

MSMWHS216

Operate Breathing Apparatus

Learner Guide Instructions

Who is this document for?

The learner.

What is in this document?

- Course information that matches the PowerPoint presentation.
- Review questions.
- Practical assessment instructions for learners.

What do you need to do before you use it for the first time?

1. Rebrand the document.
2. Review the document as part of your validation process.
3. Set the reading and test time limits that are highlighted in pink at the end of the document.

See the 'Read Me First' document for a complete set of instructions on how to use these resources.

LEARNER GUIDE

MSMWHS216 Operate Breathing Apparatus

Learner Name:	
Learner ID:	
Learner Contact Number:	
Learner Email Address:	
Date Training Commenced:	

This Book Contains:

- Course Information.
- Review Questions.
- Practical Assessment overview and instructions.

Table of Contents

1.1 Introduction	5
1.1.1 What is a Breathing Apparatus?	5
Open-Circuit Breathing Apparatus.....	5
Closed-Circuit Breathing Apparatus.....	6
1.1.1.1 Components of a Breathing Apparatus	6
1.1.2 Irrespirable Atmospheres that Require Breathing Apparatus	7
Heated Atmospheres.....	7
Asphyxiating Atmospheres	7
Toxic Atmospheres.....	7
Air Contaminated with Smoke or Suspended Particles	7
1.1.3 The Effect of Irrespirable Atmospheres on the Respiratory System	7
1.1.4 Work Method Statements	8
Review Questions.....	8
1.2 Inspect the Breathing Apparatus	10
1.2.1 Pre-Use Checks	10
1.2.2 Donning the Breathing Apparatus.....	10
1.2.2.1 Donning the Facemask.....	11
1.2.3 Starting and Checking Breathing Apparatus.....	12
1.2.3.1 Negative Test.....	12
1.2.3.2 Positive Test	12
1.2.3.3 Audible Alarm Test	13
Review Questions.....	13
1.3 Report and Record Faulty Equipment	16
Review Questions.....	16
1.4 Hazard Identification and Control	16
1.4.1 Identify Hazards	17
1.4.2 Hazard Controls.....	18
1.4.2.1 Select the Right Breathing Apparatus for the Situation	19
Review Questions.....	20
1.5 Select Ancillary Equipment	21
1.5.1 Distress Signal Unit.....	21
1.5.2 Tally and Control Board.....	21
1.5.3 Guidelines	22
1.5.4 Guideline Tallies	22
1.5.5 Torch	22
Review Questions.....	22
1.6 Control Procedures	23
1.6.1 The Entry Control Officer	23
1.6.2 Entry Point Procedures	24
1.6.3 Timing Devices	24
Review Questions.....	25
2.1 Establish and Maintain Communications	26
2.1.1 Communications Equipment.....	26
2.1.2 Communicating in Breathing Apparatus	27
Review Questions.....	27
2.2 Operate Breathing Apparatus	28
2.2.1 Operating in Breathing Apparatus.....	28
2.2.1.1 Monitoring Working Time	29
Review Questions.....	30
2.3 Implement Entrapment Procedures	32
Review Questions.....	32
2.4 Maintain Personal Safety at All Times	33
Review Questions.....	33

2.5 Remove and Close Down the Breathing Apparatus	34
2.5.1 Removing the Breathing Apparatus	34
2.5.2 Closing Down the Breathing Apparatus	35
Review Questions.....	35
2.6 Clean and Maintain Breathing Apparatus	36
2.6.1 Cleaning the Breathing Apparatus	36
Clean the Harness, Backplate and Hoses	36
Clean the Facemask	36
2.6.2 Conducting Maintenance Activities.....	37
2.6.3 Making Equipment Ready for Operational Use	37
Review Questions.....	38
Practical Assessment Instructions	39
Conditions of Assessment.....	39
Personal Protective Equipment (PPE) Requirements.....	39
Grounds for Stopping the Assessment	39
Achieving a Satisfactory Outcome	39
Practical Assessments.....	40

Evaluation Copy Only

1.1 Introduction

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

You will learn about:

- ◆ Conducting pre-donning checks and tests on breathing apparatus.
- ◆ Operating breathing apparatus.
- ◆ Concluding operations in accordance with procedures.



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 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, Open-Circuit Breathing Apparatus and Closed-Circuit Breathing Apparatus.

Open-Circuit Breathing Apparatus

Open-circuit breathing apparatus contain 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 system 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.

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

The components of an open-circuit breathing apparatus system include:

- ◆ Backplate – holds the cylinder.
- ◆ Harness – attaches the backplate to the wearer.
- ◆ Pressure reducer – used to reduce the pressure coming from the cylinder to ensure breathability.
- ◆ Chest pressure gauge – gives the user an indication of the level of cylinder pressure.
- ◆ Regulator – used to deliver and control the flow of air.
- ◆ Mask – used to cover the face. Most will have communications systems built into them.
- ◆ Cylinder and valve unit.
- ◆ Airline equipment.



1.1.2 Irrespirable Atmospheres that Require Breathing Apparatus



Dusts, gases, fumes, mists and vapours are common hazards in workplace air. These can seriously affect the health of workers. For example, 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 and 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:

Atmosphere Type	Description and Effects
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 50 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 Work Method Statements

Many worksites require a work method statement before any high risk work can start. A work method statement is a list of steps that outlines how a job will be done and includes details for any hazards that occur at each step, and what you need to do about them.

These statements can also be known as a Safe Work Method Statement (SWMS), Job Safety Analysis (JSA) or Standard Operating Procedure (SOP).

Make sure you understand all of the information in the work method statement before you start the work. It will help you to complete the work as safely as possible.



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

- 1. Donning and starting breathing apparatus.
- 2. Performing operational checks on the equipment.
- 3. Following control procedures.
- 4. Selecting ancillary equipment.
- 5. Identifying and controlling hazards.
- 6. Maintaining communications.

Review Questions

1.	List 5 components of an open-circuit breathing apparatus system.	<input type="checkbox"/>
1.	<div style="position: relative; height: 100%;">Evaluation</div>	
2.		
3.		
4.		
5.		

2.

What are 4 types of irrespirable atmosphere?



1.

2.

3.

4.

3.

List 4 activities that would be covered by operational procedures or safe work practices when working with breathing apparatus.



1.

2.

3.

4.

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:

Visual Checks

Visually checking the integrity and serviceability of each component.

Cylinder Checks

Checking the cylinder for dents and gouges, and ensuring the cylinder pressure is correct and working properly.

Hose Checks

Checking hoses for cuts, cracks and bulges, and checking that the airflow system is functioning within recommended parameters.

Ancillary Equipment Checks

Checking that all ancillary equipment is working and within useable boundaries.

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 point 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.

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.

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.

The **over-the-head method** should be similar to the following:

- 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 mask and check the seal, airflow and safety devices.
- 6 Ensure the helmet is in place and every strap is connected.

The **coat method** follows a similar procedure, except you are required to swing the system onto one shoulder then the other, as you would to don a jacket.

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:

- 1 Extend the straps on the facemask.
- 2 Put your chin in the chin pocket or place.
- 3 Bring the mask up and cover your face.
- 4 Pull the straps or webbing over the head.
- 5 Tighten the straps in order, the lower straps first.
- 6 Check the seal.
- 7 Don the hood and helmet.
- 8 Place/Connect the regulator to the facemask.
- 9 Ensure there is correct airflow and adequate pressure.

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 and the manufacturer's procedures.

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

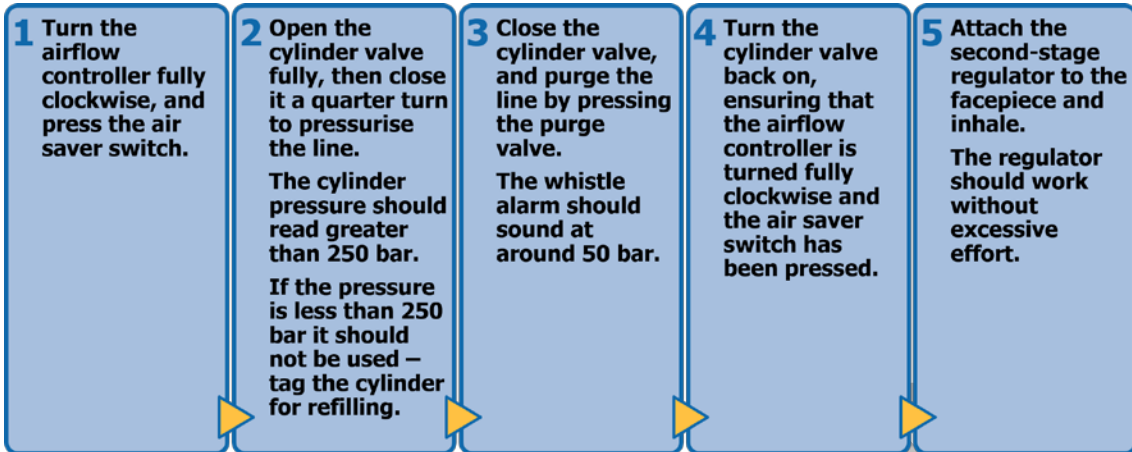
The positive test is also known as the leak test. While breathing normally, place a finger under the edge of the facemask. This should create a high airflow from this point.

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.



1.2.3.3 Audible Alarm Test

To conduct an audible alarm test:



Review Questions

4.	What 4 checks must you complete during pre-use testing?	<input type="checkbox"/>
1.		
2.		
3.		
4.		