

# PROCEDURES FOR WORKING IN CONFINED SPACES



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**GuernseyWater**

A DIVISION OF THE PUBLIC SERVICES DEPARTMENT

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## ■ ASSESSMENT AND CATEGORISATION

1. A confined space is a place which is substantially enclosed (though not always entirely), and where serious injury can occur from hazardous substances or conditions within the space or nearby (e.g. lack of oxygen). Difficult access and egress are also significant factors when assessing risk.
2. In clean water operations such conditions may exist in valve and meter pits, tunnels, service subways, pipes, shafts, service reservoirs, wells and bore holes, if ventilation is inadequate or the atmosphere is contaminated.




Hazardous conditions may arise due to a number of factors such as; the absorption of oxygen from the air into the surrounding structure; the permeation of carbon dioxide from the geological strata; the decomposition of vegetation and other organic matter to produce explosive or toxic gas; explosive gases; toxic fumes or oxygen enrichment given off from a process such as welding, painting or nitrogen/carbon dioxide pipe freezing etc; and the ingress of fumes from other sources such as leaking gas mains, vehicle or plant exhausts, etc.

The most common factor in Clean Water Operations and Construction is lack of oxygen due to poor ventilation.

3. Clearly the degree of hazard will differ with different types of confined space, and other factors such as access and egress, flooding risk, etc. will also need to be taken into account.
4. To enable Managers and Supervisors to assess confined space hazards, and the necessary precautions, a system of three classifications of confined space entry has been adopted.

Each classification will relate to a method of work and a standard of training and competence.

## CLASSIFICATIONS

Classification A	
 <p><b>CONFINED SPACE</b></p> <p>CLASSIFICATION <b>A</b></p>	<p>Areas where the access/egress may not be adequate or is difficult to negotiate. The possibility may arise that the condition of the atmosphere could change after initial venting and testing. Traversing away from the point of entry may be required.</p>
Classification B	
 <p><b>CONFINED SPACE</b></p> <p>CLASSIFICATION <b>B</b></p>	<p>Areas where access/egress is not adequate or is difficult to negotiate. The atmosphere is unlikely to change after initial venting and testing.</p>
Classification C	
 <p><b>CONFINED SPACE</b></p> <p>CLASSIFICATION <b>C</b></p>	<p>Areas where the access/egress is adequate. The atmosphere is unlikely to change after initial ventilation and testing.</p>

## CATEGORY CHANGES

5. Certain work locations may have been defined as a specific category under normal circumstances. However, changes to the normal work requirements may introduce additional hazards, such as welding and burning, and would therefore be changed from that category to Classification A.

Conversely, because additional safety measures are taken, such as the introduction of forced ventilation say in a Classification A location, this may allow the use of Classification B procedures. It may also be possible to reduce further to Classification C once it has been established that the atmosphere is safe and that no source of hazard exists.

## ASSESSMENT AND CERTIFICATION OF PERSONNEL

6. A Competent Person Class 2 (CP2) is a Guernsey Water employee who has completed the required course of training and has been assessed as competent to apply or supervise the system of work for Classifications A, B and C confined spaces.

An Authorised Person (AP) is an employee of Guernsey Water who has sufficient knowledge and experience to recognise the hazards associated with the system he has been appointed to supervise, the routine and specialist operations carried out in it. This person should have the necessary knowledge and experience to enable them to assess risk, specify and where necessary, develop the appropriate safe system of work and ensure that the system of work is monitored and supervised.

The AP has been trained in the following: -

Managing Safely, Confined Spaces (to the level of CP2) and has completed a course in Risk Assessment.

## **CONTRACTORS**

7. Contractors will be required to demonstrate that they have sufficiently trained and experienced employees, together with the necessary safety equipment to apply a system of work applicable to the Classification of Confined Space in which their operations take place.

## ■ CLASSIFICATION A – CONFINED SPACES

Areas where the access/egress may not be adequate or is difficult to negotiate. The possibility may arise that the condition of the atmosphere could change after initial venting and testing. Traversing away from the point of entry may be required.



### OPERATING REQUIREMENTS

1. This classification of confined space operation will be undertaken under the control of an AP.

The AP will follow a systematic process for the issue of a permit to work, as follows: -

#### Stage 1 - Assessment

2. Every location and operation is likely to be different and therefore every case will require specific consideration. A number of aspects will be common to all entries, whilst others will be individual to special operations.

Factors for consideration include: -

- Identify the System Layout
- Schematic drawings and plans, isolation and connection points, valving, geological factors, dimensions (depth, bore, access, distances) other services and movements in the vicinity.

## **Access and Structure**

- Ventilation, method of access and egress (power winching), site security, structural stability, obstructions, inspections and temporary support.

## **Materials**

- Use of paints, mastics, adhesives and chemicals and processes using gasses or producing fumes; chlorine dosing, etc.

## **Equipment and Special Operations**

- Hotwork (flame cutting, grinding, welding cartridge tools), CCTV, flash photography and surveying instruments, non BASEEFA (or ATEX, IECEx) approved electrical / electronics apparatus.
- Environmental Factors – noise, temperature, dust, etc.
- Is lifting and winching equipment necessary?
- Lighting standards and equipment
- Power requirements and electrical safety standards
- Divers – special Regulations apply, refer to Safety Adviser
- Will disinfection be necessary before re-instatement?

## **Water Operations Factors**

- Establish any operation constraints (hours of work, head levels, plant availability, pressures, etc). Identify methods and sequence of isolation necessary and the need for any documentation. Implement liaison arrangements where more than one area or operational group is involved.
- Identify special factors such as dosing points, siphons, surge vessels, airing points, drain valves, etc.
- Identify operations where water levels cannot be maintained by isolation and therefore rely upon planned and documented flow control.

## **Personnel**

- Skills required – contractors, consultants (specialist scientific or engineering advice) ensuring competence, physical fitness and supervision.
- Will personnel entering the confined space need to hold a current National Water Hygiene certificate clearing them for work on restricted operations?

## **Stage 2 - Planning and Preparation**

3. By this time the AP will have produced a documented safe system of work appropriate to the task to be undertaken. For the more common special operations these documented procedures, once developed, may be retained for future reference.
4. Before the permit to work is issued for the commencement of operations the AP will obtain all necessary ancillary permits to work, conformation of isolations, flow control agreements, and inspection certificates for plant and equipment etc.
5. Having established that the necessary engineering and environmental controls have been applied, the AP confirms to his satisfaction that manpower aspects have been met with regard to trained, experienced personnel, adequately equipped and competent to apply the designated safe system of work.
6. The AP will satisfy himself that the facilities required for the emergency and contingency planning, rescue and first aid, welfare and communications, aspects covered by the documented system of work are available and in good order.

## **Stage 3 – Issue of Permit**

7. Being satisfied that all potential hazards have been identified, safety controls implemented and equipment provided the AP issues the permit to work to a CP2 in charge of the works. The CP2 in charge completes the atmospheric test section on the permit prior to signing to receive the permit. The permit must be held available at the worksite for the top man to fill in the gas monitor readings every 2 minutes on the reverse of the permit.

## **Variations**

8. In the event of significant changes to conditions or the operation of the system of work the CP2 holding the permit will promptly notify the AP. While awaiting further instructions the CP2 in charge is authorised and expected to take any necessary action to prevent danger. This includes authority to suspend work.

## **Cancellation**

9. At the completion of the operation or in the event of its abandonment the CP2 holding the permit to work will complete the appropriate part of the permit confirming that the confined space has been evacuated and the site left safe.

The AP will then cancel the permit to work and progress the cancellation of any associated mechanical or electrical permits to work.

## ■ CLASSIFICATION B – CONFINED SPACES

Areas where access/egress is not adequate or is difficult to negotiate. The atmosphere is unlikely to change after initial venting and testing.



### CLASSIFICATION B – STANDARD ENTRY METHOD

1. This method will be appropriate in all Classification B confined space work where the continuous use of an attached life line is inappropriate or impracticable.

#### Training

2. Training standards for this class of operation are covered by the confined training given to Guernsey Water staff.
3. Will personnel entering the confined space need to hold a current National Water Hygiene certificate clearing them for work on restricted operations?

#### Equipment

4. All equipment is to be approved for its purpose.
  - (a) Personal Equipment: Overalls  
Safety helmet  
Appropriate safety footwear  
Gloves
  - (b) Team equipment: Safety barriers, signs, etc.  
Gas detector

Personnel Winch\*\*  
Rescue harness/belts  
Lifeline  
Handline – for lowering equipment  
Oxygen resuscitator (MARS)  
At least 2 sets of 30 minute working/rescue self contained  
breathing apparatus (SCBA)  
Standard first aid kit  
Portable lighting\*  
Emergency escape breathing apparatus\*\*  
Signalling apparatus (as appropriate)  
Radio or mobile phone\*\*\*

- \* In all such cases hand or cap lamps must be available for use as emergency lighting and BASEEFA, ATEX or IECEx approved for use in potentially explosive atmospheres.
- \*\* This item is optional and will require consideration. The need for escape sets or rescue winches will depend upon the anticipated time to rescue a casualty. Consequently the prime factor in the decision will be working depth or travel distance.
- \*\*\* This item is optional and will require consideration of the communication facilities available at the site to summon the Emergency Services.

## Planning and Documentation

5. The CP2 in charge of the operation shall ensure that all equipment is available and operational before leaving the depot. These checks to include SCBA, MARS resuscitator, escape sets and gas monitor checks as listed in the APPENDIX.
6. Before the permit to work is issued for the commencement of operations the AP will obtain all necessary ancillary permits to work, conformation of isolations, flow control agreements, and inspection certificates for plant and equipment. If this arrangement is complex then consideration should be given to reclassifying this entry as Classification A.
7. Having established that the necessary engineering and environmental controls have been applied, the AP confirms to his satisfaction that manpower aspects have been met with regard to trained, experienced personnel, adequately equipped and competent to apply the designated safe system of work.
8. The AP will satisfy himself that the facilities required for the emergency and contingency planning, rescue and first aid, welfare and communications, aspects covered by the documented system of work are available and in good order.
9. The CP2 in charge of the operation on site shall ensure that communications, in the form of either a telephone or a radio, are immediately available and operational.
10. Being satisfied that all potential hazards have been identified, safety controls implemented and equipment provided the AP issues the permit to work to a CP2 in charge of the works. The CP2 in charge completes the atmospheric test section on the

permit prior to signing to receive the permit. The permit must be held available at the worksite for the top man to fill in the gas monitor readings every 2 minutes on the reverse of the permit.

## System of Work

11. Where appropriate give notification of presence on site to either local operational management or St Saviours control room.
12. Erect barriers and signs where necessary.
13. The no-smoking prohibition should be enforced both in the confined space and the immediate vicinity of the entry and ventilation points.
14. Check the gas detector then place it next to the confined space access point.
15. Remove cover, open doors for access and ventilation and allow ventilating for a minimum of 15 minutes. Where appropriate upstream and downstream access covers should be lifted (and barriered) to provide for through ventilation and emergency egress.
16. Having previously carried out pre-use checks on the SCBA and the resuscitator place them adjacent to the entry point.
17. Lower the gas detector into the confined space for at least 10 minutes prior to entry.
18. During this gas test note any unusual smells and carry out visual checks of the stability of the structure, including ladders, step irons, etc. Assemble the winching system (where appropriate) put on the safety harness and protective equipment.
19. Minor structural problems can be reported at the end of the working day.
20. If a gas or structural hazard is identified, abandon the entry, make the area safe by replacing covers, etc., and immediately report conditions to your supervisor or manager.
21. The CP2 in charge of the operation, having established there is no gas hazard and that the structure appears sound, allocates duties and completes the permit to work.
22. With the gas detector in position in the confined space the first man entering will be attached to a safety line in case there are unobserved faults in the ladders or step irons. In some cases, for instance where there are fixed stairs or entry upwards (water towers), this will not be appropriate.
23. Only one person may be on a ladder or series of steps at one time. All tools and materials should be lowered and raised by line and never carried by hand on ladders.
24. The CP2 in charge of the party will establish a system of visual or audible contact with the CP2 topman posting intermediate relay men if appropriate.
25. At least one gas detector will be carried with the working party and one gas detector will remain at the entry point being monitored by the CP2 bottom-man.

Where the entry involves a long walk-through operation a further gas detector and CP2 topman will be stationed at the exit point.

Where relay men are stationed for communications and safety monitoring they too must be equipped with gas monitors.

26. Consideration should be given at the planning stage to the provision of emergency escape breathing apparatus. Whether this is required at all, and if so whether 15 minute emergency escape breathing apparatus or 30 minute working / rescue self contained breathing apparatus (SCBA) are more appropriate will depend upon depth, distance of travel and the anticipated time needed to escape.
27. Standards for safety in confined spaces are that only electrical equipment approved for this operation may be used in a confined space.
28. Details of approved lighting apparatus for confined spaces are that only approved battery operated hand or cap lamps must be used.
29. If when travelling through a tunnel or similar confined space a blockage is discovered, and it is not possible to determine with certainty conditions beyond the blockage, the party should return to the point of entry and obtain instructions from the AP.

Any work in clearing or investigating the blockage should be subject to Classification A procedures.

30. If when working in a Classification B confined space either the water level begins to rise significantly, there is a gas alarm or the CP2 topman gives the instruction, the confined space should be evacuated immediately. Do not stop to recover equipment. The CP2 in charge of the working party should account for personnel as listed on the permit. Under no circumstances should anyone enter a confined space to rescue a gas casualty unless wearing rescue-breathing apparatus. Emergency evacuation from a walk through operation should be back in the direction from which you travelled.
31. At the completion of the operation the CP2 in overall charge shall account for all personnel, ensure that the underground work area is either clear of tools and materials or is otherwise in a safe condition and that all covers are replaced, barriers removed and the site left in a safe condition.

Where entry points are left open for ventilation purposes they must be effectively and securely fenced to prevent unauthorised entry.

At the end of the day check and stow safety equipment: -

- Report any equipment defects, operational problems or faults to the supervisor or manager.
- Report the finish of work to local operational management or St Saviours control room.

## ■ CLASSIFICATION C – CONFINED SPACES

Areas where the access/egress is adequate. The atmosphere is unlikely to change after initial ventilation and testing.



### CLASSIFICATION C – CONFINED SPACE

#### Training

1. Training standards for this class of operation are covered by the confined training given to Guernsey Water staff.
2. Will personnel entering the confined space need to hold a current National Water Hygiene certificate clearing them for work on restricted operations?

#### Equipment

3. The appropriate gas detector.  
Appropriate protective clothing including safety footwear.  
Barriers, signs and cones where necessary.

#### Communications

4. Supervisor, team leader or manager to ensure that operatives are aware of the classification of the workplace and are competent persons appropriately equipped and briefed.

5. Difficulties in applying the system of work or any unusual circumstances which introduce unforeseen hazards should be reported immediately to the immediate supervisor or manager.

## **Documentation**

6. The CP2 in charge of the operation shall ensure that all equipment is available and operational before leaving the depot.
7. Before the entry log is issued for the commencement of operations the AP will obtain all necessary ancillary permits to work, conformation of isolations, flow control agreements, and inspection certificates for plant and equipment etc.
8. Having established that the necessary engineering and environmental controls have been applied, the AP confirms to his satisfaction that manpower aspects have been met with regard to trained, experienced personnel, adequately equipped and competent to apply the designated safe system of work.
9. The AP will satisfy himself that the facilities required for the emergency and contingency planning, rescue and first aid, welfare and communications, aspects covered by the documented system of work are available and in good order.
10. The CP2 in charge of the operation on site shall ensure that communications, in the form of either a telephone or a radio, are immediately available and operational.
11. Being satisfied that all potential hazards have been identified, safety controls implemented and equipment provided the AP issues the entry log to a CP2 in charge of the works. The CP2 in charge completes the atmospheric test section on the log prior to signing to receive the permit. The log must be held available at the worksite.

## **System of Work**

12. Where appropriate give notification of presence to local operational management or St Saviours control room.
13. Erect barriers and signs where necessary.
14. Smoking is prohibited after this stage of the procedure.
15. Check the gas detector then place it next to the confined space access point.
16. Remove cover, open doors for access and ventilation and allow to ventilate for a minimum of 15 minutes. Where appropriate upstream and downstream access covers should be lifted (and barriered) to provide for through ventilation and emergency egress.
17. Lower the gas detector into the confined space for at least 10 minutes prior to entry.
18. During this gas test note any unusual smells and carry out a visual check of the stability of the structure, including ladders, step irons, etc.

19. If a gas or structural hazard is identified, abandon the entry, make the area safe by replacing covers etc, and immediately report conditions to your immediate supervisor or manager.
20. Minor structural problems can be reported at the end of the working day.
21. Provided that no gas hazard is indicated and the structure appears to be sound, enter, and carry out duties, keeping the gas detector with you.
22. On completion of the work, ensure that any covers are replaced and that the area is left safe and any barriers removed.
23. Report the finish of work to local operational management or St Saviours control room.

## ■ APPENDICES – EQUIPMENT CHECKING PROCEDURES, EMERGENCY PROCEDURES & FIRST AID

- APPENDIX 1 - EMERGENCY PROCEDURES
- APPENDIX 2 - RESUSCITATION
- APPENDIX 3 - USE OF THE MARS OXYGEN RESUSCITATOR
- APPENDIX 4 - USE OF SELF CONTAINED BREATHING APPARATUS (SCBA)
- APPENDIX 5 - USE OF EMERGENCY ESCAPE BREATHING APPARATUS
- APPENDIX 6 - USE OF GAS DETECTOR

## APPENDIX 1 - EMERGENCY PROCEDURES

1. If an accident occurs or a dangerous situation involving a gas alarm, water level, or any other significant hazard becomes apparent then the confined space entry should be abandoned. Instructions for evacuation may be given by the CP2 in charge of the working party, by the CP2 topman or any relay topman in a communications chain. Any such instruction must be obeyed and failure to do so may result in disciplinary action.

Following the gas alarm, the escape breathing apparatus carried should be worn.

Try to avoid getting out of breath as an increased breathing rate may cause gas to affect you more.

The CP2 in charge of the working party should, if practicable, be the last man out. The topman must account for all the party in the entry logbook and ensure that the incident is recorded.

The sudden collapse of a person in a confined space will either be because of a medical condition or because of gas/oxygen deficiency. This will require a rapid assessment from the CP2 in charge, using the gas detector.

### Medical Emergency

2. Send for the fire and ambulance service via the topman, send someone for the resuscitator, remain with the casualty and monitor their condition. If they lose consciousness maintain an airway. If they stop breathing use the resuscitator.

**REMEMBER – IT IS ESSENTIAL THAT THE TOPMAN REMAINS AT HIS POST UNLESS RELIEVED BY ANOTHER CP2, THEY SHOULD NOT GO INTO THE CONFINED SPACE TO HELP.**

### Gas or Oxygen Deficiency

3. If a person collapses and an atmosphere problem is either apparent or suspected then the rest of the party **MUST** evacuate immediately.
4. All that can be done for the casualty at this stage is to place them with their head out of water. **BUT DO NOT GO INTO DANGER TO ACHIEVE THIS.**
5. Shout out message to the topman to send for fire and ambulance services.
6. Get out.
7. Two CP2's don the 30 minute working / Rescue SCBA sets.
8. Meanwhile the topman lowers resuscitator into the confined space on a rope.
9. The topman notes time and contents gauge reading on the SCBA sets in the entry log – tell the firefighters when they arrive.

10. Rescue men return to casualty and support life using resuscitator.
11. If the fire and rescue service have not arrived by the time the warning whistle sounds on the SCBA then evacuate leaving the casualty with a clear airway and the resuscitator for the fire fighters.
12. The fire and rescue service will take charge when they arrive. The topman will give details of the confined space layout, position and number of casualties and rescuers, and availability of equipment.

**REMEMBER YOU MUST LEAVE A TOPMAN AT THE SURFACE TO DIRECT THE FIRE AND RESCUE SERVICE WHEN THEY ARRIVE.**

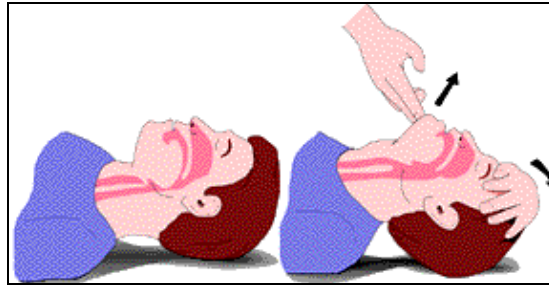
13. The decision on whether to attempt to remove the casualty from the confined space or wait for the Fire and Rescue Service will depend upon the local circumstances.

**DO NOT ATTEMPT A RESCUE WITHOUT WEARING BREATHING APPARATUS.**

## APPENDIX 2 – RESUSCITATION

1. Drowning, gassing, electric shock, accidental injury or illness could occur in confined spaces where resuscitation (cardiac massage and / or artificial ventilation) may be required.
2. The following notes are provided to re-inforce the first aid training given on the confined spaces course (DRAB): -
  - ASSESS the situation and make it safe (e.g. switch off electric power).
  - SHOUT “Are you alright? Can I help you?” if there is no response, SHAKE THE CASUALTY GENTLY.

IF NO RESPONSE: -



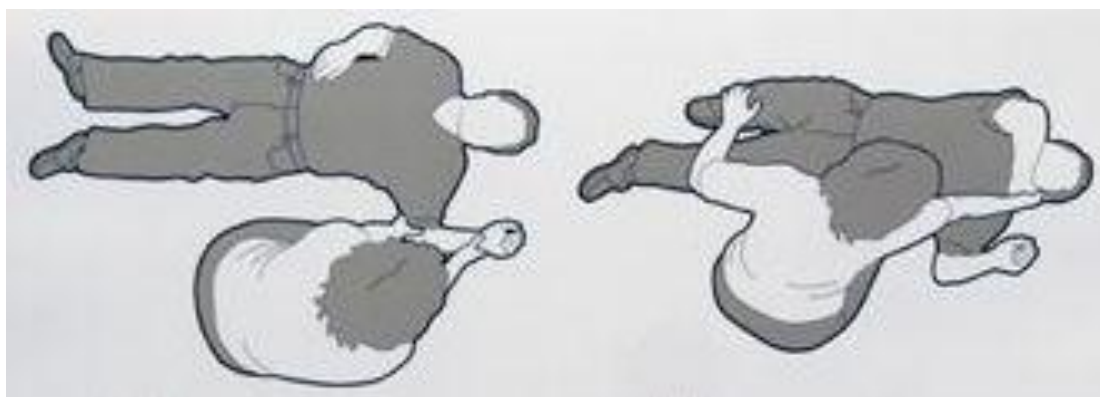
- Place the casualty on their back, OPEN the AIRWAY by tilting the head back and pulling the jaw forward.
- Check for BREATHING (can you see, hear or feel air movement?).

IF BREATHING: -

- Turn the casualty into the RECOVERY POSITION.
- CALL FOR ASSISTANCE (DIAL 999 OR 112).

## Recovery position

For a collapsed casualty who is breathing.

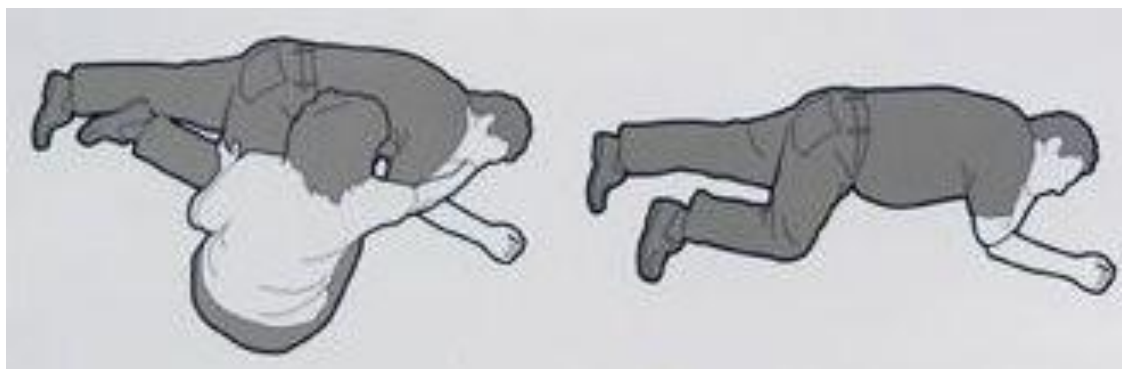


### Step 1

- Place arm nearest to you at a right angle with palm facing up.

### Step 2

- Move other arm, as shown, palm downwards, hand against casualty's cheek.
- Get hold of knee furthest from you and pull up until foot is flat on floor.



### Step 3

- Pull the knee towards you, keeping the casualty's hand pressed against their cheek.
- Position the leg at a right angle

### Step 4

- Making sure that the airway remains open by tilting the head back, then check breathing by feeling and listening for breath.

## If No Breathing Present

- Dial **999** or 112 for an ambulance immediately and then return to help the casualty.

### Give 30 chest compressions

- Place heel of your hand in the centre of the chest.
- Place other hand on top and interlock fingers.
- Keeping your arms straight and your fingers off the chest, press down by 4-5cms. Then release the pressure, keeping your hands in place.
- Repeat the compressions 30 times, at a rate of 100 per minute.



### Give 2 rescue breaths.

- Ensure the airway is open.
- Pinch nose firmly closed.
- Take a deep breath and seal your lips around the casualty's mouth.
- Blow into the mouth until the chest rises.
- Remove your mouth and allow the chest to fall.
- Repeat once more.



**Continue resuscitation, 30 compressions to 2 Rescue Breaths.**

**Do not stop unless:**

- Emergency help arrives and takes over
- The casualty breathes normally or
- You become so exhausted that you cannot carry on.

**Notes:**

- If you are alone, call an ambulance as soon as you know the casualty is not breathing - unless unconsciousness is due to drowning.
- If two rescuers *with the knowledge of CPR* are available, change every 2 minutes with minimal disruption.
- If you are unable or unwilling to give rescue breaths, give chest compressions only. Continue at a rate of 100 per minute.

## APPENDIX 3 – USE OF THE MARS OXYGEN RESUSCITATOR

1. Full details for the use of the MARS resuscitator may be found inside the fabric bag containing the MARS resuscitator.

### Using the Resuscitator Unit in Respiratory Arrest

#### WARNING:

During resuscitation monitor the casualty's pulse, colour and pupils frequently. Monitor the cylinder contents gauge frequently. Change the cylinder when pressure drops to 20 bar, in accordance with Section 2.3 of the MARS users Instruction Manual.

When children under 20kg require resuscitation, operate by gently depressing the trigger whilst watching the chest rise and fall. DO NOT prolong or sustain trigger operation as over-inflation may occur in extreme cases.

**DO NOT use a Guedal Airway unless trained in its use.**

2. Bring the resuscitator to the casualty as soon as possible.
3. In normal non-toxic breathable air, expired air resuscitation (mouth to mouth) should be commenced immediately if no breathing is detected and continued until the resuscitator is ready for use.
4. On arrival at the scene of the incident, assess the situation for danger to yourself and the casualty.
5. Ensure that the casualty's mouth is clear of debris, vomit, and loose dentures.
6. Open and maintain the airway by extending the head and neck using a rolled blanket or coat as a support.
7. Check the casualty's breathing, colour and pupils. Listen, feel and look for signs of respiration.
8. Loosen restrictive clothing at the neck, chest and waist.
9. Open the case using snap fasteners.
10. Use the key to open the cylinder valve (2-turns anti-clockwise) and check cylinder contents.
11. If cylinder pressure is less than 20 bar, change the cylinder for a FULL one, see Section 2.3 of the MARS users Instruction Manual.
12. Take the demand valve from the MARS box and connect the appropriate face mask. Place MARS adjacent to the casualty.
13. Check the airway and place face mask over the casualty's face ensuring a tight seal round the nose and mouth.

14. Give 2 inflations to saturate the lungs with oxygen using the manual trigger watching the rise and fall of the chest at the same time.

**WARNING:**

**Excess pressure caused by a blocked airway (possibly due to: patient position or vomit) will set off the relief valve and audible alarm on the demand valve.**

**RECTIFY IMMEDIATELY BY ESTABLISHING THE AIRWAY.**

15. Re-check breathing, colour and pupils. If no pulse is found, follow the procedure entitled: *Using Resuscitator Unit in Cardiac Arrest*

16. If a pulse is present, but no breathing is detected, select the appropriate mode on the ventilation unit (i.e. large adult, small adult or child). The unit will now ventilate automatically. Note that whilst on automatic mode, ensure that airway is maintained and frequently monitor the casualty's pulse, colour and pupils.

17. When the casualty commences breathing, the unit will automatically switch to demand flow, allowing the casualty to breath unassisted through the unit. Should the casualty's respiratory rate drop below the pre-set levels, the unit will automatically recommence ventilation.

18. Having successfully ventilated the casualty and established a good respiratory rate, check the casualty for further injuries, "medi alerts". Turn the casualty into the RECOVERY POSITION.

19. Treat the casualty for shock. Reassure the casualty and DO NOT LEAVE until the medical services arrive.

20. Use the head harness to maintain mask to face seal during transportation of the casualty.

21. If breathing and / or circulation cease, recommence resuscitation.

## **Using the Resuscitator Unit in Cardiac Arrest**

**WARNING:**

**Throughout resuscitation frequently monitor the casualty's pulse, colour and pupils. Frequently monitor the cylinder contents gauge, when the pressure drops to 20 bar, change the cylinder in accordance with Section 2.3 of the MARS users Instruction Manual.**

**When children under 20kg require resuscitation, operate by gently depressing the manual trigger whilst watching the chest rise and fall. Do not prolong or sustain trigger operation as over-inflation may occur.**

**DO NOT use a Geudal Airway unless trained in its use.**

22. Bring the resuscitator to the casualty as soon as possible.
23. In normal non-toxic breathable air, expired air resuscitation (mouth to mouth) should be commenced immediately if no breathing is detected and continued until the resuscitator is ready for use.
24. On arrival at the scene of the incident, assess the situation for danger to yourself and the casualty.
25. Ensure that the casualty's mouth is clear of debris, vomit, and loose dentures.
26. Open and maintain the airway by extending the head and neck using a rolled blanket or coat as a support.
27. Check the casualty's breathing, pulse, colour and pupils. Listen, feel and look for signs of respiration.
28. Loosen restrictive clothing at the neck, chest and waist.
29. Open the case using snap fasteners.
30. Use the key to open the cylinder valve (2-turns anti-clockwise) and check cylinder contents
31. If cylinder pressure is less than 20 bar, change the cylinder for a FULL one, see Section 2.3 of the MARS users Instruction Manual.
32. Take the demand valve from the MARS box and connect the appropriate face mask. Place MARS adjacent to the casualty.
33. Select CPR mode on the control module.
34. Check the airway and place the face mask over the casualty's face ensuring a tight seal round the nose and mouth.
35. Use the manual trigger to give 2 inflations that will saturate the lungs with oxygen, whilst watching the rise and fall of the chest.
36. Check the carotid pulse in the neck.

**Note:**

**THE PULSE AT THE WRIST IS UNRELIABLE. IF A PULSE IS PRESENT BUT NO BREATHING IS DETECTED, FOLLOW THE PROCEDURE ENTITLED '*Using Resuscitator Unit in Respiratory Arrest*'.**

37. If a pulse is not detectable:

Give **30 chest compressions**

- Place heel of your hand in the centre of the chest.

- Place other hand on top and interlock fingers.
- Keeping your arms straight and your fingers off the chest, press down by 4-5cms. Then release the pressure, keeping your hands in place.
- Repeat the compressions 30 times, at a rate of 100 per minute.

Give **2 rescue ventilations**.

- Ensure the airway is open.
- Use the trigger to give TWO ventilations of the lungs

**Continue resuscitation**, 30 compressions to 2 rescue ventilations.

## Checking for Response

38. When resuscitation is successful the carotid pulse will return. Look at the casualty's face and lips – their colour will improve as oxygenated blood begins to circulate.

39. If the casualty is not breathing their normal colour will turn to blue, cyanosis. Maintain the resuscitation cycle until cardiac output is achieved, or until advised to stop by medically qualified personnel.

40. When breathing and pulse are stable:

- Place the casualty in the RECOVERY POSITION and treat for shock, continually reassuring the casualty throughout.
- DO NOT LEAVE the casualty until the arrival of the medical services.
- Use the head harness to maintain the mask to face seal during the transportation of the casualty.

**If breathing and / or circulation cease, recommence resuscitation.**

## Using the Resuscitation Unit as an Oxygen Therapy Unit

**WARNING: Special care must be exercised when using oxygen therapy with casualties who have long standing chest conditions, such as bronchitis etc. Use low flow.**

**NOTE:** An oxygen therapy unit and resuscitator can be used at the same time.

41. On arrival at the scene of the incident, assess the situation for further danger to yourself or the casualty then perform the following checks on the casualty:

- Ensure that the casualty's mouth is clear of debris, vomit, and loose dentures.
- Open and maintain the airway by extending the head and neck using a rolled blanket or coat as a support.
- Check the casualty's pulse, if not present, refer to - ***Using Resuscitator Unit in Respiratory Arrest.***

- Loosen restrictive clothing at the neck, chest and waist.
- Open the case using snap fasteners.
- Use the key to open the cylinder valve (2-turns anti-clockwise) and check cylinder contents.
- If cylinder pressure is less than 20 bar, change the cylinder for a FULL one, see Section 2.3 of the MARS users Instruction Manual.

### **Using Therapy Outlets**

42. Take the oxygen therapy mask and insert the hose connector into the oxygen outlet.

43. Select the flow rate on the outlet most suitable for your application.

## APPENDIX 4 - USE OF SELF CONTAINED BREATHING APPARATUS (SCBA)

Only authorised, trained and certified personnel may use B.A. equipment.

**APPARATUS CHECK** – to be carried out before use and monthly. **DO NOT** use the set if any faults are identified or any part of the equipment's test / service date has expired. The set **MUST** be removed from service and an appropriate member of staff informed.

1. The B.A. set should be checked to ensure that the date of the equipment's next examination is not overdue.
2. Check set is clean and in good condition.
3. Fully slacken waist belt, shoulder straps and head harness.
4. Check hoses and couplings are free of damage (do not use if braiding is visible).
5. Check visor for blemishes / cracks.
6. Check hand tight connections.
7. Fit cylinder if not already fitted.
8. Reset demand valve.
9. Reset bypass knob.
10. Slowly open cylinder valve fully.
11. Check pressure gauge (minimum before use 80% full = 160 bar).
12. Close cylinder valve and check pressure gauge for one minute (10 bar drop).
13. Open bypass knob.
14. Observe gauge (whistle at 55 bar +/- 5 bar).
15. Close bypass knob.
16. Check demand valve by pulling back locking catch and ensure it springs back.
17. Rotate bypass knob and check it springs into on and off positions.
18. Check O-ring and fit demand valve.
19. Press reset button and check bypass is off and re-stow set.
20. Details of such checks should be recorded and kept for future inspection.
21. Refer to the instruction manual or Guernsey Water's Health and Safety Officer should you have any concerns or queries.

## Donning Procedure

1. With harness straps fully slackened don set and adjust straps for comfort.
2. Fasten waist belt and adjust for comfort.
3. Check red bypass is off and depress black reset button.
4. Open cylinder valve fully.
5. Check pressure gauge (minimum before use 80% full = 160 bar).
6. Don facemask.
7. Place chin in chin cup.
8. Pull straps over head.
9. Remove hair from under seal.
10. Tighten harness in sequence: BOTTOM, MIDDLE, and TOP. Do not over-tighten.
11. Inhale sharply to activate demand valve.
12. Breathe normally.
13. Check positive pressure by placing finger under face seal. Check for steady flow.
14. Remove finger and allow mask to re-seal.
15. Close cylinder valve (keep hand on Valve).
16. Hold breath and check for leaks (pressure gauge movement will indicate).
17. If test fails open valve, adjust mask and repeat test.
18. Check gauge and breathe down air
19. Check whistle sounds at 55bar +/-5 bar.
20. Open cylinder valve fully.
21. Open bypass knob and check for steady flow then close bypass.
22. Recheck pressure gauge is at least 160 bar 80% full.
23. Once satisfied with set proceed with task.

## Removing Apparatus Procedure

1. Hold breath and reset demand valve by pressing rubber reset button.
2. Remove facemask by pulling metal buckles forwards let it hang on strap.
3. Close cylinder valve.
4. Remove apparatus by removing waist belt and slackening shoulder straps.
5. Bleed air by opening bypass, clean and re-stow set.

## Cleaning and Testing

1. Remove cylinder.
2. Remove and clean facemask according to manufacturer's recommendations.
3. Clean and examine apparatus (DO NOT immerse demand valve or whistle).
4. Check apparatus (Check demand valve locking by depressing a number of times).
5. Carry out function test and complete records.
6. The apparatus must be examined and tested at least once a month by a competent person in accordance with the manufacturer's instructions and APPARATUS CHECK instructions.
7. Details of such checks should be recorded and kept for future inspection.
8. The apparatus must be tested and components replaced annually.

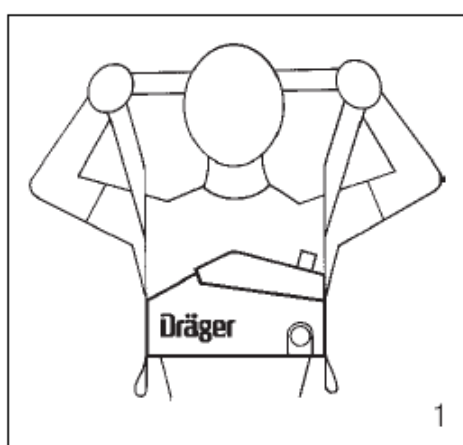
## APPENDIX 5 - USE OF EMERGENCY ESCAPE BREATHING APPARATUS

### Pre Operational Checks

1. Check contents gauge – ensuring the cylinder is fully charged e.g. 200 bar. Gauge needle inside the “green” segment of the gauge face.
2. Check anti-tamper tag on lid of bag is intact.

### Use - Putting on Equipment

3. Refer to Fig. 1. Place the neck strap of the carrying bag over head and adjust the strap until the equipment sits in the centre of the chest.

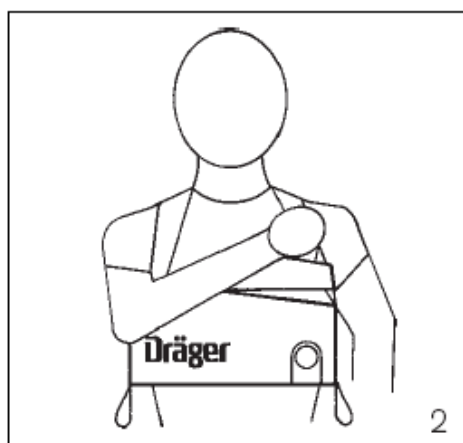


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4. If fitted with an optional waistbelt – loop the waistbelt around the waist and fasten the buckle. Pull the free end of the strap, tightening the waistbelt until equipment is secure and comfortable.

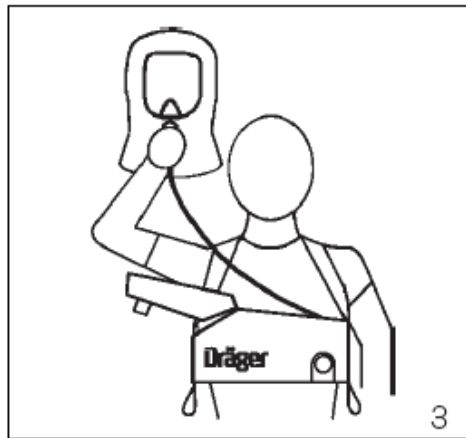
### IN AN EMERGENCY

5. Refer to Fig. 2. Grip the loop on the lid of the carrying bag and pull firmly upward to “break” the anti-tamper tag, open the flap of the bag which then releases the locking clip from the valve – turning “On” the air supply to the hood.



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6. Refer to Fig. 3. Immediately remove the hood from the carrying bag.



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**Safety Warning:** Duration of the equipment begins from the time of valve activation of the air supply and not from the time of putting on the hood.

7. Refer to Fig. 4. Grip both sides of the base of the hood with your thumbs inside the neckseal. Lift the hood above the head, stretch the neckseal then pull the hood over the head locating the half mask over the nose and mouth. Breathe normally and immediately leave the hazardous area by the shortest and safest escape route.



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**Important Note:** Spectacle wearers should stretch the neck seal over the spectacles.

## After Use

**SAFETY WARNING:** Do not remove the equipment until in safe area and clear of hazard. A whistle warning unit sounds at the end of the rated duration.

8. When in a safe environment remove the hood then take off the equipment.

**NOTE:** Do not drop or throw down equipment. Damage could occur.

9. Clean and disinfect the unit at necessary and perform a visual inspection.

10. Pass the equipment to your manger to have the cylinder recharged.

## APPENDIX 6 - USE OF GAS DETECTOR

### Switching On

1. Press and hold the **OK** key (for 3 seconds). A count-down is displayed to indicate when the three second period has elapsed.
2. When the count down reaches zero, release the **OK** key. The instrument then switches itself on in three phases.

**NOTE:** If you release the OK key before the count-down reaches zero, the instrument remains in the off state.

### Phase 1 of the power on sequence

3. During this phase, a signal tone sounds briefly.
4. The red alarm lamp lights briefly (test of the alarm signals).
5. The green operating LED is switched on.
6. Instrument specific information is displayed.
7. The active sensors are listed. If applicable, the remaining time before the next calibration date is shown (only if this is 14 days or less).
8. A message indicating completion of the self-test is displayed.

### Phase 2 of the power on sequence

9. For each active sensor, the full scale value of the measuring range and the alarm threshold settings are displayed.
10. Phase 2 of the power on sequence can be terminated at any time by pressing the **OK** key.

### Phase 3 sensor warming up period

11. When the sensors are warming up the remain time until measurement is displayed for each sensor.
12. When the warming up period is complete the instrument is in measure mode.

### An alarm is generated

13. If the measurement value exceeds the threshold for the related concentration alarm (in the case of O<sub>2</sub>, also if the measured value is below the lower alarm threshold).
14. If the measured value exceeds the threshold for the related exposure alarm

15.If the battery is exhausted.

16.If an instrument or sensor fault is detected.

### **Switching on the display illumination**

17.To switch on the display illumination during measuring mode press any key and the display illumination is switched on for about 30 seconds.

18.The display illumination is also switched on automatically if an alarm is generated.

### **Switching off**

19. Press and hold the  $\Delta$  and  $\nabla$  keys (for 3 seconds). A count-down is displayed to indicate when the three second period has elapsed.

20. When the count down reaches zero, the signal tone and the alarm lamp lights for about one second, the green operating LED is switched off and the instrument then switches itself off.

21. If the keys are released before the count down reaches zero, the instrument remains in measuring mode.