RIIWHS202D

Enter and Work in Confined Space

Reference Book

Safety Prompts

Symbols are used throughout this module to highlight specific points, particularly those that involve safety. The symbols and their meaning are shown below.

DANGER
This prompt is used when there is an immediate hazard that IS LIKELY TO result in severe personal injury or death if proper procedures are not followed.

CAUTION
This prompt is used to warn against potentially unsafe practices that COULD result in personal injury or death and/or property damage if correct procedures are not followed.

NOTE
This prompt is used when an operation, condition, or information is of sufficient importance to warrant highlighting.

KEY CONTROL
This prompt is used to indicate where a Key Control has been identified in the training material.

Contents

Introduction

Confined spaces are considered dangerous environments, because they are usually not designed or intended to be areas where people work. In many confined spaces hazardous atmospheres quickly develop due to poor ventilation. Confined space hazards are not always obvious and may change from one entry into the confined space to the next.

It is important that people who are required to enter and work in confined spaces are aware of the requirements of confined space entry.

This training resource outlines the processes for entering and working within a confined space.

On successful completion of this training you will be able to demonstrate how to:

- Identify a confined space
- Plan and prepare for entry and work in confined spaces
- Obtain and complete appropriate authorities, clearances and permits
- Identify and select appropriate PPE
- Identify and control hazards
- Enter and work in a confined space
- Perform post task activities.

NOTE
This training resource is a guide only. Always follow your site procedures when performing your work.

1. CONFINED SPACES

Before you enter any work space, you must determine if it is considered a confined space according to relevant legislation. For example, Australian Standards define a confined space in the following ways.

An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following:

- An oxygen concentration outside the safe oxygen range
- A concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation
- A concentration of flammable airborne contaminant that may cause injury from fire or explosion
- Engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning.

Similar definitions are used in most areas.

1.1. TYPES OF CONFINED SPACES

Confined spaces have limited or restricted means of entry and exit and may contain harmful atmospheres or stored substances that pose a risk to employees working in them.

Examples of potential confined spaces can include:

- Storage tanks
- Tank cars
- Process vessels
- Boilers and pressure vessels
- Silos and other tank-like compartments
- Open-topped spaces such as pits or degreasers
- Pipes, sewers, shafts, tunnels and ducts
- Ditches and trenches
- Enclosed spaces entered through a small hatchway or access point.

Confined Space

NOTE

The above list provides examples of confined spaces and is not meant to be exhaustive. Some work areas may become confined spaces due to the type of work performed. If you are unsure about your work environment contact your supervisor.

1.2. CONFINED SPACE REGISTER

Most work sites have pre-determined and identified confined spaces onsite. Signage is placed at the entry point to any area designated as a confined space or restricted access area. Each location will usually be numbered according to a site plan and listed in a Confined Space Register.

The register lists both generic and specific confined spaces and restricted access areas. Each type of confined space listed will have an accompanying procedure or instruction regulating work within that space.

The type of information included in a register is shown in the following table.

Confined Space

Generic Confined Spaces			
Description of Confined Space	Location	Confined Space	Restricted Access
Fuel, sewage and water tanks not specifically listed in this register		X	
Void spaces within vehicles, machinery and buildings not specifically mentioned in this register			X
Specific Confined Spaces			
Galvanised raw water tank – 1 and 2	ABCD No 13	X	X
Ventilation Units – 1, 2, 3, 4	ABCD No 14	X	
Sewage Inspection Pit	ABCD No 15	X	

NOTE
If you are assigned a task in an area that you feel may be a confined space that has not been identified on your site's confined space register, speak to your supervisor before entering the area.

ACTIVITY
As a group discuss the confined spaces that are in your work area.

2. OPERATOR OBLIGATIONS

You must ensure the safety and health of yourself and others and protect the environment in which you work.

The following actions will help you to do this.

- Ensure that you are physically and mentally fit for work before entering a confined space.
- Do not attempt enter and work in a confined space unless you are trained and authorised to do so.
- Make sure that you have the required authorisation and clearances to perform the work.
- Select, check and use the correct personal protective equipment (PPE). Make sure that the PPE fits properly and is suitable for the task.
- Report unsafe conditions, activities, incidents or near misses to your supervisor or safety representative.
- Report damaged or defective equipment for repair.
- Operate equipment within manufacturer specifications and limitations and according to site procedures.
- Use your site lock and tag system.
- Adhere to site environmental guidelines to prevent damage to the natural environment and designated heritage sites.

2.1. ROLES AND RESPONSIBILITIES

Responsibilities vary depending on your role during the work. The following is a brief description of roles and responsibilities relating to confined space activities.

The list is not comprehensive and you may be allocated additional responsibilities depending on the scope of work. If you are unsure about your role - STOP work and ask your supervisor.

Role	Role Description	Responsibility
Confined Space Entry Authorisation Issuer	A person competent and authorised to allow entry and work in a confined space and to issue an Authority to Work (ATW) and associated Clearance Certificates for work in a confined space.	Only issue ATW and Clearances if you are competent and authorised to do so. Ensure the competency of the ATW and Clearance Acceptor before issuing the Authorisation. Ensure the ATW and associated Clearance Certificates are issued in accordance with OTML and site requirements.
Confined Space Entry ATW and Clearance Acceptor	A person competent and authorised to supervise works to be performed under an ATW and associated Clearance Certificates.	Perform your role according to the required competencies for the task to be performed. Ensure a JSA is developed for presentation to the Authorisation Issuer. Ensure all relevant persons receive instruction in the requirements of the ATW and associated Clearances before entry and commencement of work in a confined space Ensure an Emergency Response Plan is in place for the evacuation of personnel associated with the work being conducted. Immediately evacuate persons from the confined space where any condition is identified that compromises the safety and wellbeing of persons associated with the work. Comply with OTML and site requirements.
Confined Space Entry ATW and Clearance Users	Any person performing work under an ATW and associated Clearances for work in a Confined Space.	Perform your role according to the requirements of the ATW, Clearances, site procedures and safety requirements. Attach your Personal Danger Tag and Personal Lock to the ATW Control Board upon instruction by the ATW and Clearance Acceptor. Only attach lock and tag to an installed Scissor Lockout Hasp secured by the correct ATW Lock for the ATW. Comply with OTML and site requirements.

Role	Role Description	Responsibility
Confined Space Standby Person	The confined space standby person is a competent person assigned to remain on the outside of, and in close proximity to, the confined space. They must be in continuous communication with, and if practical observing, those inside the confined space.	Maintain the Confined Space Entry Log. Continuously monitor personnel in the confined space in accordance with the requirements of the ATW and Confined Space Entry Clearance. Where required and authorised perform the role of the Confined Space Atmosphere Gas Tester. Immediately report any condition that adversely affects the health and wellbeing of persons associated with the work. Immediately evacuate persons from the confined space where any condition is identified that compromises the safety and wellbeing of persons associated with the work. Initiate emergency response, if required. The number of standby persons for the confined space must be sufficient to enable constant appropriate communication and engagement with all personnel within the confined space.
Confined Space Atmosphere Gas Tester	The Gas Tester must clearly understand the proposed scope of work and the hazards so that gas testing requirements can be determined. The Gas Tester conducts atmospheric testing at work areas where there is a possibility of: A potential ignition source contacting a flammable or explosive atmosphere A reduction or increase of oxygen in breathable atmosphere A toxic atmosphere.	Ensure the atmospheric testing and monitoring devices are appropriate to the testing requirements, correctly calibrated and maintained and operated to the manufacturer's specifications. Monitor / test and record the confined space atmosphere in compliance with the requirements of the ATW and Confined Space Entry Clearance. Ensure that: The confined space atmosphere has a safe oxygen range (19.5%-23.5%) Airborne contaminants that may cause impairment, loss of consciousness or asphyxiation are below relevant exposure limits Flammable airborne contaminant concentration is below 5% of its lower explosive limit (LEL). Immediately report any atmospheric condition that adversely affects the health and wellbeing of persons associated with the work. Comply with OTML and site requirements.

2.2. COMPLY WITH LEGISLATION AND SITE PROCEDURES

You must comply with government legislation and industry guidelines when entering and working in confined spaces. You must conduct your work according to organisational and site policies and procedures. It is your responsibility to access, interpret and apply all relevant documentation to entering and working in a confined space. The general hierarchy of compliance documentation is shown in the following table.

GOVERNMENT	ACTS OF PARLIAMENT (ACTS)	Written laws passed by government to set out the general obligations that employers and employees have in relation to each other and themselves. Acts vary across states and territories. **EXAMPLE: Mining (Safety) Act**
	REGULATIONS	Lawful requirements that provide additional details about how to comply with the Acts. **EXAMPLE: Mining (Safety) Regulations**
INDUSTRY	CODES OF PRACTICE	Developed by industry to provide practical guidance for complying with Acts and Regulations. **EXAMPLE: Code of Practice for Managing the Risk of Falls at Workplaces (Australia)**
	STANDARDS (National and International)	Documents that detail practical guidelines, which when followed will ensure that a minimum quality benchmark standard is achieved for a product, service or process. Standards are established by a recognised body such as government or an industry regulator. They cover all industry types including construction, business, and energy and water utilities. **EXAMPLE: AS/NZS 1891.4 Industrial Fall-arrest Systems and Devices - Selection, use and maintenance**
ORGANISATION	MANAGEMENT SYSTEMS	Developed by management to comply with legislation. Management systems provide overarching governance for all site activities including safety, human resources, finances, environment and community engagement. **EXAMPLE: Risk Management System, Authority to Work System**
	POLICIES	Broad statements of the overall intent and direction of a specific activity or interrelated group of activities. Policies ensure that management plans are implemented and that everyone's roles, responsibilities and obligations are clearly defined. **EXAMPLE: Fit for Work Policy, Environmental Policy**
	PROCEDURES	Easy to understand, step-by-step instructions for carrying our tasks safely and in an environmentally sustainable way. **EXAMPLE: Safe Work Procedures**

NOTE
You must comply with applicable government legislation and site requirements. If you are unsure how to access the relevant information, ask your trainer or supervisor.

2.2.1. ENVIRONMENTAL ISSUES

An environmental management plan must be prepared for all sites. The purpose of the plan is to minimise the environmental impact of operations and the use of equipment. When working in confined spaces, you must be aware of procedures and practices for:

- Dust prevention and minimisation
- Control of fumes including exhaust gases and smoke
- Water quality control
- Waste management
- Handling of dangerous substances and chemicals.

Check that the proper environmental control measures are in place. If you find any damaged or missing controls, report them to your supervisor before work starts.

Changes to environmental conditions such as rain and hot weather can affect safe operations within the confined space. You are required to monitor weather conditions and take appropriate action if these changes occur.

3. PLAN AND PREPARE FOR OPERATIONS

Before starting a task, make sure that you have all the necessary information and resources to do your work safely, effectively and efficiently in a timely manner. You must obtain and follow your site procedures to ensure that your work complies with the task requirements.

3.1. OBTAIN INFORMATION

Before starting operations, ensure that you have received a shift briefing from your supervisor, and a handover from the previous operator (if applicable). Briefings are to be conducted according to site policy.

You should not enter and start work in a confined space until you have received and understood the work plan given to you by your supervisor. The work plan should include the job specifications and any other relevant information. The information that you gather will help you to ensure that your work complies with the requirements.

You will need to the following information:

- Job requirements
- Site and task procedures
- Authority to work.

You will also be required to assist in the development of a task specific Confined Space Rescue Plan and Job Safety Analysis (JSA). These items are addressed in the controls section of this resource.

3.1.1. JOB REQUIREMENTS

Before starting any work you need to ensure that you know all of the requirements for the task that you are to complete. This may include the quality requirements, work plans, authority to work requirements and specifications. You must obtain all relevant information if it is not provided to you and add it to your work plan.

3.1.2. SITE AND TASK PROCEDURES

Once you know what your task requires, you will need to obtain all relevant site and task specific procedures and work instructions. This may include instructions for PPE, isolations, ATWs and procedures on how to conduct your allocated task. You may be provided with these during your shift briefing. You will need to obtain the information if it is not provided during the brief. Never start any task without all of the required information.

NOTE
It is your responsibility to make sure you understand and apply all site safety procedures and instructions throughout the task.

3.1.3. AUTHORITY TO WORK SYSTEMS

An authority to work (ATW) system is a formal system used to plan, control and complete work in accordance with safe work practices. The ATW system requires communication and coordination from management, supervisors, ATW issuing officers and those who complete the task. A risk assessment is conducted prior to issuing an ATW.

All persons involved with the ATW must sign on and off the ATW.

The ATW system applies to tasks such as:

- working in confined spaces
- working at heights
- hot work
- digging or excavation
- land/vegetation clearance
- high voltage work.

NOTE
Make sure you know your site requirements for working under an ATW.

3.1.4. ASSOCIATED CLEARANCE CERTIFICATES

Clearance Certificates identify the hazards and list the controls that must be applied to ensure that the specific high risk work can be performed safely.

Work in a confined space will require a Confined Space Entry Clearance Certificate.

Clearance certificates must be checked and approved by the authorised ATW issuer before work can start. A typical Confined Space Entry Clearance Certificate requires the following information:

- Location
- Dates and times of work
- Valid period for the ATW/Clearance
- Hazards
- Atmospheric testing
- PPE requirements
- Job steps
- Hot work requirements
- Personnel sign on/sign off
- Standby person details
- Emergency procedures
- Rescue arrangements
- Authorisation
- ATW closure and sign off
- Controls or other precautions e.g. isolations, ventilation and purging.

When a clearance certificate is issued, the following information is entered into a register:

- ATW and Certificate number and date
- ATW and Certificate issuer name
- ATW and Certificate holder name and organisation
- Work completion date.

If you are required to perform hot work within the confined space, a Hot Work Clearance Certificate must be completed, authorised and attached to the ATW and Confined Space Clearance Certificate.

Hot work includes any work or procedure that involves:

- Thermal cutting including oxy / acetylene cutting
- Welding
- Brazing / soldering
- Grinding
- Mechanical friction
- Electrical tools in a hazardous area
- Any naked flame or spark-producing operation.

3.2. INTERPRET INFORMATION AND PLAN WORK

Once all relevant information has been obtained, it must be interpreted. This should be done at the work site, if possible. Compare what you see on site with the information that you have been given. If you find a variation between the site conditions and the documentation you received, talk to your supervisor.

From the information you, your work team and your supervisor can develop a work plan for conducting the job.

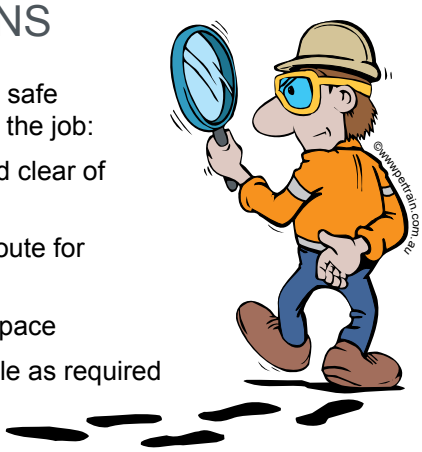
Your plan should include the following information:

- How the task will be safely and efficiently accomplished
- What equipment or plant may be needed
- How hazards will be controlled
- What work area preparation needs to be conducted
- Procedures for communicating and coordinating work with other personnel in the area.

Make sure that all people involved with the work are aware of the work plan and understand their tasks and responsibilities.

NOTE
Clarify vague points and agree on how any changes will be implemented with your supervisor.

3.3. CONDUCT SITE SAFETY INSPECTIONS



Work with other operators to ensure that access and conditions are safe and suitable for entry and work in a confined space. Before starting the job:

- Check that the travel route and work area is firm, level and clear of obstructions
- Check that there is adequate access and a planned exit route for operations
- Check the work area layout and location of the confined space
- Ensure that support personnel and equipment are available as required
- Coordinate the work schedule with other work area operators to ensure there is no unauthorised access to the confined space area.

Notify the relevant support personnel if you need the work area prepared for the shift. At the end of the shift, ensure that changed conditions are noted in your shift report.

3.4. SELECT TOOLS AND EQUIPMENT

Select the tools and equipment suitable for your task. Confirm that the equipment characteristics and technical capabilities are applicable to the job. Check that you have all the required safety equipment including gas detectors and respiratory protective devices.

Inspect the tools, safety and work equipment for serviceability, defects and faults. Do not use any equipment that is in an unsafe condition. Isolate defective equipment and attach an Out of Service tag to the item. Report all damaged or defective equipment according to your site procedures.

When you are using equipment, respond to alarms and indicators, and rectify faults that you are authorised to fix according to site procedures and manufacturer guidelines.

NOTE
Additional information about suitable equipment for use in a confined space is addressed in the 'Specific Controls for Confined Spaces' section later in this resource.



4. CONFINED SPACE HAZARDS

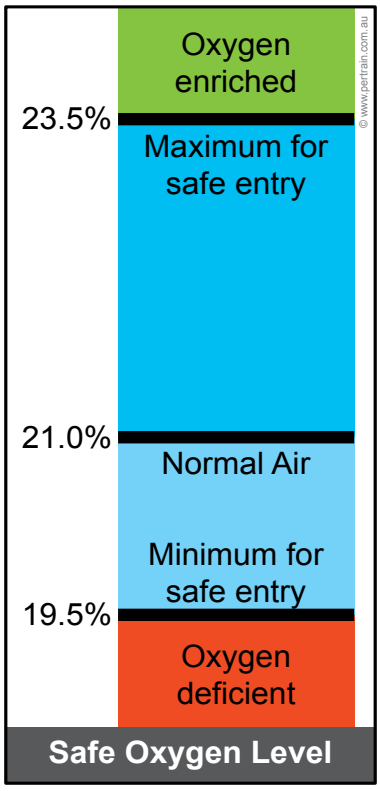
Working in confined spaces is a hazardous task that requires the personnel involved to be aware of the environment, identify hazards and implement controls. Confined space hazards can be categorised as follows.

Hazard	Example
Structural	Unstable design, restricted access, restricted working area
Atmospheric	Toxic gases, oxygen too high or too low, flammable and explosive gases, biological contaminants
Energy	Electricity, radiation, stored energy, moving parts
Environmental	Noise, light, visibility, temperature
Surfaces	Irregular, elevated, slippery
Material Shift	Bulk material shifting or collapsing
Barrier Failure	Flooding, release of free-flowing solid
Psychological	Claustrophobia

While many hazards are common to different work locations, there are some hazards that are specific to confined spaces.

4.1. ATMOSPHERE

The air in the confined space may be hazardous to breathe due to toxic gases, insufficient or too much oxygen, or the presence of explosive gases.



4.1.1. OXYGEN CONTENT

The air may be oxygen deficient or oxygen rich. Oxygen deficiency may be due to:

- Combustion - from welding, heating or cutting
- Bacterial reaction - occurs in sewage
- Inorganic reactions - such as rusting
- Oxygen absorption - grain in a silo
- Displacement by another gas - nitrogen used to purge a vessel
- High oxygen consumption rate - too many people in a confined space.

The following table shows the effects of low oxygen levels.

Low Oxygen Level	Effect
15%	Disorientation, impaired judgement and breathing
14%	Faulty judgement, rapid fatigue
8%	Mental failure, fainting
6%	Difficulty breathing, death in minutes

Oxygen enrichment may be due to:

- Wrongfully purging with oxygen
- Leaking oxygen hose or fitting
- Oxygen injection systems
- Use of chemicals that release oxygen.

Oxygen enrichment can cause:

- Materials to burn more easily
- Explosions
- Health issues.

4.1.2. TOXIC GASES

The majority of gases are colourless, odourless and tasteless. Therefore the atmosphere in a confined space can be toxic but this may not be obvious without testing.

Many gases, such as carbon monoxide, hydrogen sulphide and nitrogen dioxide are poisonous at certain concentrations.

Other gases, such as hydrogen, methane, nitrogen and carbon dioxide, though not poisonous will not support life.

Even oxygen, which is essential to life, must be present in the correct proportions.

The effects of breathing in toxic gases in the air may include:

- Increased respiration
- Disturbed heart rate
- Headaches and dizziness
- Impaired muscle control
- Impaired judgment
- Emotional issues
- Drowsiness and fatigue
- Respiratory illness
- Brain and nerve damage
- Unconsciousness
- Cardiac arrest
- Death.

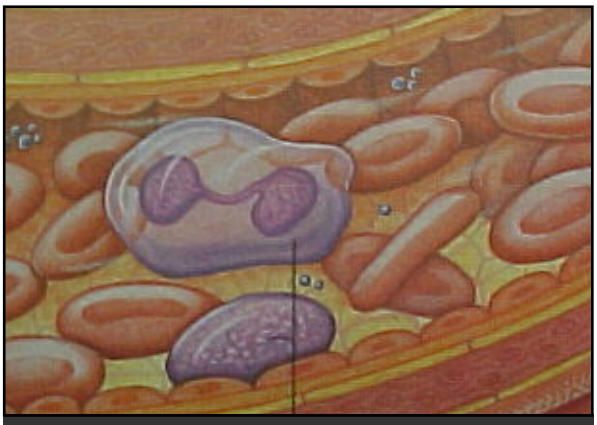
The following information relates to common gases that affect safe work practices in confined spaces.

Carbon Monoxide (CO)

As humans we breath oxygen (O_2) into our lungs and breath out carbon dioxide (CO_2) as a waste product. Oxygen is transported from the lungs to all other parts of the body by attaching to haemoglobin, a protein found in red blood cells.

If we breath in Carbon monoxide (CO), it attaches to the haemoglobin and stops the blood cells from absorbing, and therefore transporting oxygen.

The following table shows the effects of CO levels.



Oxygen Attaches to Haemoglobin

CO Level in parts per million (ppm)	Effect
30	Time Weighted Average (TWA) / Permissible Exposure Level (PEL) - 8 hours
200	Possible mild frontal headache in 2-3 hours
400	Short Term Exposure Level (STEL) Frontal headache and nausea after 1-2 hours Occipital (back of head) after 2-3 hours
800	Headache, dizziness and nausea in 45 minutes Collapse and possible death in 2 hours
1,500	Immediately dangerous to life or health (IDLH)
1,600	Headache, dizziness and nausea in 20 minutes Collapse and possible death in 2 hours
3,200	Headache and dizziness in 5-10 minutes Unconsciousness and danger of death in 30 minutes
6,400	Headache and dizziness in 1-2 minutes Unconsciousness and danger of death in 10-15 minutes
12,800	Immediate effect - unconsciousness Danger of death in 1-3 minutes

NOTE
TWA, STEL and IDLH are based on recommendations from the National Occupational Health and Safety Commission (NOHSC).

Hydrogen Sulphide (H_2S)

Hydrogen Sulphide (H_2S), or rotten egg gas, is very poisonous, corrosive, flammable and explosive. Because H_2S is heavier than air, it tends to accumulate at the bottom of poorly ventilated areas.

Hydrogen sulfide occurs naturally in the body and in the environment, so low levels of H_2S can be tolerated indefinitely. However overexposure can affect various systems in the body, particularly the nervous system that controls our senses, movement, breathing and blood flow.

The following table shows the effects of H_2S levels.

H2S Levels in ppm	Effect
0.13	Minimal perceptible odour
4.60	Easily detectable, moderate odour
10	Beginning eye irritation Permissible exposure level (8 hours)
27	Strong, unpleasant odour, but not intolerable
100	Coughing, eye irritation, loss of sense of smell after 2-5 minutes
200-300	Marked conjunctivitis (eye inflammation) Respiratory tract irritation after 1 hour
500-700	Loss of consciousness and possible death in 30 minutes to 1 hour
1000-2000	Immediate effect - unconsciousness with early cessation of respiration Death in a few minutes (death may even occur even if individual is removed to fresh air at once)

Sulphur Dioxide (SO_2)

Effects of SO_2	
TWA	2 ppm
STEL	5 ppm
IDLH	100 ppm

Sulphur Dioxide is a toxic gas with a strong, irritating smell. Exposure to concentrations of 10 to 50 ppm for 5-15 minutes causes irritation of the eyes, nose and throat, choking and coughing.

Other health effects include headache, general discomfort and anxiety. Those with impaired heart or lung function and asthmatics are at increased risk.

Repeated or prolonged exposure to moderate concentrations may cause inflammation of the respiratory tract, wheezing and lung damage.

Exposure of the eyes to liquid sulphur dioxide (from for example in an industrial accident) can cause severe burns, resulting in the loss of vision.

4.1.3. FLAMMABLE / EXPLOSIVE ATMOSPHERE

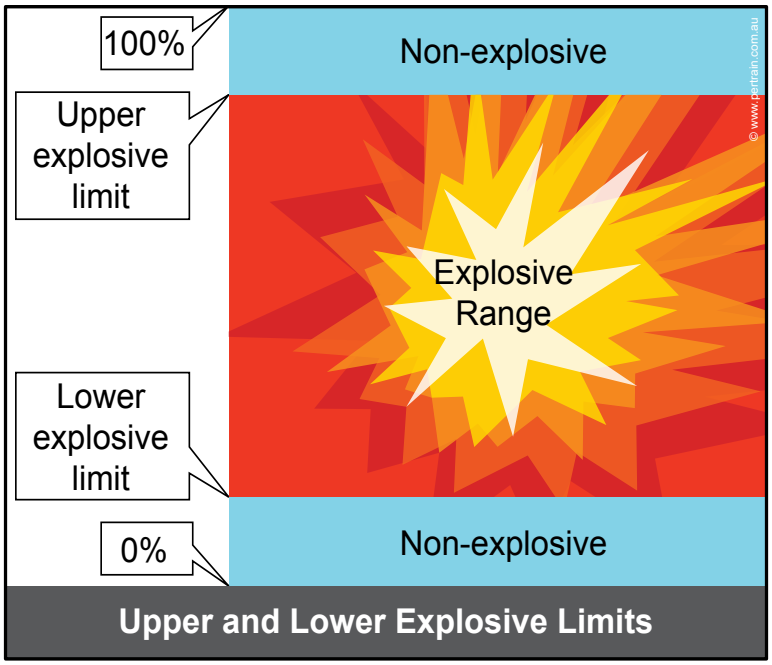
Flammable gases trapped in a confined space create a hazard. A flammable atmosphere in a confined space can arise from:

- Enriched oxygen
- Vaporisation of flammable liquids
- Chemical reactions
- Concentrations of combustible gas
- By products of the work.

If gases in the confined space reach their flammable limits, or come into contact with an ignition source, an explosion and fire may occur. For a gas to become flammable, the concentration must fall within a particular explosive range.

For example, the explosive range of methane is 5% to 15%. This means that below 5% (the Lower Explosive Limit or LEL) the methane / air mixture is too lean to explode. Concentrations above 15% (the Upper Explosive Limit or UEL) are too rich to support combustion. The risk occurs in the explosive range where the mixture of methane and air is dangerous.

NOTE
Ensure that the atmosphere is tested for harmful substances. Monitor your environment using the appropriate equipment.



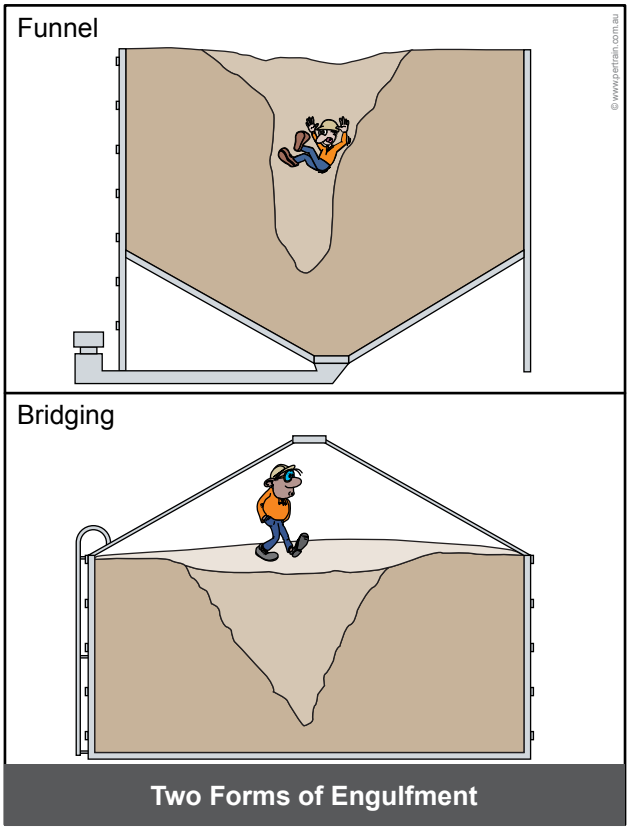
4.2. ENGULFMENT

Engulfment may occur from material in storage containers and excavations as well as by flooding.

4.2.1. STORAGE CONTAINERS

When material is stored in silos, bins or hoppers, engulfment can cause injury or death by asphyxiation or crushing. Engulfment can take place in two ways:

- Funnelling
- Bridging.



Two Forms of Engulfment

Funnelling:

When material flows out of a container, it often creates a funnel-shaped vortex. A person standing on the material, even at the edge, can be drawn into the funnel when material is emptied.

Bridging:

Bridging can occur when the top surface of stored material forms a hard crust. As the material is drawn from the bottom of the silo, bin or hopper, a void is created. If you are standing on top, the crust may give way and you will become engulfed in the material.

NOTE
Consult your site safe working procedure when performing tasks in silos, bins or hoppers.

4.2.2. EXCAVATIONS

Material can collapse when a trench is not adequately shored. Adopt a safe working approach when eliminating hazards.

- Shore up the material in an excavation.
- Use a trench box or other devices.
- Batter or bench the excavation walls if possible.
- Choose the safest approach route.
- Ensure adequate access and egress.
- No internal combustion engines near or in trench.
- Spoil must be at lease one metre from the edge.
- Vehicles and machinery must be at least one metre from the edge.
- Monitor conditions constantly.

If you think it is unsafe, STOP work and talk to your supervisor.

4.2.3. FLOODING

Flooding of a confined space may be sudden or gradual and may introduce other hazardous substances.

Flooding can include:

- Steam, for example from damaged pipe work
- Water from rain, burst water pipes or fire fighting operations
- Gas leaks from damaged pipe work
- Industrial waste consisting of toxic chemicals
- Sewage arising from faulty isolation or a leaking system.

Before entry into a confined spaced, make sure that all pipelines have been isolated, valves are turned off and locked out and isolation points are locked and tagged. Verify all isolations.

Flood Mitigation

4.3. BIOLOGICAL HAZARDS

Contact with micro-organisms such as viruses, bacteria or fungi, can result in infectious diseases, dermatitis or lung infections. Sewers are an example of a confined space where biological hazards may be present.

4.4. HOT WORK

Welding, thermal or oxygen cutting (including fire or spark-producing) operations in confined spaces or in areas next to confined spaces that contain flammable atmospheres can increase the potential for fire or explosion.

Hot Work in Confined Space

4.5. HEAT STRESS

The normal air movement within a confined space may not be adequate to provide and maintain a safe working environment. Temperatures with the confined space can be many degrees hotter than the outside temperature depending on the position of the confined space and the material around it.

4.6. MECHANICAL HAZARDS

Sources of mechanical hazards include plant such as:

- Augers
- Agitators
- Blenders
- Conveyors
- SAG and ball mills
- Mixers and stirrers.

The close environment within a confined space means that entering a confined space with energised mechanical sources can increase the risk of being struck by moving objects, entanglement, crushing, cutting, piercing or shearing of parts of a person's body.

Processing Plant

4.7. ELECTRICITY

Damaged or faulty wires and cables, or electrical equipment that is live during work, pose a serious hazard to work in a confined spaced. Arc welding cables and components are a common source of electrical hazards. The risk of electrical hazards increases in wet or humid conditions.

Verify that all sources of electricity are isolated and that all electrical equipment used on the job is serviceable and connected to a earth leakage circuit breaker (ELCB).

NOTE
Treat all wires as live unless tested and proved 'dead'.

Treat all wires as live unless tested otherwise

5. IMPLEMENTING CONTROLS

Hazards must be identified and controlled to avoid an incident or emergency. Conduct a personal hazard identification and risk assessment procedure before starting work, especially if:

- The task is unfamiliar to you
- You are unsure that your work can be carried out safely
- The task is potentially hazardous
- The task is potentially a high-risk activity.

Use your site hazard analysis tool to identify and control workplace hazards. Apply the Hierarchy of Controls for confined space entry in the following order.

1. **Elimination:** Remove the need to enter the confined space, either by design or by performing the work from outside the space.
2. **Substitution:** Replace the hazardous work task in the confined space with a less hazardous one.
3. **Engineering:** Engineer out the hazard or modify the confined space, plant or process.
4. **Administration:** Apply site procedures and carry out training on working in confined spaces.
5. **PPE:** Use equipment designed for safe work in confined spaces.

Use your site risk assessment where available for the controls required. The following table provides some examples. Your site may require additional or different controls.

Hazard	Example of Control Measures
Access	• Signage and barricades
Atmosphere	• Atmospheric testing • Gas detection and monitoring • Ventilation and purging
Heat	• Limit exposure • Rotate personnel
Machinery	• Mechanical isolation • Machine guards
Electricity	• Electrical isolation
Stored energy	• Control and isolation
Fire, explosion	• Prevention or control of ignition sources • Hot work ATW, clearance and controls
Chemicals	• Use a less hazardous chemical or solvent
Engulfment	• Isolation • Shoring
Flooding	• Pipeline isolation

Hazard	Example of Control Measures
Biological	• PPE
Communication	• Standby person • Communications equipment
Ability to perform work	• Qualifications and training

ACTIVITY
As a group discuss the hazards specific to confined spaces at your site.

5.1. JOB SAFETY ANALYSIS

A Job Safety Analysis (JSA) is used by a work team to identify job steps and control hazards for a task. Conduct a JSA if:

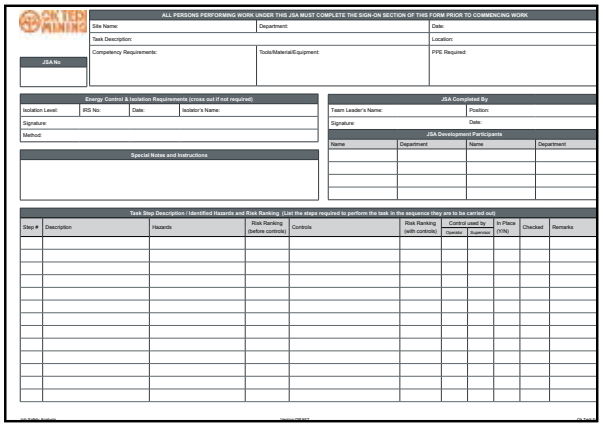
- There are uncontrolled hazards
- There is no written job procedure for a complex task
- ATW or Clearance is required, for example working at heights
- Equipment brought to the site creates a hazard
- A procedure needs to be changed
- An incident has occurred during operations.

A JSA is carried out by two or more people. Every person who takes part in the JSA must read and understand the information before signing the JSA form and commencing work.

NOTE
If you do not understand the JSA, disagree with it's contents, or feel that the task is not safe to proceed, talk to your supervisor.

A JSA should only be used once. It needs to be reviewed before carrying out the same task again as the hazards may have changed. An old JSA can be used as the basis for a new one.

If you are doing the same JSA repeatedly, and there is little variation each time, use the JSA to develop a task procedure.


ALL PERSONS PERFORMING WORK UNDER THIS JSA MUST COMPLETE THE SIGN-ON SECTION OF THIS FORM PRIOR TO COMMENCING WORK

Site Name: | Department: | Date:
Task Description: | Location:
Competency Requirements: | Tools/Material/Equipment: | PPE Required:
JSA No

Energy Control & Isolation Requirements (cross out if not required)
Isolation Level: | IRS No: | Date: | Isolator's Name:
Signature:
Method:

JSA Completed By
Team Leader's Name: | Position:
Signature: | Date:

JSA Development Participants

Name	Department	Name	Department

Special Notes and Instructions

Task Step Description / Identified Hazards and Risk Ranking (List the steps required to perform the task in the sequence they are to be carried out)

Step #	Description	Hazards	Risk Ranking (before controls)	Controls	Risk Ranking (with controls)	Control used by		In Place (Y/N)	Checked	Remarks
						Operator	Supervisor			

5.2. HAZARD REPORT

A hazard report is used to communicate information about identified and uncontrolled hazard/s to your supervisor and management. The purpose of reporting the hazard is to prevent an unsafe condition or behaviour from causing an incident. Controls can then be put in place to reduce or eliminate the hazard.

5.3. PROCEDURES AND WORK INSTRUCTIONS

Procedures have been developed in accordance with legal regulations. They detail the OTML way of doing things such as managing fatigue, traffic management and authorities to work.

Work Instructions (WI) detail specific operational procedures.

Check to see if there is a WI for the confined space task you are to perform. If there is, make sure that no conditions have changed since the WI was completed. Changes may include:

- Weather
- Location
- Equipment being used
- New work team members.

If conditions have changed a new risk assessment, such as a JSA, must be completed.

5.4. PERSONAL PROTECTIVE EQUIPMENT (PPE)

You must wear PPE to protect yourself from injury. Selection and types of PPE are regulated under National Standards and detailed in procedures, ATW and work instructions.

- Always select and wear PPE appropriate to the site and task being performed.
- You must be trained in the correct fit and use of PPE before entering any hazard area.
- Check that PPE is clean and in good condition before it is used.
- Clean PPE that you have used on the job, and store it in the designated area.
- Tag out damaged PPE, and have consumable PPE stocks, such as dust masks and ear plugs, replenished as necessary.

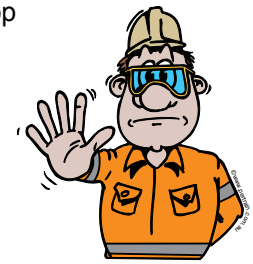
NOTE
Talk to your supervisor if you are unsure what PPE is required.

5.5. COMMUNICATIONS

Two way radios and mobile phones are used when personnel in the confined space and the standby person are not in line of sight or are too far away from each other for hand signalling.

Radios should operate on a dedicated commercial frequency to minimise interference.

Hand signals are commonly used if the person in the confined space and the standby person are in close proximity. Signals vary between sites and tasks, so check that all personnel working in and around the confined space understand the signals to be used before starting the task.

Lift	Lower	Stop
		

NOTE
All signals must be clearly understood. If there is a signal you do not understand, stop the task and ask for the meaning before proceeding.

5.6. HAZARDOUS CHEMICALS

Hazardous chemicals are any substance that, because of its chemical, physical or biological properties, can cause harm to people, property or the environment.

Each work area maintains a register of hazardous chemicals used in their operations. This register includes Safety Data Sheets (SDS) for each hazardous chemical. SDS contain information on storage, transport, handling and first aid for the chemical.

Transport and handling of hazardous chemicals is strictly controlled by site procedures. Further information on hazardous chemicals can be accessed from a chemical database such as ChemAlert (www.chemalert.com).

NOTE
Familiarise yourself with the locations of SDS registers at your site. They should be kept close to where the hazardous chemical is stored and also in a central repository.

5.7. EQUIPMENT ISOLATION AND TAGGING

Before entering a confined space make sure that all sources of energy are isolated and equipment can not start up or move unexpectedly. Site procedures may require you to isolate all equipment when it is not in use. This may involve:

- Turning off the energy source (for example, electrical power to a motor being isolated)
- Releasing energy (for example, compressed fluid or air)
- Locking, supporting, barricading or chocking moving parts to stop movement.

Once you have isolated the equipment and attached your personal lock and tag, verify/prove the isolation to ensure that the power source has been disconnected, all stored energy has been released and all moving parts stabilised. Ensure that interlocking equipment is also isolated.

5.7.1. PERSONAL DANGER TAGS AND LOCKS

Personal Danger tags and locks are used on mine sites and some construction sites. When a Personal Danger tag and lock is attached to an isolation point, it is a direction to all personnel that the equipment is not to be started or operated.

DANGER
Never remove another person's danger tag or personal lock.

5.8. MANUAL HANDLING

To avoid injury to your spine or limbs, use the proper lifting technique. Lifting methods, handling techniques and safety procedures are outlined in health and safety procedures and site safety instructions.

5.8.1. SAFE MANUAL LIFTING TECHNIQUES

Use the SMART lifting technique to safely lift, move and set down the load.

	Step	Description
S	**Size up the load**	• Assess the load size, shape and weight. • Check that there is a clear path to the destination. • Do you need mechanical or human assistance.
M	**Move the load close to your body**	• It requires less effort to lift or carry a load close to the body. • Get a firm grip that can be held for the whole carry. • Keep arms close to your sides, slightly bent at elbows.
A	**Always bend your knees**	• Position your feet slightly apart, as close as possible to the load with one foot slightly ahead of the other. • Check footing is secure and adopt a balanced position. • Bend your knees at a wide angle and use a semi-squat. • Maintain the natural curvature of your spine.
R	**Raise the load with your legs**	• Take a deep breath, raise the load by straightening your legs. • Use leg muscles instead of back muscles. • Do not change grip while carrying. • Complete the lift smoothly and in one move.
T	**Turn your feet to change direction**	• Change direction by turning your feet, not your back and avoid bending, twisting and reaching. • Set the load down by squatting, keeping your head up.

6. SPECIFIC CONTROLS FOR CONFINED SPACES

Control measures for entering and working in a confined space include:

- Signage and barricading
- Ventilation
- Atmospheric (gas) testing
- PPE and breathing apparatus
- Standby personnel
- Emergency response and rescue procedures.

6.1. SIGNAGE AND BARRICADING

Protective barriers must be erected in front of, or around the confined space. These control measures are intended to keep non-authorised personnel out of the confined space.

Additional temporary signage should be erected if the work is in proximity of vehicular traffic and or pedestrians. Signage will also indicate when personnel are inside the space.

Identify the requirements for signage and barricades from your work instructions, JSA, ATW and work area inspections. The signs may include:

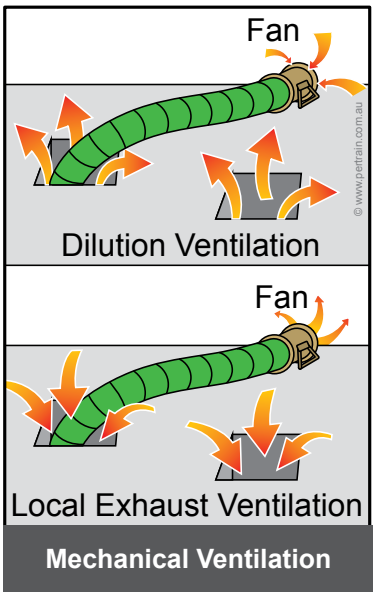
- Warning signs
- Barricades and tape.

After obtaining the signs and barricades, check that they are located according to the work plan.

6.2. VENTILATION

Ventilation in a confined space is crucial to the safe completion of tasks and must be sufficient to ensure that there is adequate fresh air. Ventilation is required to:

- Create a safe, breathable atmosphere within the space
- Maintain temperature
- Purge / flush the space of contaminants and flammable gases/vapours.



The ventilation can be supplied to the space by natural, forced or mechanical means. If there are sufficient openings to the confined space, natural ventilation may be adequate. However, in most cases, mechanical ventilation will be required.

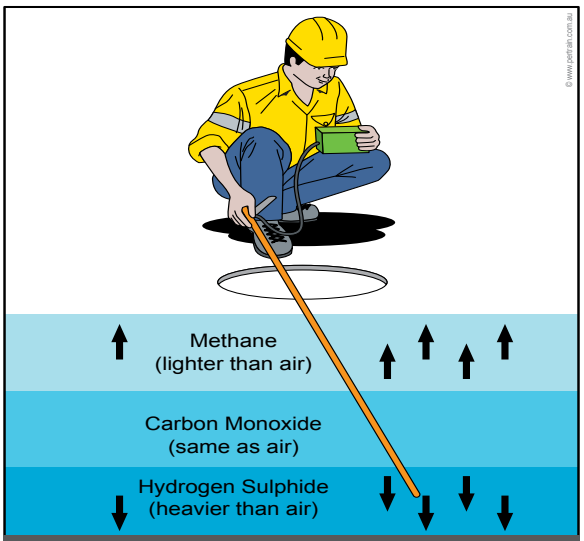
The ventilation requirements must be determined depending on the characteristics of the confined space and the activities to be performed inside the space. Before entry, inspect the confined space from the entry point(s) to confirm that no hazards remain.

6.3. ATMOSPHERIC TESTING REQUIREMENTS

Before entering a confined space, the air within the space must be tested to determine that it is free from both toxic and flammable vapours and that it is fit to breathe.

A competent and authorised person, using a suitable and correctly calibrated gas detector, performs the test and then records the results on the confined space entry authorisation.

NOTE
Testing is also performed throughout the work if there is a likelihood that conditions could change.



Monitoring at Different Levels

6.3.1. TESTING PROCESS

Electronic gas detectors are used to test the atmosphere to test for:

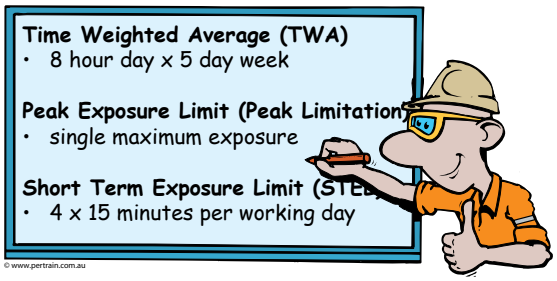
- Oxygen content
- Airborne concentration of flammable contaminants
- Airborne concentration of potential contaminants.

Atmospheric testing is a systematic process. You cannot enter a confined space immediately. The testing sequence must follow a series of steps as shown in the following table.

Stages of Atmospheric Testing		
1	Initial External Test	Test the atmosphere from outside the confined space using probes. Avoid disturbing the air inside the space.
2	Internal Tests	Perform tests on all levels of the confined space (side to side and top to bottom) as contaminants can stratify (occupy different horizontal levels). Gases that stratify include: • Methane – lighter than air • Carbon dioxide – a little heavier than air • Hydrogen sulphide – heavier than air.
3	Test Order	The test order is: 1. Oxygen 2. Combustible gases 3. Toxic gases.
4	Test Duration	Perform each test for at least the minimum time as specified by the instrument manufacturer.
5	Record Findings	Record the test results on the confined space entry authorisation, along with the equipment or method used.

Exposure Standards

Exposure standards usually apply to an 8-hour day, 5 days per week, over a normal working life. This is known as the Time Weighted Average (TWA).



The Peak Exposure Limit is the maximum single exposure permitted at one time.

There are also guidelines in place to ensure that any short-term exposure up to certain concentrations of gas is limited to no more than 15 minutes, for a maximum of four times per working day, with at least 1 hour break between exposures. The concentrations are defined by standards known as Short Term Exposure Limits (STEL).

NOTE
Consult the SDS for advice on what level of exposure is considered acceptable. The absence of an exposure standard does not mean that a contaminant is safe.

Minimum Requirements

Before entering a confined space, the atmosphere of the space must meet the following minimum requirements.

Item	Requirements
LEL	The Lower Explosive Level (LEL) must be less than 5%.
Oxygen	Oxygen concentration must be no less than 19.5% and no greater than 23.5% by volume.
Contaminants	The concentration of other atmospheric contaminants (for example, ammonia, carbon monoxide, chlorine, oil, etc.) must be no greater than the exposure standard expressed as a Time Weighted Average (TWA).
Potential	Confirm that there is no potential for the level of atmospheric contaminant to fall outside the above ranges.
Records	Record all results from air quality tests accurately on the atmospheric testing sheet documentation.
Monitoring	Monitor the air quality at intervals as specified by the JSA or other risk assessment.
Risk Assessment	If air quality conditions change in a confined space (for example if there is a release of airborne contaminants) complete a risk assessment to identify the need for retesting or continuous monitoring of the air quality.

DANGER
No one is to remain in the confined space when the concentration of flammable airborne contaminants is greater than or equal to 10% LEL.

6.4. GAS DETECTION EQUIPMENT

Gas detectors may vary from site to site but all detectors operate on the same principles.

Gas detectors provide not only a test of the air before entry to a confined space but also provide continual readings of the air quality during work in the confined space.

Electronic gas detectors operate continuously and will sound an alarm. They measure a range of different gases and provide direct readings on the LCD display. Strap the detector to your body for continual monitoring during the work.

Typical Gas Monitor

NOTE

If you leave a confined space temporarily during the work, the atmosphere must be tested again before re-entering. Only re-enter the area without testing if the atmosphere has been under constant monitoring to ensure safe levels and this information is available outside the space.

6.4.1. GAS DETECTION TERMINOLOGY

Gas detectors provide information about gas in the air using the following terminology.

Term	Explanation
Percentage	The percentage is the parts of a substance in 100 parts of air. Oxygen levels are measured in percentages and the working level must be between 19.5% and 23.5%.
Parts Per Million	Parts per million (ppm) is the number of parts of a substances in a million parts of air (1 ppm = 0.0001%). Toxic gases and substances are measured as ppm, for example hydrogen sulphide may be present at 10 ppm.
Lower Explosive Limit	The lower explosive limit (LEL) is the smallest quantity of gas, which when mixed with air, will burn if ignited. An explosion cannot occur below the LEL because there is not enough fuel and too much air.
Upper Explosive Limit	The upper explosive limit (UEL) is the greatest quantity of gas, which when mixed with air, will burn if ignited. An explosion cannot occur above the UEL because there is too much fuel and not enough air.

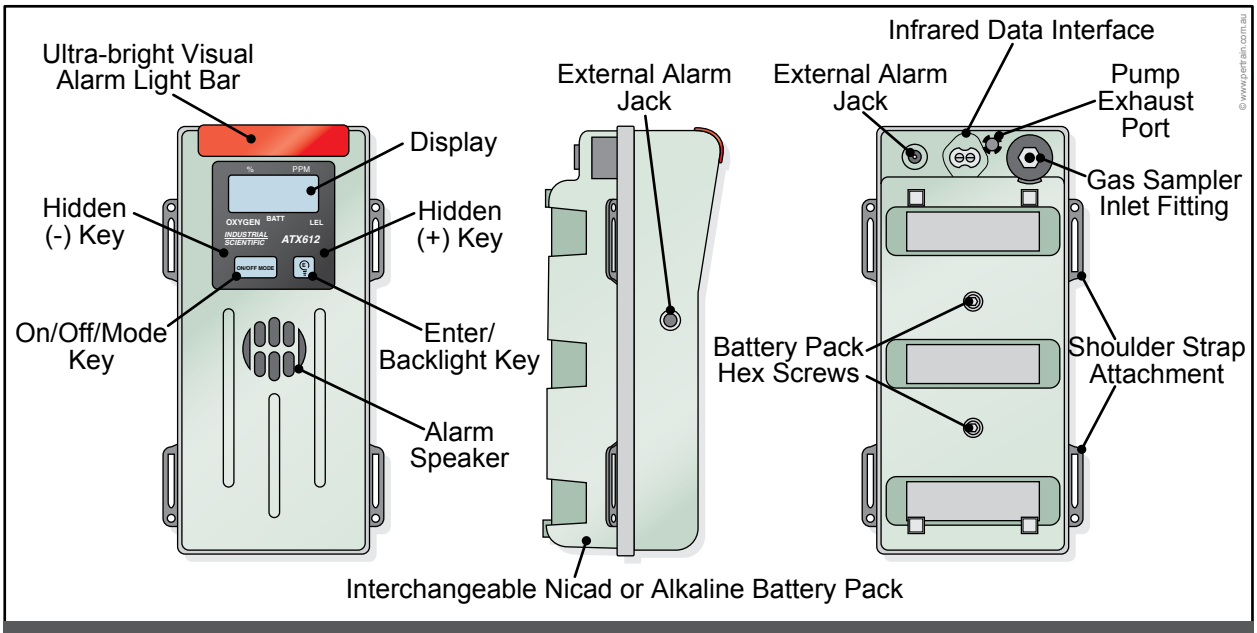
The most common readings from a gas detector are for:

- Carbon monoxide (CO)
- Hydrogen sulphide (H_2S)
- Oxygen (0_2)
- Combustible gases / dust (LEL).

Your machine may measure other gases, while some gas detectors are designed to measure only specific gases.

6.4.2. USING A GAS DETECTOR

Gas detectors should be tested before use to check that the detection and alarm system is not malfunctioning. Check that the battery level is adequate for the task and ensure that the instrument is maintained according to manufacturer recommendations. You will be trained on how to calibrate the instrument.



Typical Gas Monitor

Operate a typical gas detector using the following steps.

1. Press the power button to turn the instrument on.
2. Wait for the instrument to perform a test sequence. Usually an audible beep and a flashing green light will indicate when the test is complete.
3. Test the detector in known clean air.
4. Lower or extend the detector into the confined space.
5. Test for five minutes at different levels to ensure testing of stratified gases.
6. Withdraw the detector and check for alarms or red lights.
7. Record all readings (either as percentages or ppm as required).
8. Check that the readings indicate safe levels.
9. Strap the detector to your body to monitor the gases after entry.
10. Re-test the space before re-entry.

DANGER
Do not enter if the detector indicates the presence of a toxic atmosphere.

6.4.3. MONITORING AIR QUALITY

Monitor the air continually during work and record the readings as required by your site procedures. Notify other workers if the readings become unsafe or hazardous and immediately evacuate the area. If the air quality deteriorates during work, report the incident to your supervisor or other site control authority.

DANGER
Evacuate immediately if an alarm sounds while working in a confined space or if you feel drowsy, ill or disorientated.

6.5. CONFINED SPACE PPE AND BREATHING APPARATUS

Confined space entry requires the wearing of specific PPE in addition to your site PPE requirements.

You must be trained and competent to wear the following PPE. If you have not received training and authorisation to wear this equipment, do not enter the confined space. Contact your supervisor immediately.

6.5.1. SAFETY HARNESSES AND LINES

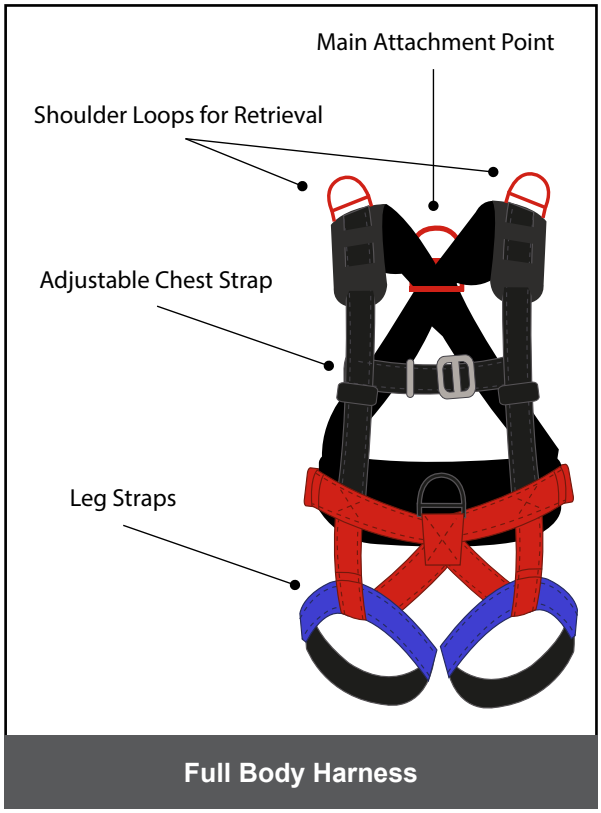
A confined space safety harness is a set of interconnected straps supporting the torso and pelvic area of the body. The system of straps prevents the wearer from falling out of the harness and distributes force.

The harness is connected to a life line and has loops at the shoulder for retrieval in an emergency.

There are two situations in which you should wear safety harnesses or use safety lines. These are when:

- There is a possibility of falling during ascent or descent to the confined space
- Rescue is practicable by a direct vertical or horizontal route.

NOTE
Additional training in the selection, fitting and use of safety harnesses and lines is required.



Full Body Harness

6.5.2. RESPIRATORY EQUIPMENT

The correct respiratory equipment could mean the difference between life and death when working in a confined space. If respiratory equipment is required, you must select, fit and use the equipment correctly. You must also ensure that the equipment is inspected, maintained and stored as required.

An air supplied respirator (e.g. self-contained breathing apparatus) is used in any confined space that may contain atmospheric contaminants.

Air Supplying Respirators

Air supplying respirators have either a self-contained air supply or are supplied from an external air source. Air supplying respirators include:

- Hose masks, with or without a blower using natural air (generally NOT suitable for rescue work)
- Airline respirators with a hose from a compressed air source
- Self-contained breathing apparatus (SCBA).

There are two kinds of SCBA:

- Closed circuit rebreather system
- Open circuit system.

The closed circuit rebreather system, removes carbon dioxide and replaces used oxygen from an oxygen cylinder. This offers longer duration than the open circuit system, but the rebreather has higher maintenance requirements and can introduce oxygen into a potentially flammable confined space environment.

The open circuit system provides compressed air from an air cylinder through a regulator. These units have shorter duration but are easier to maintain.

SCBA Gear

When worn with the proper PPE, both systems provide complete isolation from a dangerous environment.

General Breathing Apparatus Limitations

The use of breathing apparatus is affected by:

- Type of apparatus being used, including cylinder size
- Physical condition of the wearer, including:
  - Breathing rate
  - Emotional state
  - Pace
- Environmental conditions, including heat and humidity
- Work area layout and work load.

Selecting the Correct Respiratory Device

You must select the correct respirator for the task. Australian Standards AS 1715 and 1716 provide information for selecting and using respirators. Factors that will guide you in selecting the device are:

- The nature of the contaminant (particulate, gas, vapour, oxygen deficiency)
- Toxicity and concentration of the contaminant
- Level of immediate danger
- Expected time in the contaminated atmosphere
- Mobility and expected activity of the wearer
- Access to, and nature of, the working environment
- Adequacy of the respirator for the contaminant
- Flammability of the contaminant.

Fitting the Respirator

Fit the respirator over your nose and mouth so that the device is in close contact with your skin. It is essential that the mask forms an effective seal against your face. A beard or wearing glasses may compromise the fit.

Check for the quality of the fit before starting the task by performing a negative pressure test. Some work sites may require you to complete a pressure test on the respirator and to note this on the confined space entry authorisation.

Fitting and Testing PPE

NOTE
You must be trained in the selection, fitting and use of respirators.

6.6. STANDBY PERSON

A standby person (spotter or sentry) is assigned whenever the risk assessment indicates this is necessary. The standby person is in control of the confined space and their directions must be followed.

Standby Person

Before entering the confined space, all operators must check in with the standby person who will confirm the requirements of the confined space entry authorisation and clarify details of the emergency response procedure.

The standby person must:

- Check and confirm that all personnel entering the confined space comply with the confined space entry authorisation and sign on and sign off the ATW
- Check the communications equipment to make sure that the devices are working correctly and rehearse the standard hand signals that may be required
- Be vigilant and remain at the watch point, outside the confined space, for the duration of the task
- Maintain communication with the person working in the confined space at all times
- Update the personnel inside the confined space on outside conditions that may affect working conditions
- Operate the atmospheric testing equipment and monitor other equipment such as ventilation devices
- Wear a watch to record accurate times of work in the confined space
- Fully understand the rescue plan for each confined space, including how to raise the alarm
- Be able to assist with rescue equipment preparation and access to the confined space.
- Raise the alarm, evacuate personnel and request assistance in the event of an emergency.

7. ENTER A CONFINED SPACE

On arrival to the work area, you must prepare for work by identifying the confined space from your work plan and setting up the work area in accordance with the procedures.

7.1. SET UP THE WORK AREA

Set up the work area outside and around the confined space using the following general guidelines.

Ventilation

- Check that all personnel are wearing correct and appropriate PPE.
- Place warning signs and barricades to prevent unauthorised entry.
- Remove clutter from around the access point.
- Confirm that isolation procedures have been performed.
- Check the provision and operation of breathing apparatus.
- Place controls according to the JSA and work plan.
- Set up safe and effective ventilation.
- Set up and/or confirm the communication system.
- Position all necessary rescue equipment close to the point of entry as per the ATW.
- Confirm the emergency response procedure with the standby person.
- Rehearse the rescue procedure with all members of the work party.
- Determine the standby person's location to enable them to provide effective communication during the work.

To access the confined space entry point you may be required to remove an access cover and / or install and secure a ladder.

CAUTION
Use caution when removing an access cover as it may spark an explosion.

DANGER
Do not enter the space until a competent person has successfully performed atmospheric testing.

7.2. SIGN ON TO THE ATW

All members of the work party must sign on to the confined space entry authorisation with their signature, date and entry time. By doing so, you are confirming that you have been informed of the hazards and control measures in place and that you will work under the conditions of the ATW.

7.3. APPLY TAGS AND LOCK-OUTS

Apply tags and lock-outs according to site procedures. You may be required to sign an ATW and apply your personal lock to the ATW board or safe.

8. CONDUCT WORK IN A CONFINED SPACE

When all preparations have been completed, and the atmospheric testing has been recorded on the entry authorisation, you may enter and perform work in the confined space. Apply safe work practices and comply with the ATW and clearance certificate requirements at all times. The following are general guidelines for working in a confined space.

Task	Actions
Open the Access Point	Open or remove the access cover according to site procedures. If cover is detachable, tag the cover and store it in a safe location.
Enter the Confined Space	Enter the confined space safely. If conditions have changed, stop work and do a risk assessment to establish a safe entry method.
Communication	Maintain communication with the standby person throughout the work. Where possible remain in full view of the standby person. Report changed conditions so the standby person can relay information in the event of an emergency.
Conduct the Work	Conduct the work task in accordance with the ATW and clearance certificate requirements and your industry Code of Practice. Do not perform work for which you are not qualified or that is not included within the scope of work on the ATW.
Monitor the Atmosphere	Monitor the air environment using your gas detector. If the atmosphere becomes unsafe, inform fellow workers including the standby person and evacuate the area immediately.
Report Problems	Inform the standby person of any problem and report any discrepancies on the ATW in accordance with site procedures.
Keep to Time	Be aware of your entry time and the time allocated to perform the task. Monitor the time it takes to perform the work. Report to the standby person if the task is taking longer than expected. Further atmospheric testing or resources may be required.

8.1. COMPLETING THE WORK

When the work has been completed, perform the following steps.

1. Remove all tools, materials and equipment from the confined space.
2. Check that all personnel exit the confined space and account for all personnel according to the site procedure.
3. Inspect the confined space to confirm that the work has been completed in line with the work plan, all equipment has been removed and all personnel have left.
4. Close the confined space access point and replace all covers and hatches.
5. Secure the confined space to prevent unauthorised entry.
6. Remove tags and lock-outs according to site procedures.
7. Sign off the ATW log sheet and record the exit time as per procedures.

8.2. EMERGENCY RESPONSE AND RESCUE PROCEDURES

Even if you follow the safety and isolation procedures, incidents can still occur. Work sites are required to have an Emergency Management Plan that details the responsibilities of management and supervisors in the event of an incident. Follow site procedures when responding to emergency situations. Ensure that you know how to respond according to site procedures and the rescue plan in the event of an emergency.

Check that appropriate rescue equipment is available and placed close to the point of entry as required by the ATW.

Rescue equipment may include:

- First aid kits
- Lifelines and harnesses
- Radios
- Fire-fighting equipment
- Breathing apparatus.

8.2.1. CONFINED SPACE RESCUE PLAN

A Confined Space Rescue Plan must be prepared by an authorised and competent person. The plan must be developed according to the characteristics of the confined space, such as:

- Geographic nature and design
- Atmospheric conditions
- The number of personnel working in or near the confined space.

Everyone involved with the work must read the plan and understand what they must do if a confined space rescue is required.

The plan should be rehearsed as a rescue drill to ensure that all members of the team can demonstrate that they understand their role and responsibilities.

The plan must address the following:

- Emergency access to the confined space
- Hazards associated with the confined space
- The method of extraction of persons from the confined space
- Emergency equipment requirements (including PPE) to enable emergency response personnel to perform an emergency response for the confined space.

8.2.2. TYPES OF RESCUE

If possible, the rescue should be performed from outside the confined space. Never enter the space to attempt a rescue unless you are fully trained in the rescue procedures and are wearing the appropriate PPE.

The following table describes various types of rescues.

Rescue Method	Description
Evacuation	A siren or alarm is sounded and personnel evacuate the area before an emergency situation arises.
Self Rescue	In a self-rescue, an individual recognises critical conditions or symptoms of exposure and exits the space. This is the preferred rescue method as it does not endanger others.
Non-entry Rescue	A non-entry rescue involves removing a person without anyone else entering the confined space. Use a safety line attached to the person in the confined space or grab the person with a rope, strap or pole and pull them to safety.
Entry Rescue	Entering a hazardous confined space places the rescuer at considerable risk. Entry rescues must be carefully planned and executed to avoid creating more victims. Rescuers need to be aware of their surroundings and must re-evaluate their plans immediately if there is any change in the conditions. Another worker, qualified in confined space rescue procedures must be present outside the confined space before the first rescuer enters the confined space. Do not use the same air supply as the confined space worker you are rescuing. Wear SCBA or supplied air respirator with an escape bottle.

CAUTION
Rescue procedures should be commenced immediately if contact cannot be made with the worker within the confined space, or the worker exhibits physical symptoms of stress or illness and is unable to leave the confined space unaided.

9. POST OPERATIONAL TASKS

When the job is finished, there are tasks that you must do to complete your shift. Your post operational tasks may include:

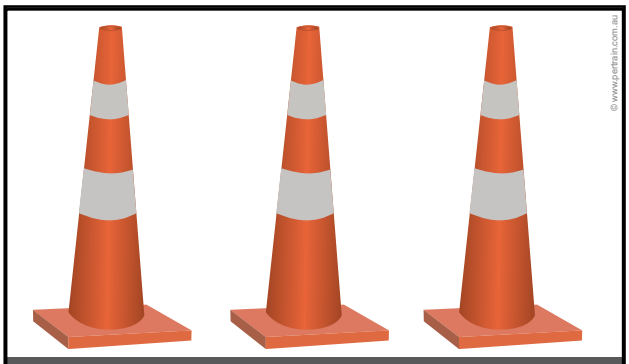
- Checking that your work complies with the task requirements
- Removing signs and barricades
- Cleaning, inspecting, maintaining and storing tools and equipment
- Disposing of, or recycling, waste materials
- Dealing with spills
- Performing general housekeeping tasks
- Completing end of shift reports and records.

9.1. REMOVE SIGNAGE AND BARRICADES

Once all tools and equipment have been removed and there is no further danger to workers on site, remove safety systems, signage and barricades.

Clean and store the equipment according to work site requirements.

Damaged or defective equipment should be tagged Out of Service and reported for repair.



Remove Barriers

9.2. STORING TOOLS AND EQUIPMENT

Correct storage increases equipment life, and is an important part of general site housekeeping. Store equipment in designated areas so that the equipment items can be easily retrieved.

Equipment must be clean and stored according to manufacturer recommendations.

Do not store defective or damaged equipment. It is your responsibility to notify your supervisor if the equipment requires repairing or replacing.

Typical Tool Storage Area

9.3. WORK AREA CLEAN-UP

When you have completed the job according to the work plan, or at the end of your shift, clean-up the work area following these guidelines.

- Clear the site of debris, rocks and spillages as required.
- Remove signs and barricades as approved by your supervisor.
- Check that there is adequate access into the work site for the next crew.
- Dispose of, or recycle, materials according to site procedures.
- Before leaving the work site, check that there are no hazards and that the area is safe.

Separate Recycling from General Waste

9.4. END OF SHIFT REPORTS

Fill out log books, daily activity sheets or timesheets and submit a full report on shift operations to provide the on-coming shift with information. Prepare the shift report as soon as possible so that all facts are clear. Follow the site reporting procedures when submitting the report. An end of shift report or shift handover should be comprehensive and include some or all of the following information:

- Equipment defects and maintenance requirements
- Faults such as:
  - Power supply stoppages and connection problems
  - Gas detector calibration / alarm problems
  - Ventilation issues
- Environmental issues
- Location of tools and other equipment
- Summary of work done and deviations to the work plan.

ACTIVITY

As a group discuss the end of shift reports required by your site. Make sure that you know how to access, complete and submit records and reports.

10. SAFETY IS EVERYONE'S RESPONSIBILITY

Help to maintain a safe workplace by taking responsibility for your own safety.

Before entering a confined space - STOP and ask yourself the following questions.

- Do I have authorisation to enter and work in confined spaces?
- Is the work area on the Confined Space Register?
- Is the Authority to Work and Confined Space Entry Clearance Certificate completed and authorised?
- Has a JSA been done for the task?
- Has atmospheric testing taken place?
- Has the space been appropriately ventilated?
- Are isolations in place?
- Am I wearing the correct PPE?
- Is there a standby person available?
- Are the Emergency Rescue Plan instructions clear?
- Is the emergency rescue equipment near the entry to the confined space?
- Can I complete the task safely?

If you answered NO to any of these questions, do not enter the confined space or proceed with the task. Contact your supervisor immediately. Remember that you have the right to STOP work if you believe that it is unsafe to proceed.

11. KEY CONTROLS INDEX

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