their work.

## Hazardous manual handling

72. Hazardous manual handling may be exacerbated by physical constraints associated with working in a confined space. Additional hazards may arise from the use of personal protective equipment that restricts movement, grip and mobility during hazardous manual handling tasks.

## Radiation

73. The health effects associated with radiation depend on the type of radiation involved, which may come from radioactive sources, x-rays, lasers, welding flash, radio frequency or microwaves.

# Part 3 – Duties of employers

## Environmental hazards

74. Environmental hazards associated with work in a confined space may cause or contribute to harm. Examples of environmental hazards include:
- heat or cold stress arising from the work process or conditions
  - slips, trips and falls arising from slippery surfaces or obstacles
  - inadequate lighting.

## Hazards outside the confined space

75. Where the confined space has a vertical opening, there is a risk a person could fall in. People at risk include those assisting the confined space entry (for example, the standby person or spotter) and, in certain circumstances, pedestrians.
76. Traffic hazards are a concern where confined space entrances or exits are located on footpaths or roads. There is the potential for employees entering or exiting the space to be struck and injured by vehicle traffic.

## Additional physiological and psychological demands of working in a confined space

77. Working in a confined space may impose additional physiological and psychological demands over and above those encountered in a normal working environment. Consideration should be given to an employee's:
- physical ability
  - ability to work in a restrictive space (for example, claustrophobia)
  - ability to wear the personal protective equipment required to do the work (for example, respirators).

## Part 3.2 – Assessing risks

78. Once the hazards associated with working in a confined space have been identified, the employer needs to ensure that the risks associated with those hazards are assessed, to determine the best way to control the risks.
79. A formal risk assessment is unnecessary if knowledge and understanding about the risk and how to control it already exist. For example, an employer who knows there is a risk associated with an employee entering a tank to clean it, and that this risk can be eliminated by using a high pressure hose through an access hatch to avoid the need for entry, can go straight to implementing the risk control without conducting an assessment.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies when, for example, making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. See page 7. [OHS Act s35](#)

80. When undertaking a risk assessment for work in a confined space, employers should consider the following:
- the hazards identified
  - the task
  - the working environment
  - work materials and tools
  - all permits associated with the work
  - the additional physiological and psychological demands of the task
  - arrangements for emergency rescue
  - training.

# Part 3 – Duties of employers

81. Guidance on how to conduct a risk assessment is available at [worksafe.vic.gov.au](http://worksafe.vic.gov.au).

## Testing the atmosphere

82. To effectively control the atmospheric hazards associated with work in a confined space, it is necessary to quantify the level of oxygen, any atmospheric contaminants and any flammable gas or vapour present in the space. Testing the atmosphere in a confined space needs to be a routine part of determining appropriate risk controls.
83. Testing needs to be carried out by a suitably qualified or competent person, using an appropriate and correctly calibrated gas detector. Where relevant, the atmosphere in a confined space should be tested for:
- oxygen content
  - airborne concentration of flammable contaminants
  - airborne concentration of potentially harmful contaminants (eg hydrogen sulphide, carbon monoxide and methylene chloride).
84. A person's senses should never be used to determine if the air in a confined space is safe. Many toxic or flammable gases cannot be detected by sight or smell and the level of oxygen in the air cannot be determined by using the senses.

## Where to test

85. Initial testing needs to be done from outside the confined space, by inserting a sample probe into appropriately selected access holes, nozzles or openings. Contaminants can settle at different levels in a confined space so the top, middle and bottom areas of the space need to be tested (see figure 2).

86. Some gases (for example, hydrogen sulfide) are heavier than air and in unventilated areas typically settle to the bottom of the space, while other gases (for example, methane) are lighter than air and typically collect at the top of the space. Tests need to be made at a sufficient number of points to accurately reflect areas of the space that are likely to be accessed.
87. If it is necessary to enter the space to test remote regions away from entrances or access holes, then air-supplied respiratory protection equipment needs to be worn. The entry must be undertaken in accordance with the OHS Regulations using a confined space entry permit (see paragraphs 139–144 for information about entry permits). [OHS Regulations r63](#)

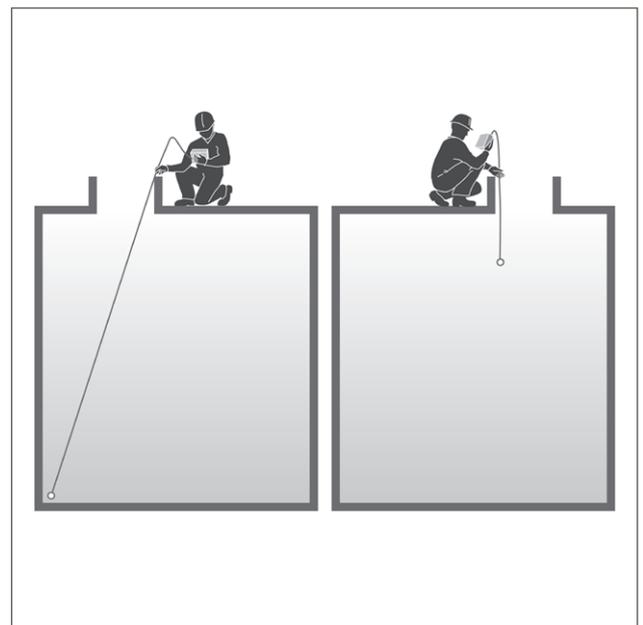


Figure 2 – Atmospheric testing of remote regions and different levels within a confined space

# Part 3 – Duties of employers

## When to test

88. Testing needs to be done before an entry permit is issued, immediately prior to entry, and at other times as necessary. Re-testing and continuous monitoring of the atmosphere needs to be undertaken if it has been identified (for example, through a risk assessment) that conditions may change due to the work being done or the disturbance of hazardous material in the confined space. Alternatively, the results of the testing may indicate a requirement to purge or ventilate the space and re-test prior to entry.
89. Where the concentration of flammable gas or vapour in the space is equal to or greater than five per cent but less than 10 per cent of its LEL, the space must be continually monitored during occupancy. For example, by using a suitably calibrated, continuous-monitoring flammable gas detector. See paragraphs 119–120 for more information about specific duties relevant to maintaining a safe atmosphere in a confined space.

## Part 3.3 – Risk control: general duty

90. Employers have a general duty to control risks associated with work in confined spaces so far as is reasonably practicable.

### Determining risk control measures

91. Employers must consult with their employees (including any HSRs) when making decisions about how to control risks. [OHS Act s35](#) Consulting with employees is likely to result in better risk control measures because it gives them the opportunity to contribute ideas, participate in trials and is likely to improve the uptake of risk control measures when they are implemented.

### Eliminating the need for entering the space

92. The primary duty is to eliminate any risk associated with work in a confined space, so far as is reasonably practicable. The first question to ask is: can the work be done another way without entering the space? For example, consider whether the work could be done from outside the space by:
  - installing fixed or temporary cleaning devices such as spray balls
  - using high-pressure hoses inserted through an access hatch to clean the inside of a tank
  - using remote cameras or a mirror attached to a probe for internal inspection of vessels
  - using remotely operated rotating flail devices, vibrators or air purgers to clear blockages in silos
  - using a hook, long-handled clasp or magnet on a string to retrieve an object dropped into the confined space.

# Part 3 – Duties of employers

## Controlling the risk

93. If it is not reasonably practicable for an employer or self-employed person to eliminate any risk associated with work in a confined space, they must reduce the risk so far as is reasonably practicable by taking into account the following matters:

- the nature of the confined space
- the level of oxygen and atmospheric contaminants
- the work being carried out in the confined space and the work method
- work done outside the confined space
- the means of entry and exit
- the type of emergency procedures required. [OHS Regulations r56](#)

## The nature of the confined space

94. The nature of a confined space may contribute to the risks associated with it. For example, consideration should be given to:

- the temperature in the space so that it will not result in heat stress
- the lighting in the space so it will not result in poor visibility.

## The level of oxygen and atmospheric contaminants

95. The level of oxygen and atmospheric contaminants is a significant contributor to the risk of working in a confined space. In ensuring a safe atmosphere within a confined space, employers or self-employed persons must ensure that:

- oxygen is maintained at a safe level and any atmospheric contaminants in the space are purged or ventilated so far as is reasonably practicable [OHS Regulations r58](#)

- any changes that may occur to oxygen or atmospheric contaminants are taken into account (for example, by regularly testing the atmosphere) [OHS Regulations r56\(2\)\(b\)](#)
- if the atmospheric conditions cannot be maintained at a safe level, appropriate respiratory protective equipment is provided and used. [OHS Regulations r58](#)

See further information about ensuring a safe atmosphere at paragraphs 119–120.

## The work and work method

96. Employers need to consider whether the work or work method will introduce any new hazards or contribute to the risks of working in a confined space. Employers should select a work method that:

- does not introduce ignition sources into a confined space that contains a flammable atmosphere
- minimises the release of harmful atmospheric contaminants into a confined space
- reduces the time spent in a confined space or the number of people that have to enter the space
- eliminates the risk of engulfment in a confined space.

97. Employers need to consider any risks associated with the use of personal protective equipment in a confined space. Using personal protective equipment may introduce new risks for those working in the space, such as the weight or discomfort of protective clothing and hearing protection.

# Part 3 – Duties of employers

## Work done outside the confined space

98. Work done outside a confined space, but near an opening, can contaminate the atmosphere inside the space. For example, the exhaust gases from an internal combustion engine. There may also be potential for fire or explosion where hot work is done in areas next to a confined space that contains a flammable atmosphere.
99. All work near a confined space needs to be assessed to determine if that work will increase the risk to a person entering and working in the space. If it is determined that this work might increase the risk, the work needs to cease in order for the risk to be controlled.

## The means of entry and exit

100. In taking the means of entry to and exit from a confined space into account, employers should consider:
  - the number, size and location of entrances and exits
  - entry and exit routes
  - equipment to be used to gain entry and exit
  - whether entrances and exits are adequate to enable the rapid exit and rescue of employees from the confined space.

## Emergency procedures

101. When things go wrong in a confined space, people may be exposed to serious and immediate danger. Effective arrangements for raising an alarm and carrying out rescue operations in an emergency are essential. See paragraphs 151–162 for further information about emergency procedure duties.

## Maintaining risk controls

102. An employer who is required by the OHS Regulations to use any particular measure to control risk must ensure that the measure is properly installed (if applicable), used and maintained. **OHS Regulations r18** The purpose of maintaining control measures is to ensure that they perform as originally intended and continue to prevent or adequately control risks associated with work in a confined space.
103. Prior to entry into a confined space, maintenance of control measures should include:
  - inspections, including inspection and testing of equipment such as rescue and ventilation equipment
  - maintenance of engineering controls and personal protective equipment
  - remedial work.
104. During an entry, inspection of control measures needs to include visual checks to ensure controls are being properly applied by employees.
105. It may be necessary to improve, extend or replace existing control measures to ensure they continue to provide adequate control of risk.
106. Employers should have a maintenance and inspection procedure in place to ensure that any defects in control measures are detected as early as possible.

# Part 3 – Duties of employers

## Review of risk controls

107. It is important to monitor risk controls to ensure they remain effective. Employers must review and, if necessary, revise any measures implemented to control risk associated with work in a confined space in the following circumstances:

- following a notifiable incident involving work in a confined space (for example, an injury requiring immediate inpatient treatment – see section 37 of the OHS Act for more information on notifiable incidents)
- if, for any other reason, the risk control measures do not adequately control the risks, or
- after receiving a request for review from an HSR. An HSR may make a request if they believe, on reasonable grounds, that:
  - either of the circumstances listed above exist
  - the employer has failed to properly review the risk controls, or
  - in conducting a review of or revising the risk controls, the employer has failed to take into account any of the circumstances listed above, for example the HSR believes that the employer has failed to consider a change to a work system that may result in an increase in risks, during their review of risk controls. [OHS Regulations r62](#)

See [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au) for more information about incident notification and duties of employers to report fatalities, serious injuries and incidents.

## Part 3.4 – Risk control: specific duties

108. In addition to the general duty to control risks associated with work in a confined space, employers are subject to a number of specific duties under the OHS Regulations.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies when, for example, making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. See page 7. [OHS Act s35](#)

## Isolation of plant and services

109. An employer or self-employed person must, so far as is reasonably practicable, eliminate any risk associated with work in a confined space in relation to the introduction of any substance or condition from or by any plant or services connected to the space. They must also, so far as is reasonably practicable, eliminate any risk associated with work in a confined space in relation to the activation or energising in any way of any plant or services connected to the space. [OHS Regulations r57](#)

110. Mechanical and electrical isolation of plant and services is essential if mechanical or electrical parts connected to the confined space could be operated inadvertently. For example, if gas, fumes or vapour could enter the confined space via a pipe, the pipework needs to be physically isolated. Any isolation measures need to be checked to ensure they are effective.

## Part 3 – Duties of employers

### 111. Isolate to prevent:

- the introduction of contaminants through piping, ducts, vents, drains, conveyors, service pipes and fire protection equipment
- the activation of machinery or services within or outside of the confined space
- the release of any stored or potential energy in plant
- the inadvertent use of electrical equipment.

112. Isolation measures such as physically locking, tagging, closing and blanking (see figure 3) need to be verified at each isolation point. Isolation measures need to be supported by systems of work to ensure they are not removed until all work is completed and all employees have exited the confined space.



Figure 3 – Example of tag and lockout with the padlocks of two employees

### Methods of isolation from materials, contaminants or conditions

113. Employers need to isolate in accordance with one of the methods described below, or by an alternative method that ensures at least an equivalent level of safety:

- Removing a valve, spool piece or expansion joint in piping leading to the confined space (as close as practicable to the space) and blanking or capping the open end of the piping (see figure 4). The blank or cap needs to be tagged to indicate its purpose. Blanks or caps need to be made of a material that is compatible with the liquid, vapour or gas they are in contact with. The material also needs to have sufficient strength to withstand the maximum operating pressure (for example, surges which can build up in the piping).
- Inserting a suitable full-pressure spade or blank in piping between the flanges as close as practicable to the confined space (see figure 5). The full-pressure spade or blank needs to be tagged to indicate its purpose.
- Closing, locking and tagging at least two valves in the piping leading to the confined space (see figure 6). A drain or vent valve between the two closed valves needs to be locked open to atmosphere as part of this method.

## Part 3 – Duties of employers

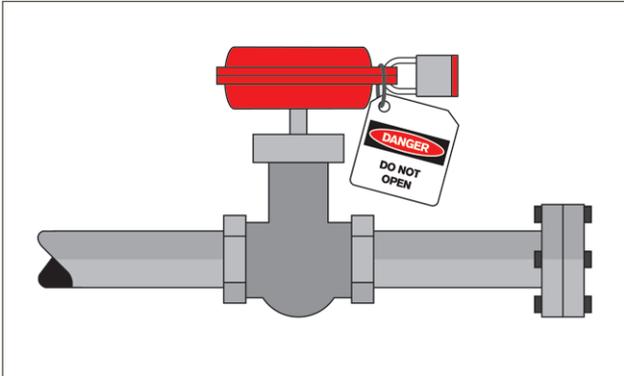


Figure 4 – Open end of pipe capped. Nearest valve closed, locked and tagged

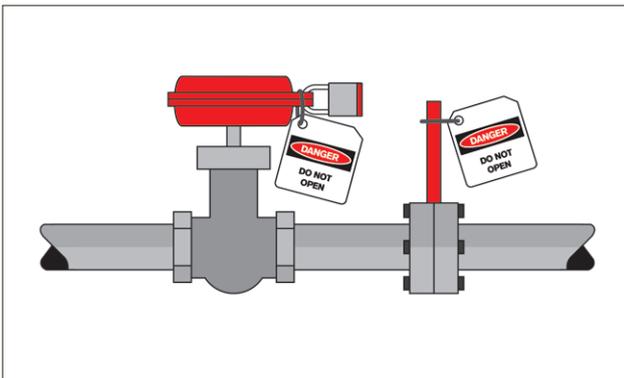


Figure 5 – Insertion of full-pressure spade or blank. Nearest valve closed, locked and tagged. Spade is also tagged to indicate its purpose

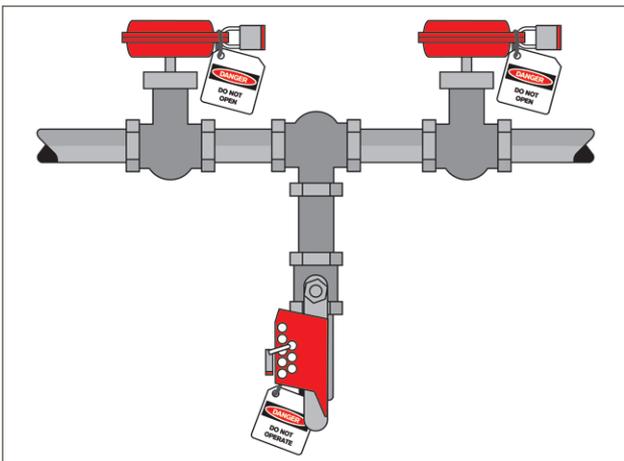


Figure 6 – Closing, locking and tagging at least two valves in the piping leading to the confined space. Drain valve locked open to atmosphere and tagged

### Methods of isolation from the activation or energising of plant or services

114. Before entry is permitted to any confined space that can move, or that has agitators, fans or other moving parts that may pose a risk to employees working in the space, the possibility of movement needs to be eliminated.
115. An employer needs to ensure that plant with stored energy (including hydraulic, pneumatic, electrical, chemical, mechanical, thermal or other types of energy) is isolated and de-energised to a zero energy condition, to prevent any risk to health and safety.
116. If the confined space contains hazardous moving parts such as shafts, agitators, blades or other moving equipment, consider control measures such as chocking, wedging, chaining or removal of these parts.
117. When a lock is used to lock out plant, the key needs to be kept in the possession of the person placing the lock. Spare keys should not be accessible except in emergencies. For example, a spare key may be used if the person who placed the lock has been injured or is otherwise unable to personally remove it. The tag on the lock should indicate that a person is in the confined space and that the lock should not be removed until the person has left the confined space.
118. Examples where a lockout procedure may be appropriate include:
  - an open circuit breaker or open isolating switch supplying electrical power to equipment with hazardous moving parts
  - where a power source cannot be controlled readily or effectively, requiring a belt or other mechanical linkage to be disconnected and tagged.

# Part 3 – Duties of employers

## Ensuring a safe atmosphere

119. During work in a confined space, employers must ensure, so far as is reasonably practicable, that the atmosphere in the space has a safe oxygen level and does not expose employees to an atmospheric concentration of a contaminant above the exposure standard. OHS Regulations r58 A safe atmosphere in a confined space is one that:

- has a safe oxygen level
- is free of atmospheric contaminants or contains atmospheric contaminants below their exposure standard (if any)
- has a concentration of any flammable gas or vapour below five per cent of its LEL.

Exposure standards represent the airborne concentration of a particular substance in a person's breathing zone that must not be exceeded, as set out in SafeWork Australia's *Workplace exposure standards for airborne contaminants*. OHS Regulations r165 Exposure standards are based on the airborne concentrations of individual substances that, according to current knowledge, should not impair the health of, or cause undue discomfort to, the majority of people.

120. A safe atmosphere can be achieved within a confined space by using methods such as cleaning, purging and ventilation. In relation to work in a confined space, an employer or self-employed person must ensure, so far as is reasonably practicable, that purging or ventilation of any contaminant in the atmosphere of the space is carried out. OHS Regulations r58(1)

**Note:** Regulation 58(1)(b) of the OHS Regulations prohibits pure oxygen or gas mixtures with oxygen in a concentration greater than 21 per cent by volume being used for purging or ventilation of any contaminant in the atmosphere of a confined space, because of the risk of increased flammability.

## Purging

121. Purging means the method by which any contaminant is displaced from a confined space. Purging can be done using an inert gas, such as nitrogen, to clear any contaminant in the atmosphere, including flammable gases or vapours, before work in a confined space begins.
122. After purging, the confined space needs to be adequately ventilated with sufficient fresh air to ensure that the inert gas is removed. Purging needs to be done in a way that ensures any contaminants removed from the confined space are expelled to a location where they present no further risk. Atmospheric testing needs to be carried out before entry into the confined space to check that the ventilation has been effective.
123. When any contaminant is required to be purged, purging and ventilation equipment designed for use in hazardous areas should be used. A hazardous area is an area in which an explosive atmosphere is present, or may be expected to be present, in quantities that require special precautions for the construction, installation and use of potential ignition sources.

## Ventilation

124. Ventilation is the act of ensuring that adequate air flow is maintained within a confined space. Ventilation of a confined space with fresh air, by natural, forced or mechanical means, may be necessary to establish and maintain a safe atmosphere and temperature during work in the confined space.

## Part 3 – Duties of employers

125. If the confined space has sufficient openings natural ventilation may be adequate, but in most cases mechanical ventilation is likely to be needed. Consideration needs to be given to where the fresh air is drawn from and where the exhaust air is vented to, so that the fresh air is not contaminated either by exhaust air or by other pollutants, and the exhaust air does not cause other risks.
126. Mechanical ventilation may be either local exhaust ventilation (LEV) or dilution ventilation. LEV is effective where the source of contaminant generation is localised, the extraction point can be located close to the source and adequate make-up air is available (for example, the capture or extraction of welding fumes).
127. Where dilution ventilation is used, air needs to be introduced in a way that will ensure effective circulation throughout the confined space, taking account of the configuration of the space, the position of the openings and the properties of any contaminants.
128. During operations likely to generate contaminants, mechanical ventilation equipment may not be adequate or sufficiently reliable to maintain contaminants at acceptable levels or to ensure a safe oxygen level. Where mechanical ventilation equipment is likely to be necessary to maintain acceptable contaminant levels in a confined space, the equipment should:
- be monitored to ensure continuous operation while the confined space is occupied
  - have the controls (including any remote power supply) clearly identified, tagged and protected to guard against unauthorised interference.

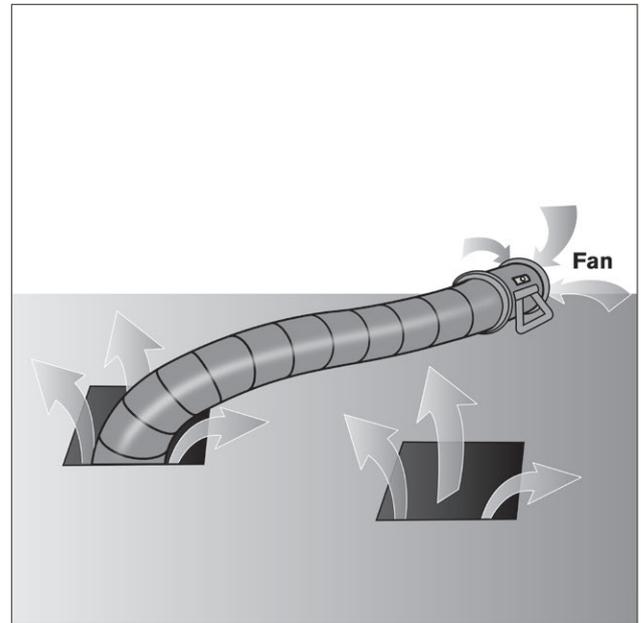


Figure 7 – Dilution ventilation

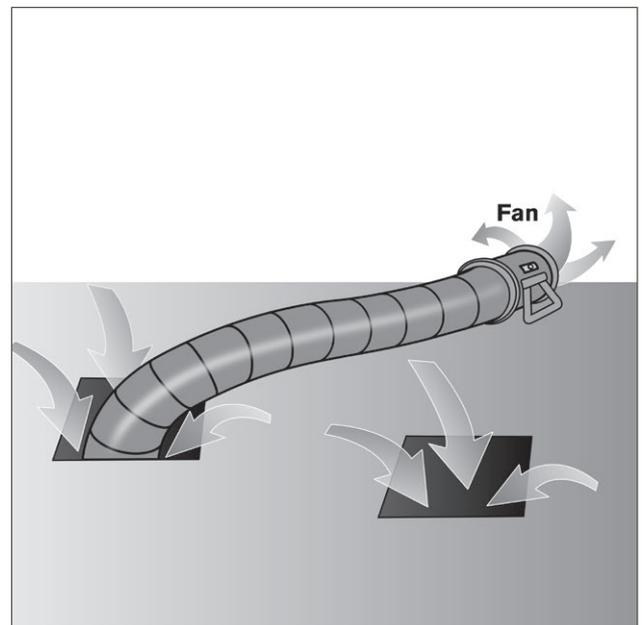


Figure 8 – Local exhaust ventilation

# Part 3 – Duties of employers

## Respiratory protective equipment

129. Employers and self-employed persons must ensure, during work in a confined space, that the space has a safe oxygen level. If it is not reasonably practicable to ensure a confined space contains a safe oxygen level, an employer or self-employed person must provide employees with air-supplied respiratory protective equipment. [OHS Regulations r58\(2\)](#)
130. Where any atmospheric contaminant in the space has an exposure standard, and it is not reasonably practicable to ensure employees are not exposed to the contaminant above its exposure standard (if any), an employer or self-employed person must provide employees with air-supplied respiratory protective equipment or other appropriate respiratory protective equipment. [OHS Regulations r58\(3\)](#)
131. Employers and self-employed persons must ensure that employees use personal protective equipment when it is supplied. [OHS Regulations r58\(4\)](#) They also need to ensure that it is correctly fitted and maintained.
132. Respiratory protective equipment includes a range of air-supplied and air-purifying equipment. Whenever there is any doubt about the type of respiratory protective equipment required, air-supplied equipment needs to be used, as it provides a higher level of protection.
133. Where there is uncertainty about the concentration of atmospheric contaminants (due to inaccessibility, no appropriate testing methodology or where the work activity generates atmospheric contaminants, such as cleaning processes), an employer needs to ensure that air-supplied respiratory protective equipment is used.

134. Further guidance is available in *AS/NZS 1715 – Selection, use and maintenance of respiratory protective equipment*.

## Fire and explosion

135. Where a flammable atmosphere may exist in a confined space, all reasonably practicable steps, including cleaning, purging and ventilation, must be taken to achieve an atmosphere where the concentration of any flammable gas or vapour is below five per cent of its LEL. [OHS Regulations r60](#)
136. If, after taking such steps, the concentration of flammable gas or vapour is equal to or greater than five per cent, but less than 10 per cent of the LEL, employees must be removed immediately from the confined space and may only re-enter and remain in the space if a suitably calibrated continuous-monitoring flammable gas detector is used in the space to continuously monitor the flammable gas or vapour concentration while the employee remains in the space. If at any time the flammable vapour concentration reaches 10 per cent or more of its LEL, the confined space must be immediately evacuated. [OHS Regulations r60](#)
137. Where there is a likelihood of fire or explosion in a confined space, an employer or self-employed person must ensure that no ignition source is introduced into the space, whether introduced from within or outside the space. [OHS Regulations r59](#)

# Part 3 – Duties of employers

## Signage

138. An employer or self-employed person must erect signs that identify the confined space and notify employees that they must not enter unless they have a confined space entry permit. Signage must be clear and prominently positioned next to each entry point to the confined space. It must be in place while work is performed in the confined space, or work is being performed in preparation for, or in completion of, work in the confined space. [OHS Regulations r61](#) See figure 9 for a typical example of an appropriate sign. An employer needs to take all reasonable steps to prevent unauthorised entry to a confined space by, for example, using fixed barriers, locks or other suitable security devices. Signposting alone should not be relied on to prevent unauthorised entry into a confined space.



Figure 9 – Typical confined space sign

## Confined space entry permit

139. An employer must ensure that an employee does not enter a confined space unless they have been issued with a confined space entry permit for the space to which the permit applies. [OHS Regulations r63](#)
140. A confined space entry permit provides a formal check to ensure all elements of a safe system of work are in place before an employee is allowed to enter the confined space. It also provides a means of communication between site management, supervisors and those carrying out the work, and ensures that the employer has checked and authorised the entry to the confined space and it is safe to proceed.
141. Employers must ensure that a confined space entry permit is issued for each confined space. The entry permit must only apply to one confined space and may allow one or more persons to enter that space. [OHS Regulations r63](#)
142. The confined space entry permit must list:
- the confined space to which the permit applies:
    - the permit form should be designed and completed to enable clear identification and recording of the space that each permit form applies to
    - a single permit can be used for multiple entries into a space and can be used where there is more than one access point into a single space
  - the measures to control the risk:
    - list the control measures to be implemented before work commences. These should include the isolation of plant and services, purging, ventilation, atmospheric testing, cleaning and signage

## Part 3 – Duties of employers

- list the control measures to be implemented or continued while work is being done in the space. These should include ventilation, continuous monitoring, respiratory protective equipment and personal protective equipment
  - list any equipment to be taken into the confined space, including any exclusions such as ignition sources
  - list any specialist emergency rescue equipment required.
- the name of any employee permitted to enter the space
  - the name of any standby person assigned to the space (see paragraphs 149–150 for further information on standby persons)
  - the period of time that the permit is in operation:
    - generally a permit will only apply for the work shift for which it is issued. The permit needs to be re-validated if the person with direct control of work in the space changes, a break in work continuity occurs (for example, a shift change), changes are made to the work that introduce hazards not addressed by the current permit or new risk controls are required. **OHS Regulations r63(3)**
143. The entry permit should be displayed in a prominent place to facilitate signing and clearance. A copy of the entry permit should be displayed at the entry point where the standby person is stationed.
144. An employer must keep each confined space entry permit they issue until work in the confined space is completed, or for two years from the date of completion if a notifiable incident occurs (for example, an injury requiring immediate inpatient treatment – see section 37 of the OHS Act for more information on notifiable incidents). **OHS Regulations r64** An example of a template for a confined space entry permit is at **Appendix D**.
- ### Entry to and exit from a confined space
145. For the entire period that the confined space entry permit is in operation, an employer must have a procedure in place to ensure the employer, or a person assigned by the employer, knows when any employee is in the confined space. **OHS Regulations r66** Appropriate systems to indicate when employees are in a confined space include the use of tags, a system of signing in and out or having a standby person record who is in the confined space.
146. An employer must also ensure that all employees have exited a confined space that has a confined space entry permit in operation once work has been completed. **OHS Regulations r67** Employers must keep a written record that all employees have exited a confined space on completion of the work. **OHS Regulations r68** Employers may choose to integrate a system so that those working in the space sign in and out on the entry permit.

# Part 3 – Duties of employers

## Communication and initiation of emergency procedures

147. An employer must ensure that when an employee is working in a confined space there is continuous communication from outside the confined space between the employer, or a person assigned by the employer, and the employee in the confined space. Employers must also ensure that when an employee is working in a confined space, emergency procedures can be initiated from outside the confined space.

OHS Regulations r65

148. Continuous communication is necessary to:

- monitor the status of any employee who has entered a confined space under an entry permit
- alert any person in the confined space if evacuation is required
- initiate emergency procedures in a timely manner.

149. One way an employer can ensure continuous communication is by assigning an appropriately trained person to act as a standby person. A standby person needs to continuously monitor the wellbeing of any person inside a confined space, and initiate appropriate emergency procedures when necessary. Depending on the conditions in the confined space, communication can be achieved by voice, radio, hand signals or other appropriate means.

150. The standby person should:

- understand the nature of the hazards inside the confined space and be able to recognise signs and symptoms that an employee in the confined space may experience
- be trained and rehearsed in all aspects of emergency procedures (including how, when and what procedures will be initiated)

- remain outside the confined space and ensure any person inside a confined space is monitored at all times
- have all required rescue equipment (eg safety harnesses, lifting equipment, a lifeline) immediately available
- where necessary, be able to operate and monitor plant used to control risk (eg atmospheric monitoring equipment, ventilation devices, respiratory protective equipment)
- have the authority to order any employee to exit the confined space if a hazardous situation is identified
- never enter the space to attempt rescue.

## Emergency procedures

151. If things go wrong in relation to work in a confined space, people may be exposed to serious and immediate danger. Effective arrangements for raising an alarm and carrying out rescue operations in an emergency are therefore essential.

152. Suitable emergency procedures will depend on the nature of the confined space, the risks identified and the likely nature of an emergency rescue.

# Part 3 – Duties of employers

## Planning and establishment of emergency, rescue and first aid procedures

153. Employers must establish procedures for the control and management of an emergency in a confined space, including procedures for:
- the rescue of any person from the confined space
  - first aid to be provided to any person in the confined space and after rescue from the confined space. [OHS Regulations r69\(1\)](#)
154. An employer must ensure that the emergency procedures take into account:
- the nature of the confined space
  - any hazards associated with the level of oxygen or atmospheric contaminants in the confined space
  - the work to be done in the confined space (including the range of possible work methods and the work method chosen)
  - any work done outside the confined space that may be associated with a hazard
  - the means of entry to and exit from the confined space
  - the method of continuous communication between people inside and outside the confined space and whether that method will enable communication in an emergency
  - how emergency procedures can be initiated from outside the confined space
  - the procedure in place which indicates that an employee has entered a confined space. [OHS Regulations r69\(2\)](#)
155. Table 3 provides further questions employers should consider when developing emergency procedures.

# Part 3 – Duties of employers

Table 3 – Relevant considerations for planning emergency, rescue and first aid procedures

Relevant considerations	Questions
Location of the confined space	<p>What is the geographic location of the space, how accessible is it in an emergency and how far away is it from appropriate medical facilities?</p> <p>Planning needs to ensure that rescue and emergency personnel can access the workplace during nights, weekends and holiday periods.</p>
Rescue and resuscitation equipment	<p>What kinds of emergencies may occur?</p> <p>The provision of suitable rescue and resuscitation equipment will depend on the potential emergencies identified. Training in the correct operation of rescue equipment is essential. Selected rescue equipment needs to be in close proximity to the confined space and able to be used immediately.</p>
Capabilities of rescuers	<p>Are rescuers properly trained, sufficiently fit to carry out their task and capable of using any equipment provided for rescue (eg breathing apparatus, lifelines and fire-fighting equipment)?</p> <p>How will rescuers be protected during the emergency operation?</p>
First aid	<p>Is appropriate first aid available for immediate use?</p> <p>Are trained first aiders available to make proper use of any necessary first aid equipment provided?</p>
Local emergency services (if they are to be relied on for rescue)	<p>How will the local emergency services (for example, fire brigade) be notified of an incident?</p> <p>What information about the particular dangers in the confined space will be given to them on their arrival?</p> <p>Have prior arrangements been made with local emergency services to ensure they are able to respond in a reasonable time, and is the specialist confined space retrieval equipment readily available?</p>

## Rehearsal and implementation of emergency procedures

156. In relation to work in a confined space, an employer must ensure that the emergency procedures are rehearsed by the relevant employees. **OHS Regulations r69(4)** This should be done soon after the emergency procedures have been established to confirm that the rescue plan for the confined space is effective.

157. An employer must ensure that emergency procedures can be carried out immediately after an emergency arises in a confined space. An employer must also ensure that any risk associated with carrying out the emergency procedures is, so far as is reasonably practicable, eliminated; or if it is not reasonably practicable to eliminate the risk, reduced so far as is reasonably practicable. **OHS Regulations r69**

# Part 3 – Duties of employers

## Air-supplied respiratory equipment to be provided

158. Where a person inside a confined space has been overcome, it needs to be assumed that entry for rescue is unsafe without air-supplied respiratory protective equipment.
159. Employers must provide employees performing rescue work with air-supplied respiratory equipment if they enter a confined space in an emergency or carry out emergency procedures in a confined space arising from an unsafe oxygen level, or an atmosphere that has a harmful level of any contaminant. [OHS Regulations r70\(1\)](#)
160. When personal protective equipment, including respiratory protective equipment, is required to be provided under the OHS Regulations for the purpose of an emergency procedure, an employer must ensure that it is used by employees. [OHS Regulations r70\(3\)](#)

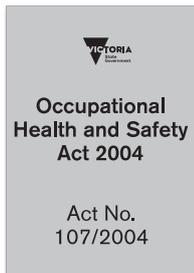
## Entrance and exit size to enable rescue

161. Any risks associated with openings for the entry to and exit from a confined space must be reduced, so far as is reasonably practicable, during the risk management process. [OHS Regulations r56\(2\)\(e\)](#)  
They must also be addressed in the development of emergency and rescue procedures. Where any openings are not of an adequate size for emergency rescue work to be undertaken, their size must be increased. If it is not reasonably practicable for an employer to increase the size of the openings, an alternative means of entry and exit from the space for rescue purposes must be provided. [OHS Regulations r71](#)

## Maintenance of plant

162. An employer must ensure that any plant provided for use in emergency procedures is maintained so that it is fit for its purpose. [OHS Regulations r72](#) This should include cleaning, inspection for any defects, testing and repair or replacement of worn or defective parts.

# Appendix A – The compliance framework



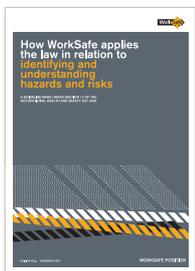
**The Occupational Health and Safety Act 2004 (OHS Act)** sets out the key principles, duties and rights in relation to occupational health and safety.



**The Occupational Health and Safety Regulations 2017 (OHS Regulations)** specify the way in which a duty imposed by the OHS Act must be performed, or prescribe procedural or administrative matters to support the OHS Act (eg requiring licences for specific activities, the keeping of records or giving notice).



**Compliance codes** provide practical guidance to duty holders. If a person complies with a provision of a compliance code, they are deemed to comply with the OHS legislative duty covered by the code provision. However, compliance codes are not mandatory, and a duty holder may choose to use some other way to achieve compliance.



**WorkSafe positions** are guidelines made under section 12 of the OHS Act that state how WorkSafe will apply the OHS Act or OHS Regulations or exercise discretion under a provision of the OHS Act or OHS Regulations. WorkSafe positions are intended to provide certainty to duty holders and other affected parties.



**Non-statutory guidance** includes information published by WorkSafe aimed at building people's knowledge and awareness of OHS issues, risks to health and safety, and the disciplines and techniques that can be applied to manage and control risks. Non-statutory guidance is not mandatory, nor does it provide any *deemed to comply* outcomes for duty holders. This guidance does, however, form part of the *state of knowledge* about OHS.

# Appendix B – Examples of incidents in confined spaces

Work in a confined space can involve the risk of serious injury or death by exposure to harmful atmospheric contaminants or engulfment. Some confined spaces incidents have been described below to highlight the high risk nature of this work. These incidents, which occurred in Australia and overseas, include near misses, injuries and fatalities.

## **Multiple fatalities in a water tank**

An employee entered a water tank that contained a water/nitrogen mixture from the displacement of a rigless coil tubing operation and became incapacitated. A co-worker, in an attempt to rescue the first employee, entered the same tank and for the same reason was followed by two other co-workers. Realising that four of his employees were inside the tank, the supervisor ordered the tank drained. He then asked two more of his employees to enter the tank to rescue the four already trapped inside by using a rope (safety line). Three of the rescued employees were unconscious and one was semi-conscious. All four employees were immediately evacuated to a local clinic. After receiving first aid, the semi-conscious employee was evacuated to a nearby hospital for further treatment. The three others were pronounced deceased by a local doctor.

## **Close call in a farm tank**

A dairy farmer set up a ladder and climbed into a full tank of fermenting corn starch where he was quickly incapacitated by fumes. It was a hot day and the corn starch was producing carbon dioxide. This reduced the oxygen levels, creating conditions that cause asphyxiation. The farmer's family saw him attempt to climb out of the tank before his head disappeared. One son climbed in after him and was overcome; a second son climbed in and was also overcome. Two Victoria

Police officers were close by. With no breathing apparatus on scene and understanding that the situation was desperate, one officer went into the tank to drag out the victims while the other held onto his belt. The farmer and his sons were taken to hospital in a critical condition but survived.

## **Fatality in an LPG tank from oxygen deficiency**

An employee collapsed in an LPG storage tank at a service station due to a lack of oxygen. The tank had been purged several times with nitrogen to remove all remaining LPG and left to stand for an hour. The supervisor then put his head in the opening of the tank and smelled the atmosphere but did not detect the smell of LPG. An employee then entered the tank without any safety equipment. Shortly afterwards he collapsed. A second employee entered the tank to attempt a rescue and also collapsed. The supervisor then introduced pure oxygen instead of air into the tank, which was dangerous because it added to the risk of explosion. The second service station employee survived, although there was a delay during the rescue process due to difficulties of access. The first service station employee who entered the tank was also rescued but sustained fatal injuries as a result of the accident.

## **Two fatalities as a result of carbon monoxide poisoning**

Two brothers were exposed to carbon monoxide poisoning in an underground water tank on their father's farm. They had been using two petrol-driven pumps over two days to pump out water. On the second day, when the water level was lower, it became apparent that neither of the pumps was fitted with a hose long enough to reach the bottom of the tank. To overcome the problem, one pump was lowered about a metre

# Appendix B – Examples of incidents in confined spaces

into the tank and secured by ropes. One brother got into the tank when it was nearly empty. He collapsed and the other brother and a friend quickly climbed in and attempted to rescue him. The second brother collapsed. The friend attempted to rescue the two brothers, but he was also affected by fumes and had to get out of the tank. Neighbours pulled the two brothers from the tank, but both died before reaching the local hospital.

Tests later revealed that the petrol-driven pump was discharging a very high level of carbon monoxide from its exhaust. Calculations confirmed that a lethal concentration of carbon monoxide would have been generated in quite a short period of time after lowering the pump into the tank.

## **Hazardous atmosphere and oxygen deficiency fatality in a sewer**

A water board employee was working to clear a blocked sewer. The equipment the employee was using to unblock the sewer became caught and the employee entered the sewer to free the equipment. The clearing of the blockage produced a gush of water and released sewerage gases. The employee collapsed as he was about to climb out of the access hole. A boy on work experience with the employee attempted to pull him out but was unsuccessful. The employee fell back into the sewer and the boy went to get help. The employee was unable to be resuscitated after being pulled from the sewer.

## **Employees overcome by carbon monoxide**

Two employees suffered carbon monoxide poisoning after being overcome by smoke while they were in a silo that contained smoking wood chips. The silo had a side door opening onto a landing about three metres above the floor, and access was provided by a steel ladder. A fire erupted in the silo, which was extinguished by employees from outside the silo. After about 30-45 minutes, three employees entered the silo to shovel out the burnt wood chips. As a result of exposure to the atmosphere in the silo, one

employee became dizzy and had to be given oxygen and taken to hospital. Work then continued in the silo until another employee became dizzy and also had to be given oxygen and hospitalised.

## **Lucky escape**

Two contractors were inside a tank applying glue to sheets of rubber, which were then attached to the walls of the tank. The walls of the tank also had glue applied to them. The two employees were overcome by fumes generated by the glue. One employee collapsed and the other became disorientated after he removed his face mask to help his co-worker. One of the employees had to be helped from the tank, while the other was dragged out. A similar incident had occurred the previous week.

## **Engulfment incident**

A large bin used by a poultry feed processing company to load poultry feed into a weighing hopper became blocked. An employee wearing a safety harness entered the bin to clear the blockage. While clearing the blockage the employee fell, went through approximately three metres of feed, and dropped out into the weighing hopper below. After a standby person opened the weighing hopper to empty the feed, the employee was winched back out of the bin. Subsequently, the company formulated a different feed to reduce the number of bin blockages, considered safer methods of clearing blockages to reduce the need to enter the space and put risk control measures in place for further entries into the bins.

## **Degreasing fatality**

A man working at a metal finishing firm, inside a degreasing tank which contained trichloroethylene, was found collapsed. The tank measured approximately 0.7m x 2m x 2m. The man had apparently decided to empty and de-sludge the tank alone. He entered the tank without breathing apparatus (none was available) and without leaving the tank to ventilate. The tank had not been emptied in six months. The man subsequently died.

# Appendix C – Confined spaces definition template

**Table C1 – Is the space a confined space?**

- (i) An answer of 'no' to any of the questions below does not necessarily mean that the space is safe to enter. The general provisions of the *Occupational Health and Safety Act 2004* may apply.
- (ii) Where there is any uncertainty as to whether the confined space criteria is met, either:
  - seek more information as required, or
  - consider the criteria to be met and apply Part 3.4 of the OHS Regulations.

An example of how this template can be used to determine whether a particular space is a confined space is available on page 11 of this compliance code.

**Note:** A space that is a shaft, trench or tunnel that is a mine or is part of the workings of a mine is not a confined space under the OHS Regulations.

Description of space	Confined space criteria						Confined space?  If the answer to A, B, C and at least one of the questions in D is yes, then the space is a confined space.
	A Is the space enclosed or partially enclosed?	B Is it likely to be entered and is it at normal atmospheric pressure?	C Does the space have a limited or restricted entry or exit?	D Does the space contain, or is it intended to contain:			
				a harmful level of atmospheric contaminants?	an unsafe oxygen level?	substances that could cause engulfment?	

# Appendix D – Sample confined space entry permit

**Note:** A confined space entry permit should only be created if the work cannot be completed without entering the space (for example by using another work method that eliminates the need to enter the space).

## Confined space entry permit

### General

Location of work:

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Description of work:

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### Control measures

#### 1. Isolation

Space should be isolated from:	Specify location/method	Locks and/or tags have been affixed to isolation points	
Water/gas/steam/chemicals		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Mechanical/electrical drives		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Auto fire extinguishing systems		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Hydraulic/electric/gas/power		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sludge/deposits/wastes		Yes <input type="checkbox"/>	No <input type="checkbox"/>

# Appendix D – Sample confined space entry permit

## 2. Atmosphere:

The atmosphere in the confined space has been tested:

### Result of tests:

Oxygen \_\_\_\_\_ % LEL (See paragraphs 56–58 for information on oxygen levels)

Flammable gases \_\_\_\_\_ % LEL (See paragraphs 63–66 for information on flammable gases)

Other gases (specify name):

\_\_\_\_\_ ppm (less than \_\_\_\_\_ ppm)

\_\_\_\_\_ ppm (less than \_\_\_\_\_ ppm)

Other airborne contaminants:

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The conditions for entry are:	YES	NO
With air-supplied respiratory protective equipment	<input type="checkbox"/>	<input type="checkbox"/>
With other respiratory protection equipment (specify)	<input type="checkbox"/>	<input type="checkbox"/>
With escape unit	<input type="checkbox"/>	<input type="checkbox"/>

## 3. Hot work

	YES	NO
Area clear of all combustibles including atmosphere	<input type="checkbox"/>	<input type="checkbox"/>
Type of appropriate fire prevention equipment available:		
Suitable access and exit	<input type="checkbox"/>	<input type="checkbox"/>
Hot work is permitted	<input type="checkbox"/>	<input type="checkbox"/>

# Appendix D – Sample confined space entry permit

## 4. Personal protective equipment

The following safety equipment must be worn:	Type
Respiratory protection	
Harness/lifelines	
Eye protection	
Hand protection	
Footwear	
Protective clothing	
Hearing protectors	
Safety helmet	
Communication equipment	
Other	

# Appendix D – Sample confined space entry permit

## 5. Other precautions

	YES	NO
Warning notices/barricades	<input type="checkbox"/>	<input type="checkbox"/>
All persons have been trained	<input type="checkbox"/>	<input type="checkbox"/>
Is continual air monitoring required (provide details)?	<input type="checkbox"/>	<input type="checkbox"/>

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## 6. Emergency response

Procedures/equipment available

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## 7. Standby person

Standby person requirements (see paragraphs 149–150 for more information):

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## Authority to enter

*The control measures and precautions appropriate for the safe entry and execution of the work in the confined space have been implemented and persons required to work in the confined space have been advised of and understand the requirements of this permit.*

Signed (employer): \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

This permit is valid until: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_





This document is intended for general guidance purposes only. The Code provides practical guidance for those who have duties or obligations in relation to the *Occupational Health and Safety Act 2004* and the *Occupational Health and Safety Regulations 2017*. Employers and employees should always check the legislation and make their own assessment about what action they need to take to ensure compliance with the law.



### **WorkSafe Agents**

Agent contact details are all available at  
[worksafe.vic.gov.au/agents](https://worksafe.vic.gov.au/agents)

### **Advisory Service**

Toll-free 1800 136 089

Email [info@worksafe.vic.gov.au](mailto:info@worksafe.vic.gov.au)

### **Head Office**

1 Malop Street, Geelong 3220

Phone (03) 4243 7000

Toll-free 1800 136 089

Website [worksafe.vic.gov.au](https://worksafe.vic.gov.au)

### **Information in your language**

For information about WorkSafe in your own language, call our Translating and Interpreting Service (TIS National) on **131 450**.