

**These notes are based on the National Units of Competency:**

RIIWHS202D	Enter and work in confined spaces
RIIRIS201D	Conduct local risk control
MSAPMPER200C	Work in accordance with an issued permit

## **Training Course Overview**

**You will learn about:**

- **Working in a confined space**
- **Confined space equipment**
- **Risk Assessing and confined space permits**



## Compliance

When performing any work in a confined space, employers, employees and contractors are bound by:

- Work Health & Safety Act 2011
- Work Health & Safety Regulations 2011
- Confined Spaces Code of Practice &
- Australian Standard – Confined space AS 2865 – 2009

### Work Health & Safety Act 2011

This is a national act of parliament that is designed to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces.

#### Enforcement of the act

Safe Work Australia appoints inspectors who are typical work health and safety inspectors operating in each state.

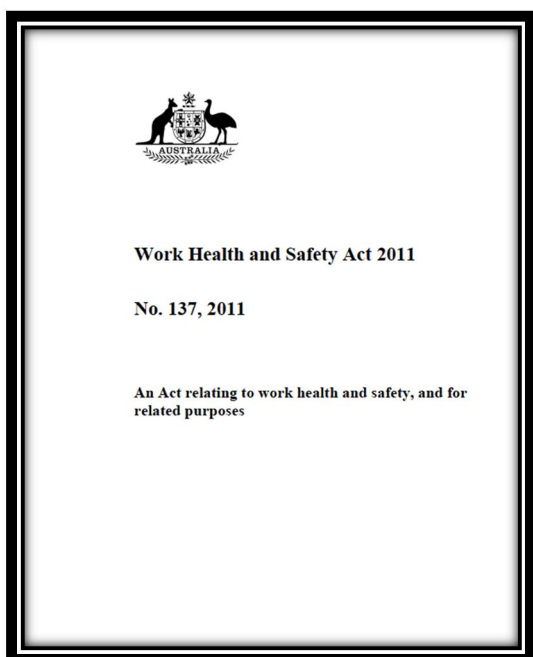
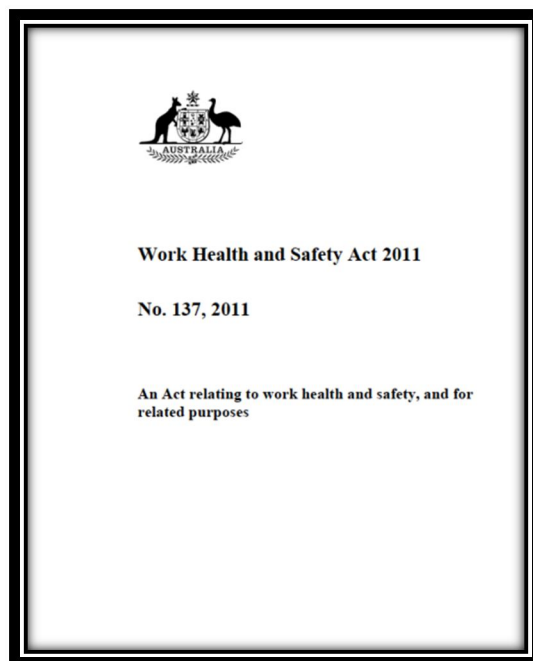
### Work Health & Safety Regulations

A person conducting a business or undertaking who has a duty under the regulations to manage risks to health and safety must as an example:

- 1 A requirement not to exceed an exposure standard.
- 2 A duty to implement a specific control measure.
- 3 A duty to assess risk.

Penalty for non-compliance of regulations in confined spaces:

- (a) In the case of an individual — up to \$6 000.
- (b) In the case of a body corporate — up to \$30 000.



## Code of Practice - Confined Spaces

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks that may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS Act and Regulations. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

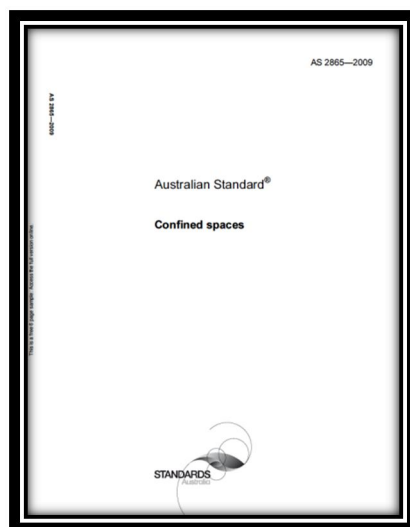


## Australian Standard (AS/NZS Australian/New Zealand)

### What is a Standard?

Standards are published documents setting out specifications and procedures designed to ensure products, services and systems are safe, reliable and consistently perform the way they were intended to. They establish a common language which defines quality and safety criteria.

These documents are practical and don't set impossible goals. They are based on sound industrial, scientific and consumer experience and are constantly reviewed to ensure they keep pace with new technologies.



**AS/NZS 2865 Confined Spaces – 2009** supplements the WHS Act and sets out minimum standards to ensure the safety of persons working in confined spaces.

***The Standard requires that all personnel working in a confined space (except mining), supervising, performing risk assessments, issuing entry permits, managing contractors, on standby for rescue, first aid etc, are to be trained in the nature, hazards and precautions to be followed during the job by competent trainers.***

## Summary

The Work Health and Safety Act, The Work Health and Safety Regulations, Codes of Practice and Australian Standards are compliance documents that must be adhered to, and they require you to:

- Risk Assess all work to be done
- Consult with all workers during the risk assessment process
- Apply appropriate control measures to all hazards identified

Who has responsibilities under these WHS documents?

- The self-employed
- Persons in control of a workplace
- Principal contractors
- Designers, manufacturers and suppliers
- Erectors and installers
- Workers and other persons at the workplace



***NO ONE IN THE WORK PLACE IS EXEMPT!***

## Definition

**What is a confined space in accordance with regulations?**

**Regulation 5:** A confined space means an enclosed or partially enclosed space that:

- is not designed or intended primarily to be occupied by a person; and
- is, or is designed or intended to be, at normal atmospheric pressure while any person is in the space; and
- is or is likely to be a risk to health and safety from:
  - an atmosphere that does not have a safe oxygen level, or
  - contaminants, including airborne gases, vapours and dusts, that may cause injury from fire or explosion, or
  - harmful concentrations of any airborne contaminants, or
  - engulfment.

***A confined space is determined by the hazards associated with a set of specific circumstances and not just because work is performed in a small space.***

Confined spaces are commonly found in vats, tanks, pits, pipes, ducts, flues, chimneys, silos, containers, pressure vessels, underground sewers, wet or dry wells, shafts, trenches, tunnels or other similar enclosed or partially enclosed structures, when these examples meet the definition of a confined space in the WHS Regulations.

**Remember you must also assess the work you will be doing in the space, as that may create a confined space.**

***What is NOT a confined space for the purposes of the WHS Regulations?***

A confined space does not include a mine shaft or the workings of a mine.

**When has a worker entered a confined space?**

**The AS/NZS 2865 defines entry to a confined space:**

*“When a person has entered a confined space is when a person’s upper body and/or head is within the confined space, the person is considered to have entered the confined space”*



**Signage**

Before any work in relation to a confined space starts, signs must be erected to prevent entry of persons not involved in the work.



## Typical training is:

**One Day Course – Enter & Work** – units of competency allow that person to actively enter and work safely in a confined space in accordance with an issued permit and conduct local risk control.

**Two Day Course – GAS TEST & Permits** – you have now completed Day 1 so on Day 2 you add the competencies of Gas Test Atmospheres & Operate Breathing Apparatus. This now skills the attendee to work as a confined space standby.

**Three Day Course – RESCUE** – you have now completed Days 1 & 2 so Day 3 is confined space rescue skilling. This includes a National CPR accreditation, use of portable fire fighting equipment, undertake confined space rescue & observe permit work. Full accreditation.

## Refresher Training of Competencies

The Australian Standard 2865 clearly states:

***“Persons shall be reassessed at appropriate intervals to maintain their Competency to conduct tasks associated with confined spaces.”*** We recommend annual refresher training to meet this requirement.











## Records of training and competency

At Certificate of Attainment showing the achieved competencies is issued to each successful student, and that document is theirs by law. Copies must be kept by employers for compliance and be made available for viewing by authorised persons.

## 1.2.9 Rescue and Emergency Procedures

You must have trained, equipped & competent rescue personnel onsite for confined space entries. The standby must ensure that the rescue plan has been rehearsed prior to entry. Also whether appropriate emergency services can be contacted in the event of an emergency, and who is tasked with that job. ***This is required by the WHS Regulations.***

## Your confined space pre entry checklist

Action	Yes
Obtain and follow procedures	
Clarify and apply work instructions	
Confirm and apply safety instructions	
Obtain and ensure permits meet requirements	
Confirm emergency procedure with standby persons	
Place signage and barriers	
Select/check tools and equipment	
Ensure all persons trained	
Protect environment	
Set up rescue equipment	



## Typical Confined Space Equipment

### Harness

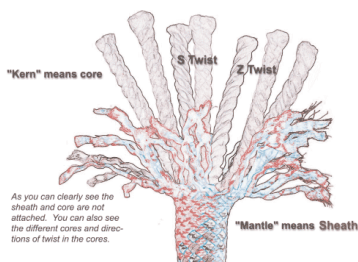


When working in confined spaces that require a harness, workers must wear **CONFINED SPACE HARNESSSES**. A confined space harness has **LIFTING LOOPS** on the shoulders for connection to a spreader bar.

### Spreader Bar



For vertical rescue of a confined space victim, a spreader bar is used. This device should be ready and available at the entry point during confined space operations.



**Static Kernmantle** is rope constructed with its interior core (the kern) protected by a woven exterior sheath (mantle) designed to optimize strength, durability, and flexibility. The core fibres provide the tensile strength of the rope, while the sheath protects the core from abrasion during use. The name is derived from the German word *Kernmantel*, which means *core[-and-]jacket*.

**Double Figure of Eight** is used as a standing eye or loop for anchoring, raising or lowering, connecting equipment or as a safety line

**Alpine Butterfly** is used along the line to create a midline anchor point, change direction of pull or to isolate damage in the line





## Tripods & Rope Rescue Devices

Tripods are designed as portable anchor points, commonly used over access holes. You then need to attach a device to the tripod to raise and lower workers, and this is commonly a rope rescue device or could be a winch, these are known as vertical entry devices (VEDs)



**Davits and Winches** are another form of anchor point and retrieval device. Remember if you are using davits and winches you need to:

- ❖ Ensure the system is correctly setup at entry point
- ❖ Ensure the winch has sufficient cable for operating depth
- ❖ Verify safe work load (SWL) of davit and winch and work to lowest
- ❖ Ensure both devices have been inspected before/after use by you, and tagged by a competent person in the last 12 months.

**Attachment Devices – Karabiners** are used to connect workers to lines, workers to rope rescue devices, lanyards to anchor points etc.

- ❖ Must be double acting
- ❖ Made from steel
- ❖ Self locking or screw & squeeze
- ❖ Oriented so screwed to earth
- ❖ Squeeze to check gate is locked
- ❖ Check SWL



## Gas Detection

The biggest killer in a confined space is gas. Gases come in three categories, toxic, flammable and oxygen.

The only way you will know whether gas is present in your confined space is to use an appropriate gas monitor. **An appropriate gas monitor has the sensors on board to sense the gases your risk assessment has identified as potentially present.**

**Common confined space gases are:**

- **Hydrogen Sulphide** – created by the breaking down of organic matter in liquid ie sewerage, stormwater or stagnate water
- **Carbon Monoxide** – a gas created by in-complete combustion ie exhaust fumes from vehicles, fork lifts, generators etc.
- **Methane** which is a flammable gas and created by the breaking down of organic matter in liquid ie sewerage, stormwater or stagnate water. 5% Methane is the Lower Explosive Level (LEL)
- **Oxygen** levels – should be 20.9% but will tell you if there is more or less, which indicates a problem.



## Correct Operation & Use of gas monitors

1. Visual inspection, ensure within calibration and "TURN ON" in fresh air
2. Ensure it completes a ZERO/Fresh Air Calibration
3. Check battery level on screen and all sensors are OK
4. Recall the PEAKS/memory to ensure clear before testing

5. Understand how to CLEAR THE PEAKS
6. Be aware of Time Waited Average (TWA) & Short Term Exposure Limits (STEL) for toxic gases
7. Know how to switch off at end of day

### Testing Procedures

- Test for layering of gases by lowering monitor slowly from top to bottom and then back to top again, **IGNORING ANY ALARMS.**
- Record readings in PERMIT
- Do not delay entry after gas test, otherwise re test
- Leave monitor in space whilst occupied
- **All workers exit space on sound of ALARM**

### Ventilation

One sure way of reducing the risk of gas being present in your confined space is by having good quality ventilation. Ventilation can be:

- a. **Natural Ventilation** created by opening hatches, lids, doors etc whereby you achieve a suitable fresh air flow through the space,
- b. **Fan Forced Ventilation** – created by inserting into the space a hose connected to an electric fan that can either force air into the space or draw air out of the space:
  - (1) **Positive Pressure Ventilation** is created when you force air into the space
  - (2) **Negative Pressure Ventilation** is created when you draw air from the space

Remember, you must monitor the space with a suitable gas monitor when you are ventilating your space. You never know when the ventilation system you have in place may introduce contaminated air and your gas monitor will warn you of this.

**Remember, gas testing combined with ventilation is your most appropriate control measure where gas may be present.**



## Respiratory Protective Equipment

Common forms of respiratory protection that we use in the work place are:

**Filtration** – Filters out airborne particles and gases when correct filter medium is selected. Remember filters **CANNOT BE USED IN OXYGEN DEFICIENT ENVIRONMENTS** & filters to remain effective need to be changed regularly to stop saturation.



**Compressed Air Escape Set** – these are carried into the space by the worker, placed next to the work area, and only used once the gas monitor alarm goes off or if some other atmospheric hazard appears. They are only used for SHORT ESCAPE – approx 5- 15 minutes

**Self Contained Breathing Apparatus SCBA** – these are used by trained workers for short duration work or rescue (25 minutes dependant on cylinder capacity).



**Airline Breathing Apparatus** – These are used by trained workers where they are required to work for long periods of time in areas that have atmospheric hazards present. They can also be used for rescue.



## Fire Fighting Equipment

Fire and explosion can be one of the hazards of a confined space. If your risk assessment indicates that this is a potential risk, then you need to have the appropriate fire fighting equipment available and know how to use it.

Obviously one of the major risks with hot work is fire. Your Hot Work Permit will indicate to not only have appropriate fire fighting equipment, but a fire watch in place during and after the job is finished.

Fire Extinguishers are an ideal device to put out SMALL fires. Different fire extinguishers are designed for different types of fires.

- ✓ WATER – All RED – is ideal for Class A fires – paper, wood & plastic
- ✓ WET CHEMICAL – Red with an OATMEAL Band – Class A & F fires
- ✓ FOAM – Red with BLUE band – Ideal for Class B fires, flammable liquids
- ✓ POWDER ABE – Red with WHITE band – good for ALL fires except Class F
- ✓ POWDER BE - Red with WHITE band – good for ALL fires except Class A
- ✓ CARBON DIOXIDE – Red with BLACK band – ideal for electrical fires Class E
- ✓ VAPORISING LIQUID – Red with Fluro Yellow Band – best for electrical fires
- ✓ FIRE BLANKET - best for cooking oils Class F

**REMEMBER – Carbon Dioxide Fire Extinguishers CANNOT BE USED in confined spaces, as they put the fire out by displacing oxygen.**

## Risk Assessment

Work Health & Safety (WHS) legislation requires that all foreseeable hazards are identified and the risks arising from these hazards are eliminated or controlled.

Risk management is a legal requirement for all businesses regardless of their size and basically it involves asking the following questions:

- what hazards exist in the workplace?
- how serious are the hazards?
- what can be done to control these hazards?

**Risk assessment is a four step process whereby you:**

- 1 Identify** hazards in the workplace,
- 2 Assess** the risk of those hazards and
- 3 Implement control measures**, which will eliminate or minimise the risk of injury from the hazards you identified.
- 4 Review** control measures which have been put in place must be reviewed periodically to check that they actually fix the problem, without creating another one.

**Hazards can be identified through:**

- **Step back, take fives**
- **Workplace hazards risk assessments**
- **Work task risk assessments such as working in confined spaces**

## **Terminology**

When risk assessing there are key words that are commonly used:

- Hazard - Potential source of damage or harm
- Risk - the consequences of an event and the likelihood of occurrence
- Consequence - Outcome such as loss or injury
- Likelihood - Probability of the consequence occurring
- Risk ranking - Level of danger ie Extreme, High, Medium or Low
- Control - Action taken to minimize or eliminate a hazard
- 
- Safety Data Sheet (SDS) - Identify the make-up of a hazardous substance, give direction on its safe use, PPE to be worn and actions to be taken in the event of an incident related to its use

## 2.1.5 Categories of Workplace Hazards

- Biological - Bacteria, viruses, infections
- Chemical - Gases, vapours, dusts, fumes & mists
- Physical - Noise, lighting, heat, cold, vibration, falling
- Psychological - Shift work, harassment, work load, the public
- Ergonomic - Lifting, bending, reaching, work station design
- Radiation - UV, gamma rays, X rays, microwaves

### Hierarchy of Controls

- 1. Design or reorganise to eliminate the hazard from the workplace**
- 2. Remove or substitute the hazard**
- 3. Enclose or isolate the hazard**
- 4. Minimise through engineering controls**
- 5. Minimise the risk by adopting administrative controls**
- 6. Personal Protective Equipment**

If no single control is appropriate, a combination of the above controls needs to be taken to minimise the risk to the lowest level that is reasonably practicable.



# Permits

## What is a work permit?

- Written authorization to work
- Controls for hazardous work
- Check list of risk assessment controls
- Record of foreseeable hazards

## Permit units of competency

**MSAPMPER200C Working in accordance with an issued permit** - Applies to persons working under a permit and may be called '**Permit Recipients**' or '**Permit Holders**'

**MSAPMPER202A Observe permit work** - Applies to safety observers & standby persons to observe the permit work and respond to adverse situations including rescue.

**MSAPMPER300C Issue work permits** - Applies to issuing of permits and overall control of the permit process.

## Working in accordance with an issued permit

This is the responsibility of all workers working under a permit & where required:

- Apply for permits
- Identify the scope of the permit
- Prepare for permitted work
- Work in accordance with an issued permit
- Complete permits to work



## Types of Permits

- **Confined Space** - Used for confined space entry, often combined with other work permits
- **Hot work** – welding, flame cutting, gouging and grinding
- **Heights** – working where a fall can occur from one level to another that may cause injury and a fall arrest system is to be used.

- **Excavation** – removal of soil or rock from a site to form an open face, hole or cavity using tools, machinery or explosives
- **Other** – other hazardous work activities, such as radioactive materials, energy, steam, electricity, diving cold work

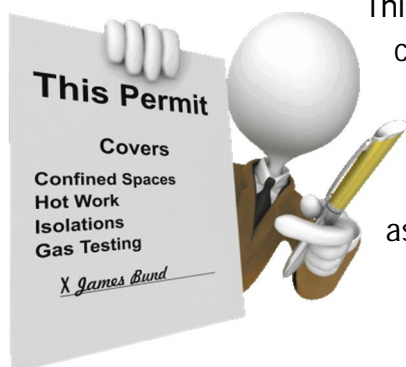
## Observe permit work

The role of the safety observer or standby is to:

- Prepare for the job
- Control the permit site
- Take appropriate action for potential incidents
- Complete safety observer role



## Issue work permits



This person may be responsible for site work teams and contractors working in his area of responsibility. This person may/but may not be involved in the actual work to be performed, but must have a good understanding of the work and complete where required the appropriate risk assessment.

**PLEASE REFER TO THE WEBSITE UNDER GAS DETECTION TRAINING OR OPERATE BREATHING APPARATUS TRAINING FOR MORE DETAILS NOTES IN THESE AREAS.**