CONSTRUCTION
Training Group

MSMWHS216
OPERATE BREATHING APPARATUS
LEARNER GUIDE

THE CUNNING FAMILY TRUST AND THE PEACHEY FAMILY TRUST TRADING AS SAFE WORK RESOURCES PTY LTD ABN 90 785 129 255
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MODULE 1 – PREPARE TO OPERATE BREATHING APPARATUS

1.1 INTRODUCTION

These resources are based on the unit of competency **MSMWHS216: Operate Breathing Apparatus.**

They cover the competency associated with the inspection, operation and maintenance of breathing apparatus equipment in an irrespirable atmosphere.

1.1.1 WHAT IS A BREATHING APPARATUS?

A Self-Contained Breathing Apparatus (SCBA) is a device worn by workers required to operate in an irrespirable atmosphere including maintenance personnel/workers, rescue workers, fire fighters and other groups.

The purpose of a breathing apparatus is to provide breathable air in an atmosphere that poses danger to health and life.

There are 2 kinds of SCBA:

1. Open-Circuit Breathing Apparatus

Open-circuit breathing apparatus contains filtered, compressed air rather than pure oxygen.

When this air is exhaled it is vented into the surrounding atmosphere.

Typical open-circuit systems have 2 regulators – a first stage to reduce the pressure of air to allow it to be carried to the mask, and a second stage regulator to reduce it even further to a level just above standard atmospheric pressure.

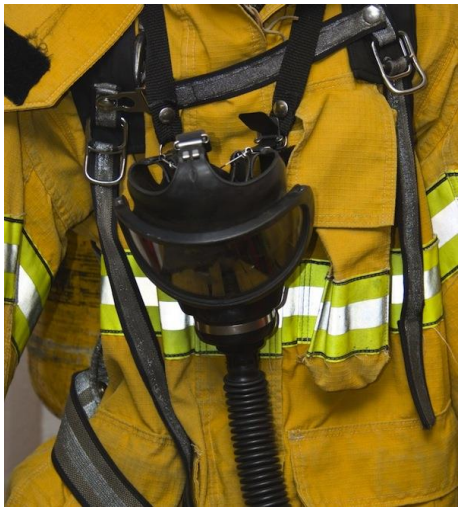
This air is then fed to the mask in 1 of 2 ways:

- With a demand valve (activating only on inhalation).

OR

- With a continuous positive pressure valve (providing constant airflow to the mask).

An open-circuit SCBA has a full-face mask, regulator, air cylinder, cylinder pressure gauge, and a harness with adjustable shoulder straps and waist belt which allows it to be worn on the operator's back.

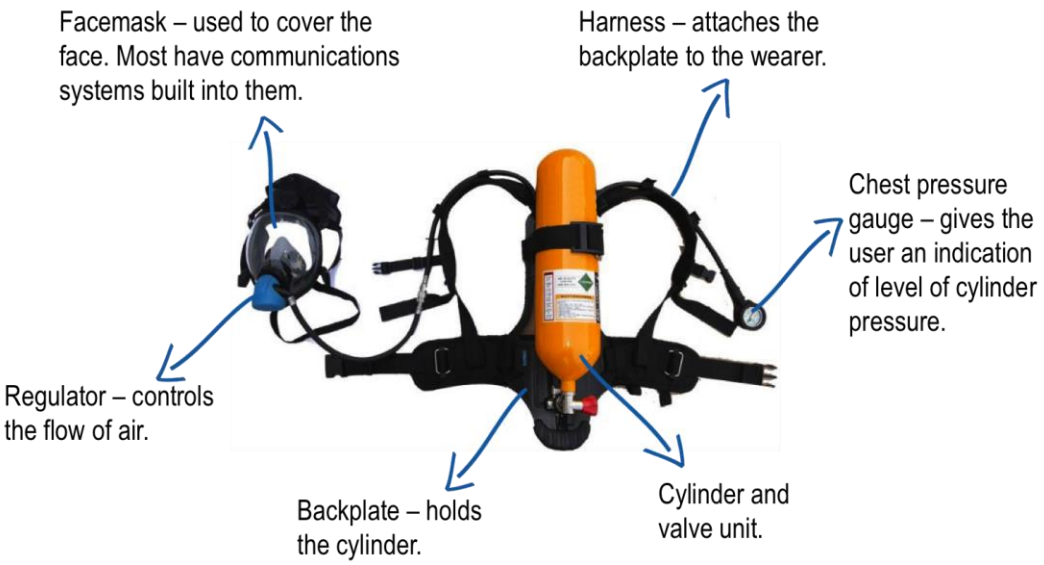


2. Closed-Circuit Breathing Apparatus

The ‘closed-circuit’ type breathing apparatus filters, supplements, and re-circulates exhaled gas. It is used when a longer lasting supply of breathing gas is needed, such as in mine rescue, and working in spaces too narrow for an air cylinder.

1.1.1.1 COMPONENTS OF A BREATHING APPARATUS

A breathing apparatus has a number of components, but typically includes:



1.1.2 IRRESPIRABLE ATMOSPHERES THAT REQUIRE A BREATHING APPARATUS

Dusts, gases, fumes, mists and vapours are common hazards in workplace air. These can seriously affect the health of workers. Breathing in asbestos fibres can lead to asbestosis and lung cancer while crippling lung diseases can be caused by the inhalation of certain dusts.

Inhaling some chemicals, such as solvents, can damage many parts of the body including the brain. Welding fumes, smoke, mists from spray painting are also serious respiratory hazards and workers should be adequately protected from exposure to any of them.

Irrespirable atmospheres are atmospheres that are unfit for breathing, or are incapable of supporting life.

Irrespirable atmospheres include:

Heated Atmospheres

High temperature air can burn the airways. The respiratory system can be damaged even if the temperatures are not high enough to be unbearable to the skin.

Anything over approximately 130 degrees Celsius could result in irreversible damage to the lungs.

Asphyxiating Atmospheres

Asphyxiating atmospheres are oxygen deficient. Any atmosphere that has less than 19.5% oxygen is not going to be able to support breathing activities.

Hypoxia is the result of inadequate oxygen. Signs of hypoxia include rapid breathing, gasping for air, blueness of skin, confusion, irritability, unconsciousness and death.

Toxic Atmospheres

Toxic atmospheres can occur due to the release of toxins and poisons in materials that have been burnt in a fire.

Air Contaminated With Smoke Or Suspended Particles

Air that is contaminated with smoke or particles is unbreathable.

Particles can settle in the lungs and will restrict the amount of oxygen that can be taken into the body. These particles within the lungs may then develop into other respiratory problems.

1.1.3 THE EFFECT OF IRRESPIRABLE ATMOSPHERES ON THE RESPIRATORY SYSTEM

The respiratory system is comprised of the mouth, nose, windpipe, lungs and pulmonary blood vessels that surround the lungs.

In this body system oxygen is exchanged into the blood while carbon dioxide is breathed out. Without the respiratory system working efficiently and effectively, the human body will die.

Respiration in healthy adults is normally approximately 16-20 breaths per minute.

However, breathing rates can increase significantly when the body is exercising, stressed, or in poor atmospheres.

The lungs cannot sustain the breathing in of irrespirable atmospheres for long periods (depending upon the type of atmosphere).

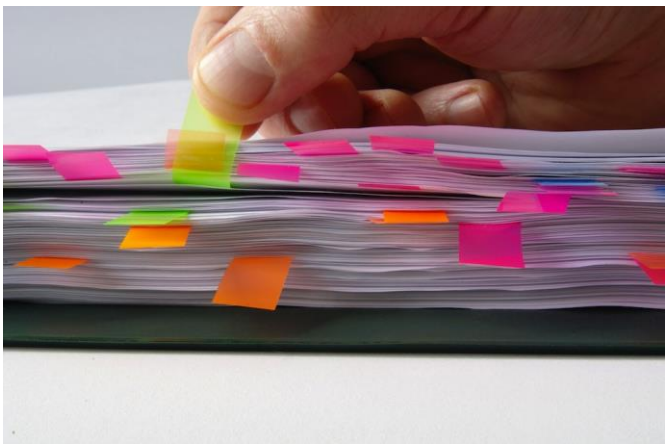
Some atmospheres can burn the lungs, while others can cause problems such as hypoxia, which can be deadly.

It is for these reasons that breathing apparatus is used when dealing with irrespirable atmospheres.

1.1.4 OPERATIONAL PROCEDURES AND SAFE WORK PRACTICES

Prior to starting and operating the breathing apparatus it is essential that you are aware of the operational procedures and safe work practices that apply.

This is to ensure you are able to complete tasks in the safest manner possible.



Operational procedures and safe work practices may include the procedures to be followed for:

- Donning and starting breathing apparatus.
- Performing operational checks on the equipment.
- Following control procedures.
- Selecting ancillary equipment.
- Identifying and controlling hazards.
- Maintaining communication.

1.2 INSPECT THE BREATHING APPARATUS

Before you use any kind of breathing apparatus you need to make sure it is in proper safe working order. You are relying on this equipment to keep you alive – **DON'T TAKE ANY CHANCES!**

All equipment inspections should adhere to procedures. These may include:

- Relevant workplace procedures and instructions.
- Manufacturers' instructions.
- Temporary instructions.
- Relevant industry and government codes and standards.

Check with your supervisor if you are unsure about any workplace procedures.

1.2.1 PRE-USE CHECKS

Pre-use tests and checks must include:

- Visually checking the integrity and serviceability of each component.
- Checking the cylinder for dents and gouges, and ensuring the cylinder pressure is correct and working properly.
- Checking hoses for cuts, cracks and bulges, and checking that the airflow system is functioning within recommended parameters.
- Checking that all ancillary equipment is working within useable boundaries.

See Appendix 1A for an example of a breathing apparatus inspection checklist.

1.2.2 DONNING THE BREATHING APPARATUS

Once all pre-use tests and checks have been conducted, it is time to don the breathing apparatus.

There is no purpose in wearing a respirator if it does not fit, or is worn incorrectly.

Faces are different shapes and sizes and respirators come in a variety of brands and sizes to match.

Correct fit and comfort are just as important as technical effectiveness.

Once a mask has been selected, the wearer must be shown how to fit it.

Correct fit of a mask requires contact with smooth skin – this makes masks unsuitable for men with beards or moustaches.

Even a one-day growth of a beard has been shown to allow nearly 1 per cent penetration of a full face-piece.

This is unacceptable with very toxic or carcinogenic substances. Small beards or moustaches which fit inside the face-piece are also unacceptable as they may cause an exhalation valve to fail if a hair lodges in it.

Glasses must not be worn inside a face-piece unless they are specially designed for the purpose, as the ear-pieces will prevent a good seal.

These face-pieces are also unsuitable for people who wear contact lenses. Workers who wear glasses or contact lenses should be supplied with air-supplied hoods or helmets.

Breathing apparatus should always be donned in a specific order to ensure all components are attached and working correctly. Your organisational procedures and manufacturer's specifications will provide you with this order.

Breathing apparatus must be donned and started in fresh air.

Breathing apparatus can be donned using an over-the-head method, coat method, or other methods approved by the manufacturer.

Over-The-Head Method:
The over-the-head method is conducted as follows:
1. Lay the breathing apparatus out with the cylinder valve in the required position and the shoulder straps extended.
2. Open the valve, lift the breathing apparatus over your head.
3. Slip into the shoulder straps. Tighten all straps and secure all buckles.
4. Ensure that the pressure indicator is in a position so the dial is easy to read.
5. Don the facemask, check the seal, airflow and safety devices.
6. Ensure the helmet is in place and every strap is connected.

Coat Method:
The coat method requires you to:
1. Lay out the breathing apparatus as required.
2. Swing the apparatus onto one shoulder, and then onto the other as you would don a jacket.
3. Tighten all straps, buckles and attachment points.
4. Ensure that the pressure indicator is in a position so the dial is easy to read.
5. Don the facemask, check the seal, airflow and safety devices.
6. Ensure the helmet is in place and connected.

Some organisations require a second person to check that all equipment has been donned correctly.

1.2.2.1 DONNING THE FACEMASK

While the exact process will depend on the type of equipment being used and your organisational requirements, the procedure for donning the facemask may be similar to the following:

Donning The Facemask:
1. Extend the straps on the facemask.
2. Put your chin in the chin pocket or place.
3. Bring the facemask up and cover your face.
4. Pull the straps or webbing over the head.
5. Tighten the straps in order, often the lower straps first.
6. Check for seal.
7. Don the hood and helmet.
8. Place the regulator to the facemask.
9. Ensure correct airflow and adequate pressures.

At all times the manufacturer's specifications and organisational requirements must be followed.

1.2.3 STARTING AND CHECKING BREATHING APPARATUS

Each breathing apparatus set will have a variety of components which need to be started and checked in accordance with your organisation's procedures.

Once you have correctly donned the breathing apparatus you will need to perform a negative test, an audible alarm test and a positive test.

1.2.3.1 NEGATIVE TEST

Prior to attaching the supply air tube to the facemask, block the end of the inhalation tube on the mask with the palm of your hand while trying to inhale.

If the face-piece is fitted correctly it will collapse against your face. If not, make adjustments and try again.

When you exhale through the exhalation valve no sticking should be evident.

1.2.3.2 AUDIBLE ALARM TEST

1. Turn the airflow controller fully clockwise, and press the air saver switch.

   Open the cylinder valve fully then close it a quarter turn to pressurise the line.

   The cylinder pressure should read greater than 250 bar.

   If the cylinder pressure is less than 250 it should not be used, and should be tagged for refilling.

2. Close the cylinder valve, and purge the line by pressing the purge valve. The whistle alarm should sound at around 50 bar.

3. Turn the cylinder valve back on, ensuring that the airflow controller is turned fully clockwise and the air saver switch has been pressed.

4. Attach the second-stage regulator to the face-piece and inhale. Your regulators should work without excessive effort.

1.2.3.3 POSITIVE TEST

The positive test is also known as the leak test. While breathing normally, place a finger under the edge of the facemask. This should create a high airflow from this point.

Your organisation may have different procedures to be followed in starting and checking the breathing apparatus. Always follow your procedures, and do not use any equipment that fails any testing.

1.3 REPORT AND RECORD FAULTY EQUIPMENT

When inspecting your breathing apparatus you are looking for anything that will affect the operational serviceability or usefulness of that piece of equipment.

If any fault or damage is found with the equipment it will need to be recorded and logged, and reported to the appropriate personnel/workers in the manner that is required by your organisation.

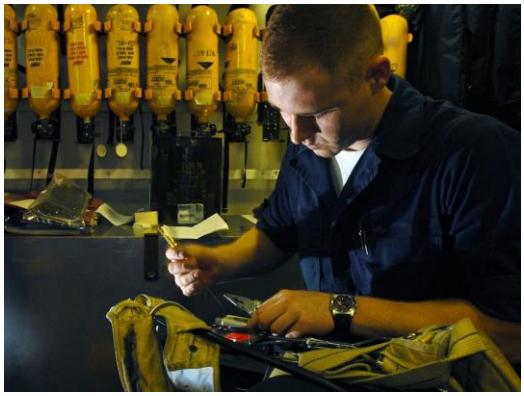
Once the damage has been reported, your supervisor or other appropriate personnel/workers will decide on the action to be taken. This will often include repair or replacement.

1.3.1 EQUIPMENT REPAIR AND REPLACEMENT

Repairs will need to be conducted in accordance with the manufacturer's specifications, and only by trained personnel/workers.

Replacement of equipment occurs when the equipment is beyond repair or is close to its replacement date.

Replacement of equipment should be undertaken on a regular schedule, as breathing apparatus and related equipment can deteriorate over time due to the nature of their use.



The old equipment will need to written off in the equipment records and the new equipment entered into the equipment records.

These records will need to be kept in accordance with the requirements of the organisation.

1.4 IDENTIFY, MONITOR AND CONTROL HAZARDS

A **RISK** is the chance of a hazard hurting you or somebody else or causing some damage.

A **HAZARD** is the thing or situation that causes injury, harm or damage.

If you can remove or at least control a **HAZARD** you can reduce the **RISK** involved. This process is called risk management.

Each organisation will have a specific process for carrying out risk management, which may be formal and conducted before starting any work, but also includes processes that can be used while the work is being carried out (such as dynamic risk control).

The basic approach for both situations is the same:

1. Identify hazards.
2. Work out the best way to eliminate, minimise or control the hazard and implement it.
3. Continue to monitor the hazard while you carry out the work and take any further action as required (if the situation changes or the control is no longer effective).

See Appendix 1B for an example of a Hazard Report Form which can be used to formally document the risk management process.

1.4.1 CONSULTATION AND COMMUNICATING WITH OTHERS

Consultation and communicating with others is an important part of the risk management process and should take place at all stages.

Identifying risks and hazards and coming up with ways of controlling them includes talking to the people with knowledge of the situation, or who are directly affected by any action you may take.

You should always talk to any workers involved in the hazard control measures as well as the Occupational Health & Safety/Work Health & Safety (OHS/WHS) officer or your supervisor.

This will help ensure that risks and hazards are not only effectively identified but that those involved with controlling and treating them are clear of their role and responsibilities in the risk management process.

1.4.2 HAZARD IDENTIFICATION

Before starting work on a site you should consult with safety officers, supervisors, site engineers, managers responsible for the site or other relevant workplace personnel/workers.

They can inform you of any site-specific hazards and ground conditions and ensure that you adhere to any workplace policies and site-specific procedures.

It is important that suitably knowledgeable personnel/workers are involved in the hazard identification process.

1.4.2.1 IDENTIFY HAZARDS

It is essential that you are aware of the possible hazards that can occur on site, and know the procedures to monitor and control them.

Hazards related to the use of breathing apparatus could include:

Running Out Of Air

Low air warnings are built into most breathing apparatus. You need to be aware of the warnings or alarms and regularly check your gauge so you are aware of the amount of time you have left.

Failure To Maintain A Face Seal

Without an adequate seal air will leak and fumes and toxic gases could leech into your mask area.

Malfunction Of Equipment

Malfunction is a constant threat to users of breathing apparatus, but regular maintenance can help to overcome this.

If you have equipment that is malfunctioning you will need to leave the work area immediately.

Never evacuate the scene without notifying your team leader and do not evacuate by yourself. Always have a two-person team. If your team is a three-person team, you should all evacuate.

Unsafe Oxygen Levels

Levels of oxygen within a confined space which are too high (above 23.5%) or too low (below 19.5%) are a major hazard.

There are a number of reasons why oxygen levels inside a confined space may fall below a safe level including:

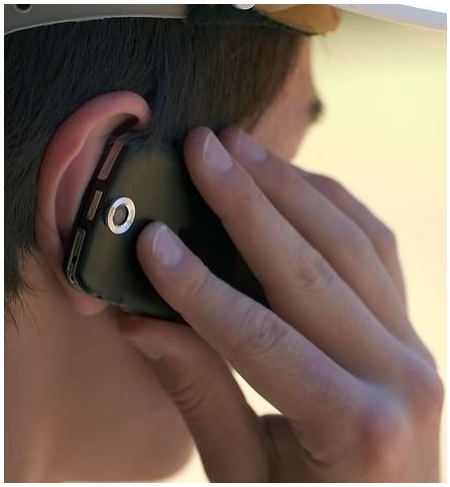
- The combustion of flammable materials (e.g. welding or cutting).
- Slow bacterial reactions of organic substances (e.g. sewerage).
- Reaction of inorganic substances (e.g. rust).
- Oxygen absorbed by materials (e.g. grain in silos).
- Oxygen displaced by another gas (e.g. nitrogen used to remove toxic fumes).
- High oxygen consumption rate (e.g. many people working in a small confined space).

Fires And Explosions

'Hot work' such as welding and thermal/oxygen cutting can create hazards like excessive heat, sparks and the risk of fires or explosions. Fires and explosions can be caused by:

- Open flames (e.g. welding torches).
- Hot surfaces (e.g. steam lines).
- Frictional sparks (e.g. a metal tool striking another object).
- A spark or heat produced by electrical equipment (e.g. a mobile phone, flashlight).
- Incorrectly installed wires or overloaded fittings.
- Static electricity sparks (e.g. from synthetic clothing).

Combustible/flammable dusts can often be found in a confined space such as a storage bin or grain silo. Fire also poses dangers due to smoke, as well as causing disorientation or structural instability of the work area.



Disorientation

In smoke, darkness and confinement, disorientation can cause hazards. This could include becoming confined or entrapped within an area, or losing touch with your team.

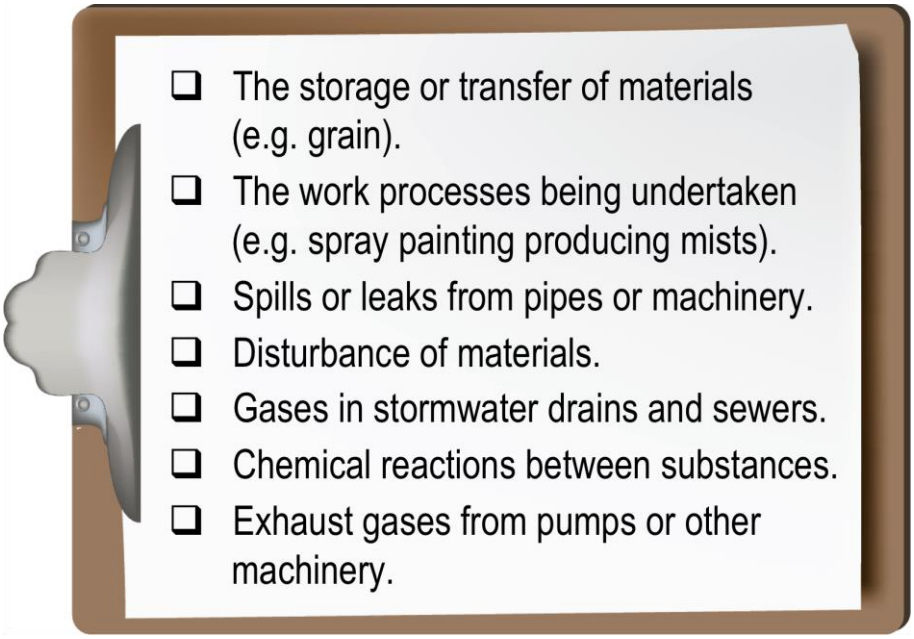
The extensive use of guidelines and working together as a team will minimise this risk.

Structural Hazards

Structural hazards are the hazards caused by the physical characteristics of the environment such as restrictions to movement or visibility caused by obstructions. The structure you have entered may also be unstable due to damage, age or use.

Atmospheric Hazards

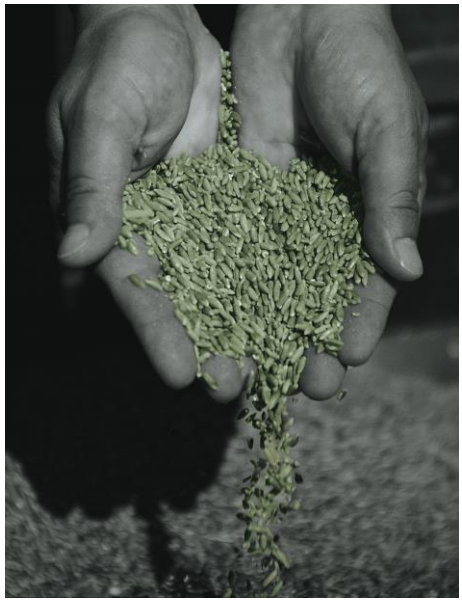
Hazardous dusts, gases, fumes, mists and vapours can arise in a confined space because of:



Residue left in confined spaces such as empty tanks and containers can cause a build-up of toxic or explosive gases.

Entrapment

Some materials stored in or around a confined space (e.g. grains, sawdust, or soil) can engulf (completely surround and trap) a person in seconds. If the person is not rescued immediately they can die within a few minutes.



Hazardous Materials

Hazardous materials could be any substance that is listed as dangerous goods, which could be toxic, corrosive, flammable or radioactive.

1.4.2.2 CHECK DOCUMENTATION

Once a hazard has been identified, check for any existing procedural documentation, workplace procedure or workplace policy which describes how to eliminate or control the hazard.

It is important that all records, policies and procedures are kept up to date so that the most relevant information is available and used.

Talk to other workers, your manager, supervisor, team leader or health & safety representative to find out if the hazard has already been identified, and what techniques are available to you to resolve it.

1.4.3 HAZARD CONTROLS

Hazard treatment involves selecting one or more options to control or eliminate a hazard and then implementing the selected option/s. Hazard treatments should be recorded in accordance with site and organisational procedures.

The most important defence against respiratory hazards is to control the contamination at its source and prevent it from entering the air.

This can be done by either substituting dangerous substances with less hazardous ones (particularly where chemicals are used), by isolating or enclosing hazardous operations, or by providing adequate local exhaust ventilation.

However, in some situations it may be necessary to wear breathing apparatus.

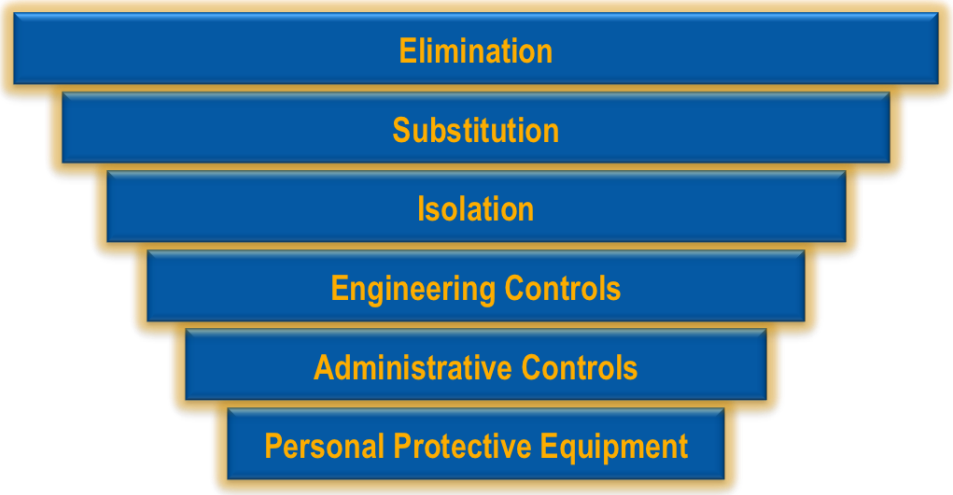
This may be because it is not immediately practical to implement alternative measures, or because access to a contaminated area is needed for a short period. In addition, breathing apparatus may need to be worn in some emergency situations.

It is also essential that any workplace that requires breathing apparatus also includes air monitoring. Respirators of different types are suitable for atmospheres of specific concentrations only. If the concentration exceeds a certain level, a different type of respirator will be necessary.

1.4.3.1 CONSIDER HAZARD CONTROL STRATEGY OPTIONS

Once a hazard control option has been implemented it may be referred to as a risk control.

The Hierarchy of Hazard Control is the name given to a range of control methods used to eliminate or control hazards in the workplace. The Hierarchy has 6 levels.



It is important that you understand what each level in the hierarchy stands for and how they can be implemented:

1. Elimination	Completely remove the hazard. This is the best kind of hazard control.
2. Substitution	Swap a dangerous work method or situation for one that is less dangerous.
3. Isolation	Isolate or restrict access to the hazard.
4. Engineering Controls	Use equipment to lower the risk level.
5. Administrative Controls	Site rules and policies attempt to control a hazard. Includes Safe Work Practices.
6. Personal Protective Equipment	The least effective control. Use PPE while you carry out your work.

Hazards should be re-assessed after the implementation of control measures to make sure they are effective and it is safe for the work to continue.

Follow all appropriate standards when deciding hazard control strategies including:

- Codes of Practice.
- Legislation.
- Australian Standards.
- Manufacturers' specifications.
- Industry standards (where applicable).

It is important to consider all of the options available when deciding on the best course of action.

Not all options are feasible or possible under some circumstances.

You may need to use a number of control strategies in conjunction to reduce the risk to an acceptable level.

The risk treatment plan should clearly identify the order in which to implement the individual risk treatments.

Some important hazard controls for working in a confined space include:

- Placing a standby person outside the confined space to respond in an emergency.
- Placing barriers and safety signs to stop unauthorised entry.
- Isolation, tagging and lockout procedures for liquid, gas, electric current or other stored energy.
- Purging gases and ventilation.

If work is planned to be done in pipelines normally used to carry liquids to a confined space (such as a boiler or fuel tank), it must be blanked off with suitable material to prevent the pipeline being used while work is being carried out.

It is not enough to just turn off a valve where the system is still live.

Document any hazards you find and the hazard controls you implement in a Job Safety Analysis (JSA) or Safe Work Method Statement (SWMS).

1.4.3.2 SELECT THE RIGHT BREATHING APPARATUS FOR THE SITUATION

Selection of the right protective equipment is easy, once the hazard is identified. Breathing apparatus should not be selected unless there is accurate information regarding the working environment.

It is therefore essential that air monitoring is regularly carried out, even when breathing apparatus is used.

If the contaminant levels in the air increase, a different type of respirator or other controls may have to be used for the work to be carried out safely.

The Australian Standard AS/NZS 1715 *Selection, use and maintenance of respiratory protective devices* should be referred to before selecting respiratory protection.

The Standard explains the general principles of respiratory protection and different types of respirators and breathing apparatus as well as effective risk management processes:

"…the provision of an item of Respiratory Protective Equipment (RPE) is only part of ensuring an overall system of respiratory protection for all employees/workers."

1.4.4 MONITORING AND REVIEW OF HAZARD CONTROLS

Monitoring and review of any hazard control is important to make sure that the control is still effective and providing as much protection from the hazard as possible. If the situation changes the control may no longer be enough and further action may need to be taken.

1.5 SELECT ANCILLARY EQUIPMENT

Ancillary equipment includes the items that help to maintain safety during the completion of the work.

Depending on the situation, ancillary equipment that may be required when using breathing apparatus includes:

- Distress signal unit.
- Tally & control board.
- Guidelines.
- Guideline tallies.
- Torch.

1.5.1 DISTRESS SIGNAL UNIT

A distress signal unit is used as a signal in distress situations, such as when you are trapped or need assistance.

Distress signal units can be automatic, manual, or have a combination of both features:

- An automatic unit will sound an alarm after a set period of time with no movement. This allows for unconscious personnel/workers to be found.
- A manual unit allows the operator to activate the alarm when they need assistance.
- Units with both features allow the operator to trigger an alarm manually, while the machine will trigger the alarm if no movement is occurring.

1.5.2 TALLY

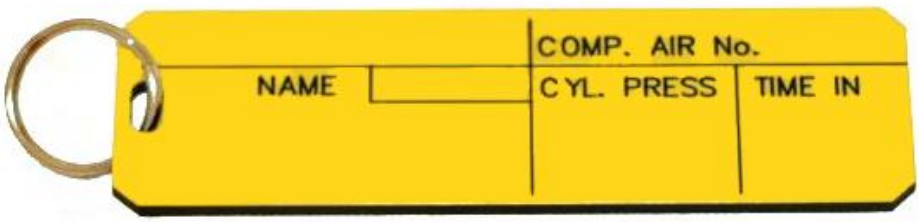
A tally is a yellow plastic strip normally attached to the distress signal unit.

The tally is given to the breathing apparatus Entry Control Officer who will ensure the required details are on the strip.

The control officer then places the tally on the control board.

The details required to be on the tally could vary between organisations but will generally include the name of the operator, time in the work environment and the contents of the cylinder.

Other details could include deployment area and estimated exit time.



1.5.3 GUIDELINES

A guideline is a small diameter line that is used by the breathing apparatus team to stay together in areas of reduced visibility.

The main guideline is up to 60m long with markings at set distances. These markings allow personnel/workers to tell by touch if they are heading in or towards the exit.

The main guideline will also be marked with a tally at the start of the line, lettered either A or B.

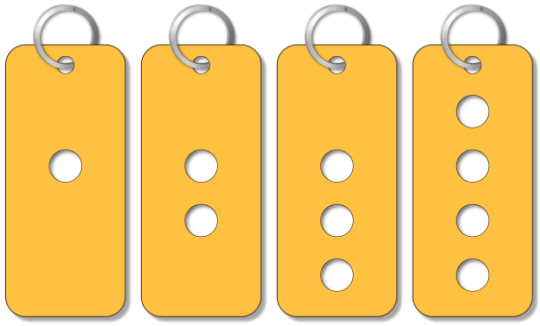
A personal line is attached to the main guideline.

1.5.4 GUIDELINE TALLIES

Guideline tallies are used to identify main or branches lines that are being used and are usually yellow.

Main lines use round tallies with either A or B on both sides and are attached to the start of the line.

For ease of identification branch line tallies have a number of holes punched through them. As each member of the breathing apparatus team attaches a personal line they will need to attach a guideline tally as well.

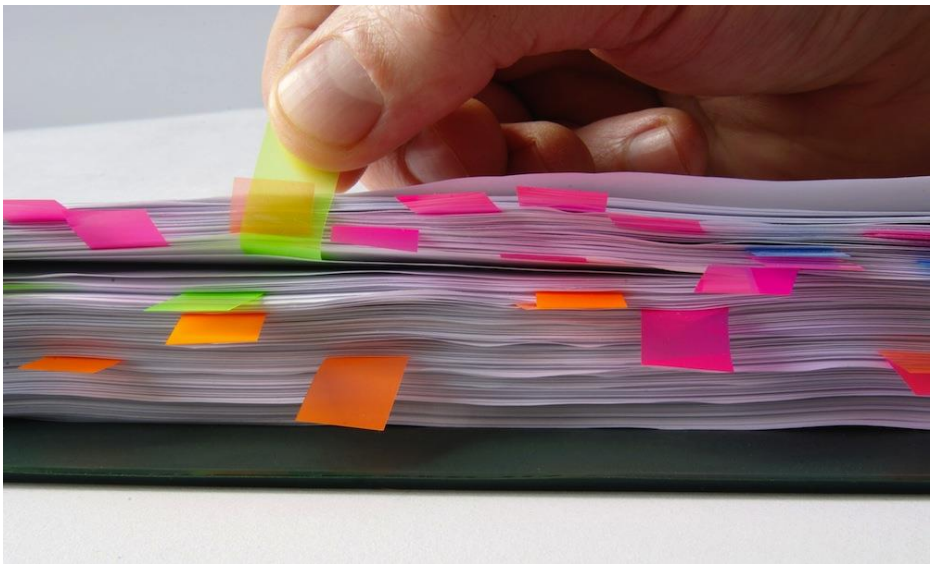


1.5.5 TORCH

Torches are used for illumination of the work area. Make sure they are operating correctly and that there is no restriction on using them within the confined space, before you enter.

1.6 CONTROL PROCEDURES

Organisational procedures will detail exactly how you are required to carry out any task that requires a breathing apparatus. It is essential that you follow those procedures in every situation.



1.6.1 PRINCIPLES OF BREATHING APPARATUS CONTROL

Whenever a person is working with breathing apparatus there must be adequate controls in place to ensure their safety.

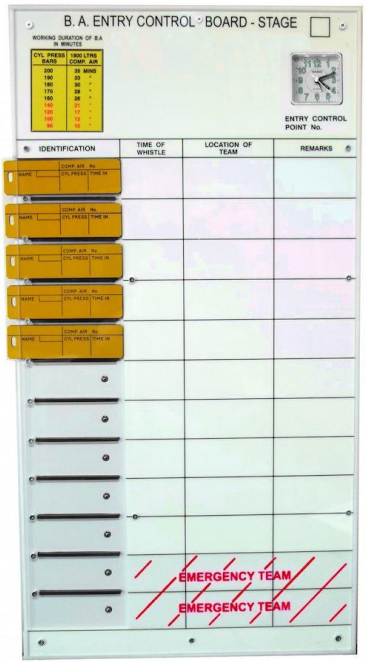
The decision to undertake breathing apparatus operations must be made after a risk analysis has been completed.

The risk analysis will assess the risk and available resources to apply the appropriate level of control procedures.

Controls to be implemented can include:

- Determining the requirements for and use of control equipment.
- Determining the correct entry point procedures, and personnel/workers in charge.
- The use of timing devices to ensure the safety of personnel/workers.

1.6.2 ROLE OF THE ENTRY CONTROL OFFICER



An Entry Control Officer is a person who is placed at an entry/exit point to:

- Determine the donning location.
- Receive tallies from the personnel/workers wearing the breathing apparatus.
- Enter the time-in on the tally board.
- Enter the tally information on the tally board.
- Check the cylinder content for each person wearing breathing apparatus.
- Ensure personnel/workers tallies are kept together on the board or as required by the operational procedures for your organisation.

- Calculate the time-out for each person.
- Place the time-out time on the tally board.
- Record which location personnel/workers are moving to.
- Return the tallies to the appropriate person when they have left the confined space.
- Keep your supervisor (or authorised person) informed of any concerns or developments that may affect the work being carried out.

In some organisations the Entry Control Officer, supervisor or standby person will also be responsible for attaching main guidelines and tallies to the guidelines, maintaining communication with personnel/workers, and responding to emergency or rescue activities.

1.6.3 ENTRY POINT PROCEDURES

Entry points are the focal points for the effective management of incidents where breathing apparatus is used, and for the safe control of access to and egress from the work area.

Entry points are selected based on factors such as:

- The size of the work area.
- Location of access points to the work area.
- Physical limitations of the site.

1.6.3.1 CONTROL PROCEDURE STAGES

Stage	Characteristics/Procedures Of The Control Stage				
	Number Of Entry/Exit Control Points	**Total Number Of BA Wearers**	**Type Of Task**	**Number Of Control Officers**	**Other Factors**
1	1	10 or less	Short term/ smaller operation.	1	
2 Used if one or more of the Control Stage characteristics are present. Often used at large-scale worksites.	2 or more	More than 10	Longer term/ greater demand for control and supervision required.	More than 1 – Generally if more than 1 entry control point an Entry Control Officer and tally board is necessary at each entry point.	Branch guidelines used.

1.6.4 TIMING DEVICES

Timing devices are used to calculate the amount of time a worker has been using the breathing apparatus.

Often timing devices will be attached to the entry control board so that the Entry Control Officer can monitor times.

A person who is using breathing apparatus has an effective work cycle of between 30 to 60 minutes depending upon factors such as respiration rate, size of cylinder, environmental conditions and individual factors.

APPENDIX 1A – BREATHING APPARATUS INSPECTION CHECKLIST

SCBA Inspection Checklist	Serviceable Condition?		
Component:	YES	NO	N/A
Is the face-piece in good condition? Look for these items: ▸ Excessive dirt. ▸ Cracks, tears, holes or distortions from improper storage. ▸ Inflexibility. ▸ Cracked or badly scratched lenses in full face-pieces. ▸ Incorrectly mounted full face-piece lens or broken or missing mounting clips.			
Are the head straps or head harness in good condition? Look for these items: ▸ Breaks in the straps. ▸ Loss of elasticity. ▸ Broken or malfunctioning buckles and attachments. ▸ Excessively worn serrations on the head harness which might permit slippage.			
Is the exhalation valve in good condition? Look for these items: ▸ Foreign material under the valve seat. ▸ Cracks, tears or distortion in the valve material. ▸ Improper insertion of the valve body in the face-piece. ▸ Cracks, breaks or chips in the valve body, particularly in the sealing surface. ▸ Missing or defective valve cover. ▸ Improper installation of the valve in the valve body.			
Is the breathing tube in good condition? Look for these items: ▸ Damaged, worn or missing end connectors. ▸ Missing or loose hose clamps. ▸ Deterioration or the hose material.			
Is the high pressure air supply in good condition? Look for these items: ▸ Air supply lines, hoses, attachments and end fittings worn. ▸ Valves and air flow regulators inoperable. ▸ Low pressure alarm inoperable. ▸ Air cylinder less than full. ▸ Gauges inoperable. ▸ Air cylinder damaged. ▸ Air cylinder hydrostatic test out of date.			
Is the cylinder harness in good condition? Look for these items: ▸ Straps or frame showing wear or damage. ▸ Broken or malfunctioning buckles and attachments. ▸ Air cylinder attachment devices inoperable.			

Respirator Inspection Checklist	Serviceable Condition?		
Component:	YES	NO	N/A
Is the face-piece in good condition? Check for these defects: ▸ Cracks, tears, or holes. ▸ Face mask distortion. ▸ Cracked or loose lenses/face shield.			
Are the head straps in good condition? Check for these defects: ▸ Breaks or tears. ▸ Broken buckles.			
Are the valves in working order? Check for these defects: ▸ Residue or dirt. ▸ Cracks or tears in valve material.			
Are the filters/cartridges in serviceable condition? Check for these items: ▸ Approval designation. ▸ Gaskets. ▸ Cracks or dents in housing. ▸ Proper cartridge for hazard.			
Is the air supply system working correctly? Check for these items: ▸ Breathing air quality/grade. ▸ Condition of supply hoses. ▸ Hose connections. ▸ Settings on regulators and valves.			
Are the rubber parts in good condition? Check for these items: ▸ Pliability. ▸ Deterioration.			

APPENDIX 1B – HAZARD REPORT FORM

Company Name:	Form Completed By:	Date of Inspection:
Site:	Address:	Contact Phone Number:

1. Identified Hazard	Hazard Type:
2. Hazard Details	Description of Hazard:

LIKELIHOOD	CONSEQUENCE				
	Insignificant	**Minor** First Aid Required	**Moderate** Medical Attention and Time Off Work	**Major** Long Term Illness or Serious Injury	**Severe** Kill or Cause Permanent Disability or Illness
Almost Certain	**M**	**H**	**H**	**VH**	**VH**
Likely	**M**	**M**	**H**	**H**	**VH**
Possible	**L**	**M**	**H**	**H**	**VH**
Unlikely	**L**	**L**	**M**	**M**	**H**
Rare	**L**	**L**	**M**	**M**	**M**

RISK LEVEL	ACTION
VERY HIGH	Act immediately: The proposed task or process activity must not proceed. Steps must be taken to lower the risk level to as low as reasonably practicable using the hierarchy of risk controls.
HIGH	Act today: The proposed activity can only proceed, provided that: 1. The risk level has been reduced to as low as reasonably practicable using the hierarchy of risk controls. 2. The risk controls must include those identified in legislation, Australian Standards, Codes of Practice etc. 3. The risk assessment has been reviewed and approved by the Supervisor. 4. A Safe Working Procedure or Safe Work Method has been prepared. 5. The supervisor must review and document the effectiveness of the implemented risk controls.
MEDIUM	Act this week: The proposed task or process can proceed, provided that: 1. The risk level has been reduced to as low as reasonably practicable using the hierarchy of risk controls. 2. The risk assessment has been reviewed and approved by the Supervisor. 3. A Safe Working Procedure or Safe Work Method has been prepared.
LOW	Act this month: Managed by local documented routine procedures, which must include application of the hierarchy of controls.

3. Risk Assessment	Risk Likelihood Level:	Risk Consequence Level:	Risk Level:
	Is there an existing safety system or procedure that deals with this hazard? Yes / No Details:		

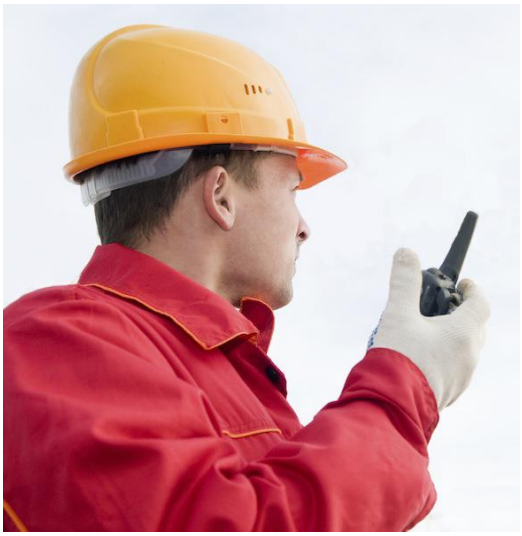
4. Control Strategies	Intended Control Strategy (Details and Resources Required)	Tick Box
	Elimination	
	Substitution	
	Isolation	
	Engineering	
	Administration	
	PPE	

Is the control strategy feasible? Yes / No

5. Action Plan	Has a plan for the implementation of the control strategy been completed?	
	Have the required resources been obtained?	
	Does the implementation meet the requirements of workplace policies and procedures?	
	What is the intended date of implementation?	_____/_____/_____
	Who is responsible for implementing the control strategy?	
	Date of review of action taken:	_____/_____/_____
6. Review	Date of Review:	_____/_____/_____
	Review completed by:	
	Has the hazard control been successfully implemented?	
	New risk level:	
	Is this risk level acceptable?	
	Further action required?	

MODULE 2 – OPERATE BREATHING APPARATUS AND CONCLUDE OPERATIONS

2.1 ESTABLISH AND MAINTAIN COMMUNICATIONS



Communications within the workplace are essential to your safety and the safety of all others around you.

It is essential that you are able to understand and use the communication systems that apply to the situation.

This includes establishing your communications initially, and maintaining communications with appropriate personnel/workers throughout the operation.

2.1.1 COMMUNICATIONS EQUIPMENT

Communications equipment could include:

Integrated Radios
Integrated radios are built into the breathing apparatus.

Portable Radios
Portable radios will have limited usefulness when using breathing apparatus and may have limited range due to atmospheric conditions.

Communication Sets

This is the name given to the complete communication equipment.

Communication sets consist of a microphone, battery, cables, amplifier and built-in speakers.

The way communication sets are used depends on the type of equipment and the manufacturer's operating guidelines. These instructions can vary so it is essential that you follow the manufacturer's operation manual for the equipment you are using.

Signal Lines

Depending upon your organisation, signal lines may be a line similar to the main guideline, which will transmit predetermined signals. It may also be a communications cable, which can be connected to communications equipment.

Hand Signals

Hand signals must be understood for clear communications to occur. Most organisations will have signals that apply only to their worksites, or that have been designed for a particular task.

If hand signals are going to be used during the work make sure you are familiar with them and that you practise them before entering any confined space.

Distress Signal Unit

Most Distress Signal Units (DSU) will have a dual activation system which will trigger an alarm automatically if movement is not detected within a certain timeframe (up to 1 minute of no movement), or the alarm could be set off manually.

The process for setting off your Distress Signal Unit will depend upon the make and model of equipment.

2.2 OPERATE BREATHING APPARATUS AS A TEAM MEMBER

You should always comply with permit conditions while working in a confined space.

If permit conditions and requirements are deviated from then they should be reported and corrected and the permit re-authorised and re-issued by a competent person.

Follow all safety procedures to maintain personal safety while doing any work that requires breathing apparatus.

Stay in constant effective communication with other personnel/workers including the standby person. Always use communication equipment correctly.

There should be constant monitoring of equipment and changes in the environment while work is being carried out. Damage to equipment, changes in the atmosphere and movement of workers can all create new hazards.

Atmospheric variables that need to be monitored include:

- Heated atmospheres.
- Asphyxiating atmosphere (oxygen deficient).
- Toxic or poisonous atmosphere (non-skin absorption).
- Smoke or suspended particles/fibres in atmosphere.

New hazards that arise while you are working within a confined space may require you to use new hazard controls or revalidate a permit.

Do not work past the time allowed for the work to be done within the confined space. Keep an eye on the amount of time the work is taking.

If you are using a gas monitor and the alarm sounds, all personnel/workers should leave the confined space immediately.

Complete confined space entry logs, ensuring that all entry and re-entry of persons working within the confined space are accurately recorded.

2.2.1 OPERATING IN BREATHING APPARATUS

Undertaking activities while wearing breathing apparatus requires teamwork and attention to detail.

With breathing apparatus on, your vision is limited. You must make more of an effort to look around you and also trust your other senses.

When moving through dark, low-visibility or smoke-filled areas, use your hands and feet effectively.

Activities should be conducted in a methodical manner with one side of your body near a wall where possible. Stick within your designated area unless you receive permission to deviate from this area.

Checking your breathing apparatus gauges regularly is important. You can move through your air tank more quickly than you think.

2.2.2 WORKING AS A MEMBER OF A TEAM

Breathing apparatus team numbers will be determined by your organisation, the situation, the requirements of the task and the available resources.

At a minimum there should be 2 people working together so that appropriate action can be taken in the event of an emergency.

Effective communication will assist the team to work cohesively and effectively in completing the work safely.

You should have trust in your team members, and you should know how to perform your role within the team.

2.3 IMPLEMENT ENTRAPMENT PROCEDURES

Becoming trapped within a confined space can occur quickly and without warning. Knowing your organisation's requirements and procedures for dealing with entrapment is essential.

Once you recognise that you are trapped it may be necessary for you to:

Cease All Non-Essential Strenuous Activities

Ceasing all strenuous activities assists you to calm your breathing and air consumption, and thus conserves the air in your breathing apparatus.

Activate Your Distress Signal Unit

You will need to activate your Distress Signal Unit manually in accordance with the manufacturer's guidelines for the unit.

Relocate

By moving to the safest position possible, you will be less susceptible to hazards, and will be able to remain calm.

While remaining calm in an entrapment situation may be difficult, it is important that you attempt to do so in order to maintain a clear mind and conserve your oxygen.

Call For Assistance

Using your inbuilt communications equipment to call for assistance allows you to confirm to the rescue team where you are, what the conditions are and if escape units or additional air cylinders need to be brought into the scene.

Entrapment is a situation that can turn deadly without notice. The success of the entrapment procedures depends on regular practice therefore appropriate training is essential.

2.4 MAINTAIN PERSONAL SAFETY AT ALL TIMES

Your personal safety should be considered your highest priority while using breathing apparatus.

Maintaining your personal safety may involve the following important points:

- Know, understand and follow the procedures for the activities you will be undertaking. This is the most important safety tool you have.
- Notify your supervisor of anything that may impact your ability to undertake activities.
- Use all equipment for the intended purposes and in the correct manner.

- Check breathing apparatus regularly and remove yourself from any situation if your equipment malfunctions.
- Be observant of the conditions around you. This could help you to avoid hazard or injury.
- Undertake a risk analysis before starting an activity.
- Work with your team members to achieve the goals.
- Keep yourself attached to the guidelines used to guide you back.

Personal safety is something that can be overlooked during situations requiring immediate response. Always take the time to ensure your safety during any activity.

2.5 REMOVE AND CLOSE DOWN THE BREATHING APPARATUS

Once operations have been completed and you have moved to a safe area, you can remove and close down your breathing apparatus.

2.5.1 REMOVING THE BREATHING APPARATUS

The steps to be followed may include:

- Collecting the tally from the entry control officer.
- Turning off distress alarms.
- Removing your gloves and helmet.
- Loosening head harness straps.
- Removing the facemask.
- Undoing the waist belt and loosening the shoulder straps.
- Slipping off the harness and backplate.

Removal of the breathing apparatus should be done in line with your organisation's procedures.

If you are unfamiliar with these requirements, speak with your supervisor or other experienced personnel/workers.

2.5.2 CLOSING DOWN THE BREATHING APPARATUS

Once you have removed your equipment, you will need to close it down in accordance with your organisational procedures.

Closedown procedures could include:

- Shutting valves – ensure that the purge valve is closed, and the cylinder valve is turned to the off position.
- Disconnecting air hoses and removing the second stage regulator from the facemask.
- Releasing any air trapped in the system.

- Listening for the whistle alarm as the air pressure reduces to zero.
- Recording any problems with the system.
- Marking the tank or system to indicate that the cylinder requires filling.

The closedown procedures will vary depending on the organisation and the type of equipment being used. Ensure you are able to follow your organisation's closedown procedures.

2.6 CLEAN AND MAINTAIN BREATHING APPARATUS

It is important for all safety equipment to be maintained. This equipment helps to protect you during dangerous tasks and you want to make sure that it will keep you safe. All breathing apparatus equipment needs to be kept clean, maintained and ready for use.

2.6.1 CLEANING THE BREATHING APPARATUS

Cleaning the breathing apparatus is essential for maintaining the useful life of the equipment and the health and safety of the people using it.

Most organisations will require you to clean the equipment regularly.

Clean Harness, Backplate And Hoses

When cleaning the harness, backplate and hoses you will need to follow the manufacturer's specifications.

These specifications will normally require you wipe the surfaces clean with a damp cloth (which has been wet in a cleaning solution).

Once the unit has been washed, wipe it over to remove any detergent residue.

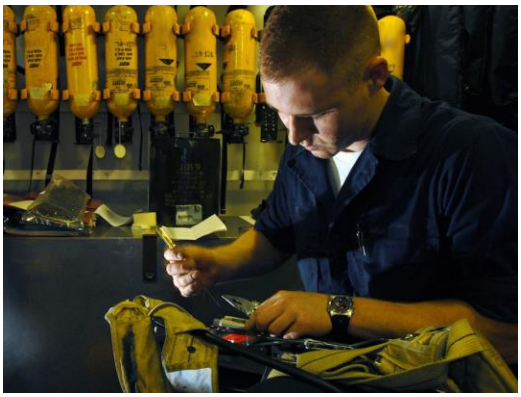
Clean Facemask

Cleaning the facemask will require disinfectant made up to the manufacturer's specifications, or the use of non-alcoholic wipes.

Wipe over the mask inside and out with a damp cloth. Once the mask has been washed in accordance with the procedures for your organisation, the mask will need to be dried. Air drying is the most common method.

Facemasks may then need to be placed into protective plastic bags.

2.6.2 CONDUCTING MAINTENANCE ACTIVITIES



Maintenance activities should be completed in line with the schedule set by your organisation. However, all equipment should undergo a complete inspection and test after each operational use.

All breathing apparatus users should be provided with instructions about how to replace filters, canisters and cartridges and when to do so.

There must be practice drills and periodic refresher training in the use and care of the protective equipment.

Maintenance activities may incorporate:

Daily maintenance could include:	
▸ Visual inspections.	☐
▸ Checking cylinder connections and valves are in working order.	☐
▸ Ensuring all straps, harnesses and buckles are in working order.	☐
▸ Replacement of filters and cartridges.	☐

Weekly maintenance could include:	
▸ Cleaning the units.	☐
▸ Checking ancillary equipment.	☐
▸ Ensuring airflow.	☐
▸ Checking for leaks.	☐

Monthly activities could include:	
▸ Full inspection.	☐
▸ Harness inspection.	☐
▸ Cleaning and disinfecting.	☐
▸ Testing of cylinder pressures.	☐
▸ Testing flows by donning mask and breathing.	☐
▸ Testing the alarm devices in accordance with the manufacturer's specifications.	☐

Refilling of cylinders will need to be completed when required. Depending on your organisation this may be done on site, or at the premises of an authorised service provider.

Any breathing apparatus equipment that is faulty must be taken out of service and reported to the appropriate personnel/workers. They will ensure that the equipment is tagged out for repair or replacement.

2.6.3 MAKING EQUIPMENT READY FOR OPERATIONAL USE

Breathing apparatus equipment needs to be kept in a constant state of readiness, as it may be required with little notice and preparation time.

Following the use of breathing apparatus, the process of removing, cleaning and maintaining the equipment will ensure that it is ready for the next operation.

This process includes the reporting and removal of faulty equipment.

Breathing apparatus equipment may also need to be stored in appropriate locations and storage cabinets, so that all personnel/workers can locate and access all items at short notice.

Each organisation will have specific procedures to ensure that equipment is made ready for operational use.

Ensure that you are familiar with your organisation's procedures.