



Department
for Communities
& Local Government



Fire and Rescue Authority

Operational guidance
Breathing apparatus



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& Local Government



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SECTION 1

Foreword

- 1.1 Breathing apparatus (BA) is used in atmospheres that are hazardous to health. Often the work undertaken in BA will be complex, physically and psychologically demanding and, in certain circumstances, normal sensory perceptions will be denied.
- 1.2 Incidents involving BA may place significant demands on local fire and rescue services and have often required a co-ordinated response from across the country.
- 1.3 Services are encouraged to adopt the principles laid out in this guidance to achieve a level of standardised approach and facilitate the implementation of a unified system that supports interoperability and inter agency resilience.
- 1.4 This operational guidance presents a framework for a safe system of work for operations at incidents where the use of BA is required. It provides robust, yet flexible guidance that can be adapted to the nature, scale and requirements of the organisation and the incident.
- 1.5 An incident involving the use of BA may generate intense media attention where the operations of the emergency services are rigorously scrutinised. Whilst much of this attention is favourable it will invariably focus on the preparedness of the emergency services and their operational effectiveness.
- 1.6 The Chief Fire and Rescue Adviser is grateful for all the assistance given, in support of the development of this document, including from rail, mining and construction experts. It will support resource co-ordination and provide the appropriate level of information during incidents involving BA.
- 1.7 Promotion of common principles, practices and procedures supports the development of safer systems of work on the incident ground and enhances national resilience.
- 1.8 The guidance will provide support for the fire and rescue services in the resolution of incidents involving BA.

SECTION 2

Preface

- 2.1** The objective of the *Fire and Rescue Authority Operational guidance – Breathing apparatus* is to provide a consistency of approach that forms the basis for common operational practices, supporting interoperability between fire and rescue services, other emergency responders and other groups. These common principles, practices and procedures are intended to support the development of safe systems of work on the incident ground and to enhance national resilience.
- 2.2** Operational guidance issued by the Department of Communities and Local Government promotes and develops good practice within the Fire and Rescue Service and is offered as a current industry standard. It is envisaged that this will help establish high standards of efficiency and safety in the interests of employers, employees and the general public.
- 2.3** This guidance, which is compiled using the best sources of information known at the date of issue, is intended for use by competent persons. The application of the guidance does not remove the need for appropriate technical and managerial judgement in practical situations with due regard to local circumstances, nor does it confer any immunity or exemption from relevant legal requirements, including by-laws. Those investigating compliance with the law may refer to this guidance as illustrating an industry standard.
- 2.4** It is a matter for each individual Fire and Rescue Service whether to adopt and follow this operational guidance. The onus of responsibility for application of guidance lies with the user. Department of Communities and Local Government accept no legal liability or responsibility whatsoever, howsoever arising, for the consequences of the use or misuse of the guidance.
- 2.5** Contributions have been made by Chief Officers, front-line personnel, central government, representative bodies, the Health and Safety Executive and others who share a passion for providing a safe system of work for the firefighters deployed in BA. It is also recognised and understood, that large scale or complex operational incidents involving the large scale deployment of BA wearers needs to acknowledge the importance of effective interoperability and the contribution it makes to the successful resolution of operational incidents.
- 2.6** This guidance facilitates professional good practice to enhance the safety of firefighters and achieve successful outcomes in saving life and protecting property.
- 2.7** This guidance is user led and represents current thinking and good practice. The 'standard operational procedures' needed to underpin and implement this guidance should be developed separately at the local level, as required by individual Fire and Rescue Services.

- 2.8** This guidance also forms part of the wider arrangements that are in place forming part of the Incident Command System that is in place for the Fire and Rescue Service. This guidance therefore, should not stand in isolation and needs to be considered as forming part of the incident command arrangements at operational incidents. This guidance should be used in conjunction with Fire and Rescue Authorities, health, safety and welfare framework.
- 2.9** The arrangements relating to the safe deployment of BA wearers and the procedures that are in place to support those arrangements should be seen as being scaleable. This means that even at a relatively low level of BA wearers being deployed, the nature of the risk may present such significant hazards that a higher level of supervision and oversight is required.

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Section 3

Strategic role of operational
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Purpose

- 3.1** This Operational guidance is set out in the form of a procedural and technical framework. Fire and Rescue Services should consider it when developing or reviewing their policy and procedures to safely and efficiently resolve emergency incidents involving the use of BA.
- 3.2** A Fire and Rescue Service may respond to a wide range of incidents where the use of BA is used. The location and risks will also be varied.
- 3.3** The purpose of this guidance is to assist emergency responders to make safe, risk assessed, efficient and proportionate responses when attending and dealing with operational incidents where BA is used.
- 3.4** Whilst this guidance may be of use to a number of other agencies, it is designed to provide relevant information, planning and operations relating to the use of BA by the UK Fire and Rescue Service.

Operational guidance review protocols

- 3.5** This operational training guidance will be reviewed for its currency and accuracy three years from date of publication. The Operational Guidance Programme Board will be responsible for commissioning the review and any decision for revision or amendment.
- 3.6** The Operational Guidance Programme Board may decide that a full or partial review is required within this period.

Scope

- 3.7** The scope of this guidance covers the broad principles involved in deploying BA at an operational incident.
- 3.8** It is focused on the tactical and technical aspects in the use of BA at incidents so as to assist Fire and Rescue Services with:
- the development of safe systems of work
 - interoperability at large or cross border incidents where more than one Fire and Rescue Service is in attendance
 - to promote interoperability at incidents with other emergency responders.
- 3.9** This guidance covers the principles used in the deployment of BA and includes some tactical and technical information that need to be considered alongside the Incident Command procedures.

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Section 4

Risk assessment

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Introduction

- 4.1** The *Health and Safety at Work etc Act 1974* applies to all activities of Fire and Rescue Authorities as the employers of fire and rescue personnel. The Act requires employers to ensure the health, safety and welfare at work of their employees and that their activities do not adversely affect the health and safety of other people.
- 4.2** These health and safety duties are not absolute and are qualified by the test of what is reasonably practicable. The Act, therefore, does not require all risks to be eliminated, and the Health and Safety Executive recognises that, even when all reasonably practicable precautions have been taken to deal with foreseeable risks, harm could still occur.
- 4.3** The *Fire and Rescue Authorities Health, safety and welfare framework* recognises that fire and rescue personnel operate in a dynamic and often hazardous environment. They operate in incidents involving fire, water, height, road traffic collisions, chemicals, biological hazards, radiation and acts of terrorism.
- 4.4** BA enables firefighters to breathe safely in otherwise irrespirable atmospheres. Its use is one of the risk control measures likely to be employed within the overall operational plan for incidents involving fire, rescue and hazardous materials.
- 4.5** Personal protective equipment, which includes BA, should only be used where other control measures are not able to ensure the safety of firefighters so far as is reasonably practicable. Personal protective equipment, where deployed, should form part of an overall safe system of work. It is recognized that there are circumstances where BA will provide the key risk control measure.
- 4.6** This guidance provides for a safe system of work for command and control in the use of BA. It also provides for a consistency of approach across Fire and Rescue Authorities, forms the basis for common operational practices, supporting interoperability across Fire and Rescue Services, other emergency services, and where appropriate, industry and other groups. The drive toward common principles, practices and procedures supports the development of safe systems of work on the incident ground and enhances national resilience.
- 4.7** BA command and control procedures represent just one of the suite of safe systems established within any operational plan involving any of the hazardous scenarios, listed in para 4.3 above, that are likely to be encountered by firefighters. Therefore, most generic risk assessments are considered relevant to a greater or lesser extent in this context.

Risk assessment process

4.8 The four pillars of operational risk assessment

PILLAR ONE

4.9 **Generic risk assessment**

Generic risk assessments are nationally produced guidance where the Fire and Rescue Authority shares the experiences gained at operational incidents. They provide hazard, risk and control measures information to support and inform the development of individual Fire and Rescue Authority's incident specific risk assessments.

PILLAR TWO

4.10 **Strategic risk assessment**

Generic risk assessments cannot be applied directly to the activities of an individual Fire and Rescue Authority. By definition they are 'generic'. In themselves, they do not satisfy the Fire and Rescue Authority's duty for conducting a suitable and sufficient assessment of foreseeable risk within their authority area.

PILLAR THREE

4.11 **Dynamic/incident risk assessment**

Dynamic/Incident risk assessment is the process by which, as the nominated competent person, an incident commander will identify the hazards and risks faced by those in attendance.

PILLAR FOUR

4.12 **Individual risk assessment**

In most cases, operational incidents are dealt with by firefighters working alongside and under the direct supervision of their line managers. However, the use of BA often means that they are required to work remotely and make decisions for themselves, when incident risk assessment will only have been able to take account of incident hazards and risks that are reasonable to expect, foresee or know about.

4.13 Therefore, there is another layer of risk assessment, one designed to inform personal safety in circumstances where unsupervised firefighters may encounter an unexpected or unforeseen situation. Individual risk assessment is the process of identifying hazards and assessing risk in order to inform and influence the risk taking behaviour and actions of firefighters when they encounter these circumstances.

4.14 Each of these principles is further explained in the Fire and Rescue Authorities, Health, safety and welfare framework document.



Section 5

Key principle

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Key principles

- 5.1** The use of BA represents a safety control measure that allows firefighters to breathe in atmospheres that are oxygen deficient, toxic, and hazardous during Fire and Rescue Service operations.
- 5.2** There is a need to provide a suitable and sufficient safe system of work to protect firefighters deployed wearing BA.
- 5.3** National Resilience and mutual aid arrangements require guidance on standardised safe systems of work in order that BA wearers may work safely across Fire and Rescue Authority boundaries, with personnel from other emergency services and, where appropriate, with industry fire and rescue teams. Such an approach will also support interoperability and National Resilience.
- 5.4** BA can only be worn on the authority of the Incident Commander; however, operational personnel have the right to request to wear it for respiratory protection. Such requests should be considered as part of the normal risk management process.
- 5.5** The Incident Commander will only deploy BA following identification of the operational outcomes and objectives to be achieved and a suitable and sufficient assessment of the risks involved, using all available information and local intelligence (involving, as appropriate, risk assessments; any site specific risk information gathered under the relevant sections of the *Fire and Rescue Services Act*; *Civil Contingencies Act*, local Fire and Rescue Service guidance such as standard operational procedures; and any other localised or circumstantial information available at or relevant to the incident), and the employment of suitable and sufficient risk control measures.
- 5.6** The appropriate level of BA command and control procedures and safe systems of work, as outlined within this guidance, must be followed at all incidents at which BA is deployed. Incident command system principles and practices must be adhered to at all times.
- 5.7** Only the Incident Commander, Operations Commander or Sector Commander may nominate Entry Control Operative/s. During an incident the Incident Commander may give their authority to Operations or Sector Commanders to deploy BA wearers on their behalf.
- 5.8** Procedures for briefing and debriefing of BA wearers/teams are critical to the effectiveness and safety of Fire Service' operations, the establishment of a safe system of work and firefighter safety. Full and effective briefing and debriefing of BA teams should therefore, be undertaken on every occasion that BA is deployed.

- 5.9** Good communications between the entry control point and BA teams, other entry control points and, where established, with Command Support are also essential to the effectiveness and safety of BA teams. Accordingly, suitable, sufficient and resilient means of communications should be established at all times.
- 5.10** All personnel assuming a role connected with BA wearing or command and control procedures must be competent for that task. (see *Operational training guidance: Breathing apparatus* www.gov.uk/government/publications/operational-training-guidance-breathing-apparatus).

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Section 6

Fire and Rescue Service
operations

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Part A

Pre-planning considerations

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Equipment

- 6A.1** All equipment must comply with the relevant British, European and/or international standards (where applicable), Fire and Rescue Service procurement specifications and any user-specifications.
- 6A.2** Ancillary equipment used in conjunction with BA command and control, procedures for which there are no relevant standards, must be fit for purpose and are described in the appendices to this guidance in the interests of developing common standards, interoperability and common safe systems of work.
- 6A.3** Respiratory protective equipment used at work must:
- be adequate and provide the wearer with effective protection
 - be suitable for the intended use
 - be 'CE' marked
 - be selected, used and maintained by properly trained people
 - be correctly maintained, examined and tested
 - be correctly stored.
- 6A.4** Equally, all equipment must be tested in accordance with manufacturers' instructions and the requirements of Section 6 Part B of this guidance.

Responsibilities

Supervisory manager

- 6A.5** The supervisory manager will:
- nominate suitably qualified and competent individuals to wear BA for each appliance
 - nominate a suitably qualified and competent individual(s) to assume the duties of Entry Control Operative (See Appendix 1); when nominating these individuals take into account any other specific duties any crew member may have at an operational incident
 - ensure that the appropriate tests of BA and associated equipment are carried out, and that the test records are accurately maintained
 - ensure that defective equipment is removed; reported as defective; and that replacement equipment is obtained as soon as possible
 - ensure that BA and associated equipment is maintained in a clean, safe and serviceable condition and is available for operational use
 - during a duty shift make such changes as are necessary in the nomination of BA wearers and Entry Control Operative.

Nominated Breathing Apparatus wearers

6A.6 A nominated BA wearer will:

- carry out general check of the BA as described in procedural guide
- as soon as practicable after completing the appropriate test, record and sign for the result of the test in the record(s) maintained for the relevant BA set including cylinder contents and details of any personal issued facemask used as part of the test
- in exceptional circumstances (where they are unable to record the completed test results), verbally confirm with their supervisory manager that the BA has been checked and is working satisfactorily
- report to the supervisory manager any defects or omissions.

6A.7 **NOTE:** A BA set that fails a test must not be worn until the reason for the failure is rectified.

Nominated entry control operative

6A.8 The nominated entry control operative will, as soon as practicable:

- examine the entry control board or telemetry entry control board/unit ensuring correct functionality is demonstrated by means of administering the appropriate test procedure, including testing any audible or visual signals, where fitted
- examine the BA tabard/s
- ensure the availability of BA ancillary equipment such as BA guidelines; BA guideline tallies; thermal imaging camera; evacuation whistle; etc
- check and where practicable adjust the entry control board or telemetry entry control board/unit to the correct time
- report to the supervisory manager any defects or omissions.

BA – general testing and maintenance

6A.9 The purpose of this Part is to outline the principles for ensuring operational readiness of BA at operational incidents (or for training).

FREQUENCY OF CHECKS

6A.10 BA equipment must be tested:

- On acceptance, ie
 - when received as a new item of equipment in to the Fire and Rescue Service
 - when returned after repair
 - when the permanent location of the BA set changes

- whenever taking over a set (general check)
- after use
- monthly
- annually.

6A.11 BA checks by firefighters nominated as a wearer, not only supports the checking for operational readiness of the BA, but also contributes toward familiarity with, understanding of and confidence in the BA set.

6A.12 As noted above, the BA set and specified ancillary equipment should be properly maintained and tested in accordance with either the provisions contained within any existing contract, and in accordance with manufacturer's instructions.

Logging and recording

6A.13 All tests, maintenance and checking of BA and any ancillary equipment must be properly logged, recorded and maintained.

6A.14 Records, log books and any BA related electronic data must be considered as important records. As such they need to be stored in such a way that they can be used should the records of maintenance, testing and repairs be needed at a later date. This information may be relied upon in civil or criminal proceedings in the event of an investigation. It is essential therefore, that BA equipment records and log books are always complete; accurate; accessible; and retained in line with current legislation.

6A.15 In addition to the periodic testing regime, Fire and Rescue Services should ensure that there is a suitable and sufficient monitoring system in place to ensure that BA equipment is serviced and maintained in-line with the manufacturer's instructions.

GENERAL CHECK

6A.16 The general check of the BA should be based upon the relevant manufacturers' guidance, but must include the following:

- The fastening of all finger-tight connections
- Ensuring that the cylinder content is not less than 80 per cent of its' full cylinder capacity
- The operation of any supplementary air flow facility
- The operation of the BA by twice inhaling and exhaling deeply, and, whilst holding the breath, after the second inhalation, ensuring that no air flow from the BA is audible
- A guaranteed assurance or check for positive pressure protection which may include momentarily breaking the face mask seal

- Ensuring the pneumatic integrity of all pressurised parts of the BA is maintained, including the face mask, whilst pressurised to the normal working pressure (to the limits specified by the manufacturer)
- Ensuring that the low pressure warning whistle/device operates at the correct pressure; and any mechanical shut-off valve provided to isolate the pressure gauge hose, low pressure warning whistle/device or pressure gauge in the event of failure, operates effectively
- Ensuring the pressure gauge correctly returns to zero when the cylinder connection is closed and the apparatus is not pressurised
- A test by operation, of any telemetry equipment to ensure such equipment is maintained in such condition to provide immediate deployment when required
- Face seal test. A face seal must be ensured by means of the appropriate test (see Appendix 3).

6A.17 The above general check should be followed by:

- An examination for damage or excessive wear to the BA, its fittings and any cylinders and cover
- An examination of the face mask visor for clear vision
- Completion of the entries on the tally attached to the BA. (It is acknowledged that on-call personnel may not complete tally entries until responding to an incident where BA may be utilised)
- Ensuring the distress signal unit operates effectively
- Check of the integrity of the back plate, including areas or fixtures protected by removable covers or padding
- Inspection of the lamp to be used with the apparatus and checking it by operation
- Examination of the personal line to ensure that it is fully serviceable and is correctly stowed and fitted to the harness of the BA
- Check that the radio communications, where fitted, are operating effectively
- Where the BA is stowed on an appliance, check that it is correctly secured to its bracket and that any fastening device is working correctly.

Monthly test

6A.18 This test should include:

- A minimum wearing duration of 50 bars (itself preceded by a general check as detailed above unless the BA set has been worn in the previous month). This can be part of normal wear at drill or incident provided it is of at least the minimum duration stated above, followed by:
 - removal of the cylinder from the apparatus

- Examination of the cylinder retaining strap(s) and fastening(s) for damage or wear
- Examination of the BA harness and its attachment points for signs of damage, wear or deterioration due to the action of chemicals
- Examination of the attachment points, if fitted, for the distress signal unit and the personal line
- Check of the security of all connection points in the air supply system
- A check that radio communications, where fitted, are operating effectively
- Refit of a cylinder, within current test date, that has sufficient pressure for a future wearer to don the BA and report to the Entry Control Operative with a minimum 90 per cent capacity
- Carry out the tests and checks described in paragraph 6A.17-18 above.

Testing – General

6A.19 In addition to the checks above the following should be borne in mind:

- The rubber and neoprene components of BA sets are susceptible to deterioration from exposure to aggressive chemicals, ozone and ageing. These components should be frequently examined for signs of deterioration and the advice of the manufacturers should be sought on their maximum service life in ideal conditions. Replacement policies should therefore reflect the advice provided by the manufacturers
- Testing of BA should only be carried out by persons who are suitably qualified and competent to wear the apparatus
- Other than the procedures set out in this document, BA maintenance invariably requires the use of specialist test equipment and should be carried out only by personnel who have received the necessary training to a standard approved by the manufacturer of the BA and have been deemed competent.

Log book/test record

6A.20 A log book/test record must be permanently kept with each BA set detailing the:

- date; time; and result of each test carried out on the apparatus and its ancillary equipment
- type of test carried out, ie on acceptance, after use, monthly or annual, and the reason for it
- name of the person carrying out the test
- nature of any defects found
- nature of any repairs or adjustments and the identity of any person carrying them out.

- 6A.21** If the logbook/test record is not utilised for daily or weekly general checks then suitable and sufficient alternative records must be maintained to ensure that these checks are being conducted and the results recorded.

Additional considerations

- 6A.22** A robust BA testing and servicing programme, together with an effective recording and auditing methodology, is essential to:
- enable Fire and Rescue Authorities to meet their obligations under health and safety legislation
 - provide set users with confidence that the BA set and ancillary equipment has been maintained to a high degree of operational readiness
 - provide assurance that any defects will have been identified and addressed before the BA set may be accepted for operational readiness
 - assist in maintaining the competence of BA wearers, through frequent exposure to and handling of the BA set and its ancillary equipment.
- 6A.23** The guidance contained within this Part of Section 6 is generic and should be used in conjunction with the relevant manufacturers servicing and maintenance instructions when developing individual Fire and Rescue Authorities, operational readiness procedures.
- 6A.24** The guidance is designed for the needs of local authority Fire and Rescue Services under normal operating conditions and conformity with this document alone does not ensure compliance with all aspects of the *Confined Space Regulations 1997*.

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Part B

Operational procedures

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PART B-1

BA entry control

Key elements

- 6B1.1** The purpose of BA entry control procedures is to provide a consistent method for the safe and effective command and control and management of BA operations.
- 6B1.2** BA is worn at incidents to provide respiratory protection for firefighters working in oxygen deficient, toxic and hazardous atmospheres. It must only be donned and removed in 'safe air'. The practice of firefighters rigging in safe air but not donning their face masks until they reach contaminated atmospheres and then starting up their BA sets is extremely dangerous and must not be permitted.
- 6B1.3** BA wearer welfare, safety and effectiveness should be addressed prior to, during and post-deployment of the BA wearer.
- 6B1.4** BA teams will consist of no less than two BA wearers, one of which should be a competent firefighter trained in the use of BA in hot and complex situations.
- 6B1.5** The exception to the above paragraph 6B1.4 is in those situations where single wearers are deployed in low risk situations, and supported by local standard operational procedures and training within individual Fire and Rescue Services.
- 6B1.6** BA entry control must be fully integrated with the Incident Command System principles and practices. The framework for BA entry control therefore, provides for escalation of BA command and control procedures commensurate with an increase in the deployment of BA wearers.

Guiding principles

- 6B1.7** BA should normally only be deployed on the instruction or with the authority of the Incident Commander.
- 6B1.8** There may be exceptional circumstances where firefighters may opt to don a BA set for safety reasons without the permission of the Incident Commander (eg a sudden change of wind direction affecting a pump operator, where a BA team's safety would be compromised if he/she were to leave the pump unattended). In such instances the firefighter should don BA and inform the Incident Commander and BA Entry Control Operative of that decision as soon as possible.
- 6B1.9** The Incident Commander may delegate the deployment of BA wearers to the Operations or Sector Commander(s).

- 6B1.10** The entry control procedures and provisions should be proportionate to the size and complexity of the incident presented, the overall operational plan, and any known reasonably foreseeable hazards and risks presented to BA wearers.
- 6B1.11** The BA entry control procedure adopted will be consistent throughout the entire incident and will not therefore, vary for different entry control points. The highest stage of BA entry control procedure at any entry control point will be adopted for the entire incident.
- 6B1.12** All relevant personnel should be made aware of the BA entry control and/or additional procedures in use at the incident, particularly those in the command line. The level of BA entry control, any additional operational procedures and relevant command decisions should be recorded in an incident log as soon as practicable.
- 6B1.13** Establishing and maintaining effective communications between the entry control point and the BA team is essential as is exchanging timely and regular information across the command line.
- 6B1.14** The BA team should generally remain together as a team for the entire time that they are deployed. However, the BA team leader may for example decide to split a team of four into two teams of two for a specific task (such as the rescue of a casualty, when other casualties are known to still be unaccounted for). This decision should take account of the prevailing conditions; remaining cylinder contents of team members; and the physical nature of the tasks being undertaken, and any alteration to the team sizes and initial briefing relayed immediately to the Entry Control Operative/supervisor.
- 6B1.15** A single BA wearer is not to enter a building, structure or any other significant risk area alone.
- 6B1.16** Disciplined adherence to BA entry control procedures, briefings and instructions is critical to the safety and effectiveness of BA operations and the BA team/s.
- 6B1.17** A firefighter may undertake the tasks and duties of the BA Entry Control Operative. Overall responsibility for BA entry control will rest with the Incident Commander. Someone who is competent by virtue of appropriate training, assessment of competence and experience should undertake the role of BA Entry Control Operative.
- 6B1.18** The level of supervision required should be subject to the situation and circumstances prevailing at any particular incident and an assessment of risk, taking into consideration the size and complexity of the incident; the scale of BA operations; and the hazards and risks presented to BA wearers.
- 6B1.19** The Incident Commander/Sector Commander should consider the need to implement a greater level of control and supervision as the risk and demands of the incident increase (for example in high rise buildings, tunnels, or other complex scenarios). The risks and demands also vary during the course of an incident. The risks during the initial stages of an incident may be very different during the

development stages of a fire. It therefore may be considered necessary to appoint a manager to provide additional entry control point supervision. These additional functions may include:

- responsibility for supervising BA communications for that BA entry control point and consideration of the use of a BA Communications Operative
- receipt of a detailed brief and implementation of the Incident Commander/ Sector Commanders operational/tactical plan with regard to incident and BA operations
- responsibility for the briefing and debriefing of all BA teams
- responsibility for routinely updating the Incident Commander/Sector Commander and/or BA sector commander of operations being undertaken at the BA entry control point
- ensuring that a coordinated search is carried out and that a record of areas that have been searched or require searching is kept
- ensuring BA teams are relieved at the scene of operations in sufficient time to allow their return to the BA entry control point by the 'time of whistle/low pressure warning device'
- ensuring that sufficient fully equipped BA emergency team/s are rigged and standing-by at the entry control point throughout the period that the entry control point is in operation.

Deploying BA wearers

6B1.20 BA will only be used on the instruction, or with the authority of the Incident Commander or in exceptional circumstances, see para 6B1.8. On arrival at an incident the Incident Commander will need to assess the risk, including the level of resources required to execute the full operational plan and, based on the resources immediately available, make a calculated decision on the appropriate level of BA control, tactical mode and tactical plan.

6B1.21 Consideration should be given to:

- immediate risk to life
- prevention of significant escalation of an incident
- size and scope of the incident
- long-term operational objectives and/or short-term specific/critical tasks to be achieved
- information gathering, both prior to (such as Civil contingency planning requirements, '7(2)(d),8(2)(d) and 9(3)(d) information') however 9(3)(d) information is likely to have minimum effect on BA operations
- those resources immediately available at the incident

- full extent of resources required to fully execute the overall operational plan
 - estimated time of arrival of necessary additional resources
 - the hazards and risks associated with the incident
 - structural integrity of the building or risk area
 - locations of suitable points of entry
 - safety and welfare of BA wearers
 - means of escape for BA wearers
 - the requirement for appropriate BA emergency arrangements.
- 6B1.22** As detailed within *Stage I BA Entry Control Procedures*, BA wearers should not be committed into a risk area until suitable and sufficient resources are available at the incident to implement BA entry control procedures.
- 6B1.23** A BA sector commander must have the appropriate level of managerial authority and responsibility, training/experience and competence to ensure that they can effectively manage the logistical requirements of a BA sector.

Designation of BA entry control points and BA teams

- 6B1.24** BA entry control points will be designated and identified at the incident by means of suitable referencing. The first entry control point established at the incident will be designated 'Alpha', the second, 'Bravo', etc.
- 6B1.25** BA teams deployed from the entry control point will be identified by a sequential numbering system. For example, at entry control point Alpha, the first BA team will be designated 'BA team Alpha-One'; the second team, 'BA team Alpha-Two', etc.

Procedural guidance

- 6B1.26** The BA entry control point is the focal point for the effective command and control and management of BA operations and the control of access and egress to and from the risk area.
- 6B1.27** BA Entry Control Operatives are to be nominated for each entry control board. The Entry Control Operative will undertake specific tasks under the command and direction of the person responsible for the entry control point.
- 6B1.28** BA entry control points should be established near the scene of operations (commensurate with safety) where they can be easily located by wearers so that the maximum duration of the BA set can be used, pre-entry checks made in safe air, and briefings provided with minimum background noise.

- 6B1.29** When BA teams to be deployed into the risk area exceed three, or the number of BA wearers deployed exceeds six, or the number of entry control points is likely to exceed one, *Stage II BA Entry Control Procedures* should be implemented. Moving from Stage I to Stage II should be based on identified hazards and be as seamless as possible. Moving from Stage I to Stage II implies the introduction of appropriate additional control measures to reduce risk.
- 6B1.30** The BA Entry Control procedures, stages and support arrangements are based around the provision of suitable and sufficient command and control procedures to safely manage and monitor BA operations. Moving from Stage I to Stage II must be based on identified hazards and implies the introduction of appropriate additional control measures to reduce risk.
- 6B1.31** Escalating the stages of BA entry control ensures that the appropriate level of support is also provided at BA entry control point. Where a firefighter is nominated as BA Entry Control Operative under Stage I BA control, this person should, where possible, remain in place when the incident moves to Stage II BA control. This allows for continuity in the management of the entry control point.

Use of the BA entry control board and cross-border working

- 6B1.32** Subject to prior arrangement, planning, exercising and validation of arrangements between Fire and Rescue Authorities, it may be appropriate for BA teams to use a BA board of a neighbouring Fire and Rescue Service that is already established at the incident.

Stage I BA entry control

- 6B1.33** Stage I BA entry control procedures apply to meet the demands of small or limited incidents and to manage and monitor the safety of BA wearers.
- 6B1.34** Stage I BA entry control procedures will apply where:
- the incident and any structures involved are small, limited and not complex
 - an incident **requires no more than one entry control point**
 - an incident requires **no more than three BA teams** deployed into the risk area at any one time
 - an incident requires **no more than six BA wearers** deployed into the risk area at any one time
 - the use of BA is unlikely to be protracted
 - BA guidelines will not be required.

- 6B1.35** A BA team must be fully briefed by the Incident Commander prior to deployment into the risk area. The BA team must receive and confirm a clear, concise briefing and instructions. This must include, for example, the task to be achieved, information as to the risks presented, safety and control measures, communications methodologies and protocols, etc.
- 6B1.36** The wearers' BA tallies must be entered into the BA control board with suitable and sufficient details entered (and/or telemetry established, as appropriate). BA team members must ensure each other's tallies and gauges are checked and tallies placed in the BA entry control board with 'time in' recorded either by themselves, or the person responsible for BA entry control, or by the use of an automated board.
- 6B1.37** Initial/rapid deployment of BA may be used where the resources available are limited at the time of arrival to deliver the full operational plan, but where there exists an opportunity to preserve life or take action that will prevent an incident deteriorating if the Incident Commander were to wait for additional resources. Any deployment under these conditions should be managed under Stage I entry control procedures.
- 6B1.38** Initial/rapid deployment will only be undertaken on the instructions of the Incident Commander following a suitable calculated assessment of the risks versus the likely benefits.
- 6B1.39** The initial/rapid deployment of BA wearers requires that the BA tallies be entered into the BA control board with suitable and sufficient details entered (and/or telemetry established, as appropriate). BA wearers must ensure each other's tallies and gauges are checked and tallies placed in the BA entry control board with 'time in' recorded either by themselves or by the use of an automated board.
- 6B1.40** The use of single BA wearers is only permissible when:
- Operations are not within a building or structure
 - The wearers' BA tally is inserted into a BA entry control board
 - The wearer can quickly be removed from the risk area
 - The wearer is always in view of the Incident Commander or other nominated officer or crew member
 - The wearer's BA tally must be entered into the BA control board with suitable and sufficient details entered (and/or telemetry established, as appropriate). The tally and gauge of the BA wearer must also be checked and the tally placed in the BA entry control board with 'time in' recorded
 - The local Fire and Rescue Service has procedures in place to explain how and when single wearer deployment of BA can take place and is supported by training for operational staff.

- 6B1.41** When the Incident Commander considers the oncoming resources to be insufficient to deal with the prevailing incident, a corresponding 'make up' request should be sent to Fire and Rescue Control to ensure that there is suitable provision for additional BA teams, particularly where the potential need for BA emergency resources are reasonably foreseeable.
- 6B1.42** Communications between the Incident Commander and the BA team are particularly important during initial deployment. The Incident Commander must make suitable provision for establishing and maintaining communications with the BA team.
- 6B1.43** BA deployment will only be undertaken on the instructions of the Incident Commander following a suitable calculated assessment of the risks versus the likely benefits.
- 6B1.44** All BA deployment shall be designated as either Stage I or Stage II BA Entry Control. When transferring from Stage I to Stage II procedures (see below), care should be taken to ensure that the BA tallies are effectively handled to ensure accurate and prompt recording and monitoring of BA wearers in the risk area.

Stage II BA Entry Control

- 6B1.45** Stage II BA Entry Control should apply to meet the demands of larger and/or more complex incidents and to manage and monitor the safety of BA wearers.
- 6B1.46** Whilst, for the purposes of continuity, a firefighter operating a BA entry control point under Stage I may also go on to operate the BA board under Stage II, this should be done under the direct supervision of a person of at least crew manager level.
- 6B1.47** Stage II BA Entry Control procedures apply where:
- an incident requires more than one entry control point
 - an incident requires more than three BA teams deployed into the risk area at any one time
 - any incident requires more than six wearers deployed in the risk area at any one time
 - the incident and structures involved are complex and/or the increased deployment of BA, plus the increased risks associated with BA operations, demand a greater degree of control and supervision
 - BA operations are likely to be protracted
 - BA guidelines are likely to be used
 - the risks presented to BA teams demand a higher level of BA emergency provision, involving the need for BA emergency teams.

Bridgehead or forward BA entry control point

- 6B1.51** This may be considered necessary by the Incident Commander in situations where there is a requirement to provide a BA entry control point at some distance from the initial point of access into a building or risk area, whilst still remaining in a safe air environment.
- 6B1.52** This arrangement allows an incident to be dealt with through the deployment of BA wearers from a safe air environment within a structure whilst being as close as practical to the scene of operations. This may be necessary for example in high-rise buildings or in large complex structures such as shopping malls.
- 6B1.53** The location of the BA entry control point in these circumstances will be determined by the Incident Commander based on the operational plan and the level of risk faced by the BA wearers.
- 6B1.54** Some of the factors that should be taken into account when determining the location of a bridgehead or forward BA entry control point are:
- the potential for an escalation of the incident
 - the safe air environment necessary to start up BA
 - the best access and egress to the scene of operations
 - crew safety and welfare
 - availability of water supplies
 - effective communications with BA wearers
 - effective communications with the Incident Commander
 - the level of supervision and support necessary for the BA Entry Control Operative
 - the distance from the initial point of access to the BA entry control point.

Additional considerations

Re-entry into a risk area

- 6B1.55** If a BA team temporarily withdraws from the risk area, eg to collect a piece of equipment or pass a message, but do not remove their face masks, close down their sets or collect their tallies they may immediately re-visit the risk area. This may be regarded as part of their initial working duration and no fresh BA entry control records or amendments to records are required.
- 6B1.56** It may occasionally be necessary for BA teams to re-enter a risk area to perform a specific task after they have withdrawn from the original entry, reported to the entry control point and closed down their sets.

- 6B1.57** Such re-entry will only take place for a limited duration and to achieve a specific task or tasks, which are within the physical and physiological capabilities of the BA wearers.
- 6B1.58** To allow a re-entry the responsible Entry Control Operative must first be satisfied that:
- The BA team have remained under their control and supervision
 - The re-entry is for a clearly defined specific task, which should not be firefighting
 - The cylinder contents of all wearers are sufficient for the task (i.e. this does not involve the fitting of a fresh cylinder, as this would constitute a 'new entry')
 - The pressure gauges of all wearers must register a pressure that provides a minimum of 15 minutes working duration. This equates to 750 litres of air, however, as cylinders vary in volume and size it will be the responsibility of each Fire and Rescue Service to determine the pressure required to provide 15 minutes working duration
 - There are no doubts about the fitness and well being of any BA wearer for the task to be undertaken.
- 6B1.59** The entry control point operative must arrange for recording fresh details for all BA team members involved in the re-entry procedure. Records must be made at the entry control point. This should include appropriately annotating the entry control board with the words 're-entry', or RE (see Abbreviations: Section 9).
- 6B1.60** Re-entry should not normally take place for extended duration BA wearers. This is due to the additional weight of the extended duration BA set, the extended BA wear durations and the additional physiological burdens involved.

Use of BA in conjunction with aerial appliances and ladders

- 6B1.61** Where BA is used in conjunction with aerial appliances and ladders:
- aerial appliances should not normally be sited in such a way that it is necessary for firefighters to wear BA from the cage or head of the ladder
 - when the Incident Commander deems it necessary for the cage operator/s to wear BA they must be controlled through the appropriate level of BA entry control procedure
 - when a single BA wearer is operating from a working platform or head of a ladder, they must remain in communication with the ladder operator or person footing the ladder and not leave the head of the ladder or cage to enter any building or risk area
 - the working platform of aerial appliances should not be used as a site for a BA entry control point

- where it is necessary for a BA team to enter a building or structure at or above ground level by use of ladders or aerial platforms, an entry control point should be established at ground level in a safe area adjacent to the ladder.

Withdrawal of BA teams

6B1.62 The decision about when to withdraw from a risk area is extremely important. The main aim is to ensure that all BA teams return to the entry control point by the estimated time of operation of the low pressure warning whistle/device, subject to circumstances which may develop from the time of entry necessitating an early withdrawal. However, the timing of withdrawal from a risk area must take into account:

- the potential for physiological and psychological stress and or distress as a result of environmental conditions or workload (eg high temperatures, humidity, casualty rescue etc)
- the physical conditions or depth of penetration into the risk area (eg tunnels, confined spaces, ships etc)
- a deteriorating situation (eg fire growth, signs of collapse)
- any relocation of the entry control point.

6B1.63 The Incident Commander and BA team leaders' duties extend to ensuring that BA wearers are not exposed to an unacceptable level of risk. BA wearers are also responsible for ensuring that team leaders are made aware of any relevant developments that might lead to the need for an early withdrawal from the risk area.

6B1.64 BA team leaders should not rely solely on cylinder contents when reaching a decision about when to withdraw their team, but should take into account information received from all sources. BA team leaders must withdraw their team, if any member:

- Has an uncontrolled loss of pressure
- Appears to be unwell, confused or in discomfort (especially when exposed to rapid temperature increase)
- Has a gauge which has become faulty or unreadable
- Has been exposed to an irrespirable atmosphere due to a BA failure
- Has a low pressure warning whistle/device activating
- Reaches a pre-determined pressure gauge reading set by the person responsible for the entry control point following an assessment of physiological risk and other relevant information. For example, by determining sufficient time for decontamination procedures to be carried out before the operation of the low pressure warning device
- An emergency evacuation signal sounds

- Loss of firefighting media that makes the situation dangerous
- The BA team experience a sustained loss of communications with their Entry Control Operative/Incident Commander
- The team leader, acting on personal initiative, experience, assessment of risk or on the advice of team members, decides that conditions in the risk area have deteriorated to the extent that BA team members are exposed to an unacceptable level of risk.

6B1.65 The BA Entry Control Operative should immediately be informed of any decision to withdraw prematurely from a risk area. This decision should then be relayed to the Incident Commander.

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PART B-2

Air management

Key elements

- 6B2.1** Air management is essential to ensure safe and effective entry control procedures and commences from the point that BA wearers go under air, ie after they have received and confirmed their briefing.
- 6B2.2** The key principle is to ensure that the BA team return to the BA entry control point either before the low pressure warning whistle/device of any BA team member operates, or by any earlier pre-determined return time as specified in the BA team briefing and instructions.

Guiding principles

- 6B2.3** This part outlines the principles for the safe and effective management of air supplies of BA wearers.
- 6B2.4** Air management refers to the shared responsibility between the entry control point and the BA wearers themselves once deployed within the risk area. It will therefore, have implications for the briefing of BA teams by the person responsible for the BA entry control point.
- 6B2.5** Air management also refers to the efficient consumption of available BA air supplies to ensure an effective use of resources. Taking regular gauge readings all BA wearers will ensure they manage their air supply to meet turn around pressures. This will result in them returning and reporting to the BA entry control point no later than the 'time of whistle/warning device'.
- 6B2.6** This guidance applies to all incidents where BA is worn, irrespective of its duration, and all personnel should be familiar with the duration of equipment used within their particular Fire and Rescue Service and plan their use accordingly.
- 6B2.7** Working duration should always be subject to the over-riding consideration that where a firefighter displays any symptoms likely to affect their welfare such as heat stress, the team should withdraw immediately. All firefighters should therefore understand and recognise the symptoms of heat stress and the treatment for it. (See Part B-8 Welfare of BA wearers).

Responsibilities

Entry Control Operative

- 6B2.8** Where BA entry control boards are not telemetry enabled the Entry Control Operative will calculate and record the time at which the BA team/s will return to the entry control point on completion of their wear, usually through the use of duration tables (or similar).
- 6B2.9** However, the person responsible for the entry control point will take the overall responsibility of determining the time at which a BA team is expected to return to the BA entry control board.
- 6B2.10** Under certain circumstances, the person responsible for BA entry control may stipulate that BA teams must return to entry control at an earlier pre-determined time/pressure. This will be determined on the basis of an assessment of risk, contingent on the tasks BA team/s are expected to undertake, the conditions under which they are expected to work and any physiological considerations.
- 6B2.11** During the BA team briefing, the person responsible for the BA entry control point may wish to determine a turn-around pressure in advance of deploying the BA team. However, the objective remains the same; that the BA team returns to the entry control point before the low-pressure warning device of any team member operates.

BA wearers

- 6B2.12** BA wearers must achieve and maintain an adequate face fit seal prior to deployment, to safeguard against accidental loss of air supply, as well as ingress of fumes (See Appendix 3).
- 6B2.13** Once deployed into the risk area, BA wearers are responsible for managing their own air, in accordance with their team briefing.
- 6B2.14** Each wearer will consume air at a different rate. The difference will be determined by a number of factors including; body mass, individual levels of fitness, work rate, environmental conditions and the wearer's reaction to the situation. Therefore, each wearer must read their own gauge, make their own calculations, and take responsibility for informing the BA team leader of the pressure at which the team will need to start exiting the risk area.
- 6B2.15** It is each wearer's responsibility to make the BA team leader aware of their gauge readings on a regular basis so that work can be shared out evenly amongst the team in order to maximise the use of the remaining working duration.

BA team leader

6B2.16 It is the responsibility of the BA team leader to ensure that every BA wearer returns to the BA entry control point before their low pressure warning device sounds. This can only be achieved, and wearers will only obtain the maximum working duration of the BA set, if every wearer fully understands the importance of air management and regular gauge readings. BA team leaders should prompt other team members for regular gauge readings and ensure the entry control point is updated. In turn, if the entry control point does not receive regular gauge readings, the BA team leader should be prompted accordingly. The regularity at which gauge checks should be undertaken and recorded will be determined by the conditions and prevailing risks.

Procedural guidance

Air management at the BA entry control point

6B2.17 The person responsible for the entry control point should be aware that BA wearers may consume air at higher rates than those indicated by the consumption rate tables when working very hard, but may also consume at lower rates when undertaking less strenuous tasks. These tables should be used to provide a predicted exit time or 'time of whistle/warning' for BA wearers, however, the introduction of telemetry with 'live' breathing rates, provides an accurate way of monitoring air consumption and thus the remaining working duration. Telemetry is dealt with in more detail in Part B-4.

Landmarking

6B2.18 On the inward journey into the risk area easily identifiable locations, eg a change of level or direction, doorways and large obstacles such as furniture and fittings, can act as prompts for gauge checks (see Part B-5). By doing this at regular intervals, any unexpectedly high levels of air consumption or loss of air should be identified.

6B2.19 In particular, by checking gauge pressure at these landmarks the team can determine the amount of air and pace required in exiting the risk area.

Low-pressure warning whistle/device

6B2.20 Air use should be monitored on the way out of the hazard area, and, in all normal circumstances, wearers must be back at BA entry control before a low pressure warning whistle/device sounds. Apart from a set malfunction; a team becoming trapped; or a situation where a BA wearer's air supply has to be augmented (eg using the supplementary air supply attachment facility on BA sets where fitted), the only possible exception to this involves the rescue of a casualty, detailed as follows.

Leaving with a casualty

- 6B2.21** Where a BA team has to exit with a casualty, it is essential that unless they are extremely close to an exit, a gauge reading is taken and a calculation is made on the air required to leave the incident. If there are insufficient air supplies to exit with the casualty, then the team should communicate with the entry control point to request additional assistance.
- 6B2.22** Having commenced the journey out, and on reaching the points where gauge readings were taken on the way in, they should take further gauge readings and, by reference to their earlier calculations, work out how much their air consumption has increased. From this the team will be able to determine if they can leave the incident with the casualty or progress as far as possible before having to leave the casualty for another BA team. The team must remain in communication with the BA entry control point, so that appropriate support and additional risk control measures may be introduced where necessary.

Calculating turn-around pressure

- 6B2.23** Where it is considered that the use of a turn-around pressure might be appropriate, the following methodologies may be considered:

METHOD 1: MAKING PROGRESS

- 6B2.24** Used for tasks such as making steady progress into a hazard area.
- 6B2.25** The wearer notes their gauge pressure as they book in with the entry control point and starts up their BA set. The wearer then calculates their turn-around pressure by dividing their full duration by two and then adding half their safety margin. This is a basic calculation but will ensure that if the wearer begins to exit when this pressure is reached they will exit before the low-pressure warning device operates.

Method 1 Example: Making progress

| | |
|--|------------------|
| Entry pressure | = 200 bar |
| Divide this by two | = 100 bar |
| Half the safety margin ($60 \div 2$) | = 30 bar |
| Add the two | = $100 + 30$ |
| Turn around pressure | = 130 bar |

METHOD 2: WORKING AT A LOCATION

- 6B2.26** This is a more accurate method and can be used when a BA team are to enter a risk area and work for some time. If, for example, Team 1 were sent into an incident to relieve Team 2 working with a branch they would need to calculate the initial turn-around pressure on entry and take gauge readings regularly along the route. Once Team 1 reached Team 2 they would take another reading and calculate the pressure they had used to reach that point. Team 1 can then safely

stay with the branch until the pressure drops to the point where they have sufficient air to exit back along the same route without entering their safety margin.

Method 2 Example: Working at a location

| | |
|-------------------------------------|---|
| Entry pressure | = 200 bar |
| Gauge reading on reaching objective | = 160 bar |
| Air used to reach objective | = 40 bar |
| Air required to exit | = 40 bar + safety margin (ie 60 bar) |
| Turn around pressure | = 100 bar |

6B2.27 In utilising Method 2, the BA team has more time available to complete a task. This can make fire and rescue operations both more efficient and effective and in turn may mean that fewer firefighters will be required to be committed and exposed to the risk.

6B2.28 However, the type of BA set worn and the tasks to be achieved by BA teams are not necessarily the only considerations in determining return time to the BA entry control point and the turn-around pressure. The expected working conditions; personal protective equipment in use; tasks being undertaken; and BA wearer's physiology are all factors to be taken into consideration at the BA entry control point (see Part B-8).

Entrapped procedure

6B2.29 When BA wearers cannot retrace their exit route they should consider going into 'entrapped procedure'. No provision exists for conserving the air supply in compressed air BA other than by the wearer moderating demand by exerting the least possible energy. By conscious effort and self-control, the wearer can reduce demand considerably (See Part B-9 BA emergency procedures).

Additional considerations

Working in pressurised atmospheres

6B2.30 There are broadly two types of pressurised atmospheres workings, referred to here as 'elevated pressures' and 'commercial workings':

ELEVATED PRESSURES

6B2.31 These are premises with a slightly elevated ambient pressure. They will include engineered features within structures to protect escape routes and/or to assist the emergency services in rendering assistance in terms of rescues or firefighting. Examples of these are where elevated pressures are created on protected

staircases or in crossover tunnels. As such engineered features are generally only a few millibars above ambient pressure, they do not present any significant physiological effect on personnel entering the risk area or duration of the BA set.

COMMERCIAL WORKINGS

- 6B2.32** During construction, tunnels may be pressurised to prevent water ingress particularly where they are bored under a river or in very wet strata. Regulations under the *Health and Safety at Work etc Act 1974* are in place in respect of persons employed in pressurised workings, which includes health monitoring. In view of these regulations it is unsuitable for firefighters to enter such workings.
- 6B2.33** The task, therefore, of first-aid firefighting and rescuing persons employed in pressurised workings, is principally the responsibility of the contractor on site. The Fire and Rescue Service would continue to respond to a call to pressurised workings and might stand-by to give advice and provide back-up facilities as necessary. However, subject to any prior arrangement between the contractor and the Fire and Rescue Authority, the contractor's responsibilities under the *Health and Safety at Work etc Act 1974* should make it unnecessary for the Fire and Rescue Service to be required to deal with an incident inside a pressurised commercial working.
- 6B2.34** Where, subject to any prior agreement and arrangement, it might be reasonably foreseeable that Fire and Rescue Authorities may be requested to provide some element of a contractor's emergency arrangements, specific BA command and control procedures that are appropriate to the risk should be established in accordance with the principles and any minimum provisions for a safe system of work contained within this guidance.

PART B-3

Communications

Key elements

- 6B3.1** This Part details the role of communications in supporting a safe system of work for fire and rescue operations requiring the use of BA.
- 6B3.2** In this context 'BA communications' refers to the exchange of information by whatever method ie verbal or by radio, throughout the BA command and control function and must be established at all incidents.
- 6B3.3** Radio equipment used with BA should be suitable for the environment in which it is to be used.
- 6B3.4** The briefing and debriefing of BA teams, pre and post entry to the risk area, is essential to the effective command and control of an incident and the safety and welfare of BA team personnel, and therefore all relevant information should be shared.

Guiding principles

- 6B3.5** Effective BA command and control communications commence with an appropriate briefing of the BA team.
- 6B3.6** BA team members should be briefed in an area free from excessive incident or background noise that may hinder effective communication.
- 6B3.7** The BA team briefing should be given to all team members. It should include all information relevant to the team's task and safety, including emergency procedures and utilisation of all available resources.
- 6B3.8** In the event that entry control point identification methodology differs between neighbouring fire and rescue services, an exchange of information to ensure that the Services are fully aware of each other's entry control point identification methods must be made to ensure that suitable operational arrangements are in place.
- 6B3.9** Regular verbal and physical communication between all of the BA team members is essential to ensure the safety of personnel and the exchange of information within the BA team.
- 6B3.10** When there are multiple teams within the risk area and BA teams come into contact with each other, all relevant information should be exchanged between the team leaders.

- 6B3.11** Where radio communications are used, a dedicated BA communications channel/s should be specified and used at all times.
- 6B3.12** All BA teams must be clearly identified with a unique call sign.
- 6B3.13** If a BA sector is in operation, the BA sector commander at Command Support must be notified of all entry control point positions and their unique call signs.
- 6B3.14** Each BA team, should, as a minimum, be equipped with a means of communications with the person responsible for the entry control point and that should rest with the team leader.

Procedural guidance

- 6B3.15** Radio communication equipment should be tested, by operation, before it is committed to the risk area.
- 6B3.16** The BA team leader should, in all normal circumstances, instigate all communications between the BA team and their entry control point. This does not preclude any BA team member from passing an 'emergency' message.
- 6B3.17** Should the Incident Commander deem it necessary to allocate additional personnel to assist with BA communications at the BA entry control point, additional resources should be requested as soon as the potential need is identified and arrangements implemented as soon as possible.
- 6B3.18** Normally, BA communications between teams will be via the entry control point. However, circumstances may arise at the incident where BA teams may need to communicate directly to other teams via radio. In such circumstances, teams should identify both themselves and the team/s they wish to contact, via their unique incident BA team call sign (see designation of entry control points and BA teams Part B-1). Whilst radio traffic should be kept to the minimum required, this should not prevent the passage of risk-critical and other appropriate information between BA teams.
- 6B3.19** As soon as practicable, all BA team members should be debriefed on exiting the risk area. This should include all relevant information that may assist in the resolution of the incident and/or improve the safety of all the BA teams committed into the risk area.
- 6B3.20** Each entry control point should establish and maintain communications with the other entry control points at the incident.
- 6B3.21** The incident, sector and/or BA sector commander should be provided with all information relevant to the effective command and control of the incident.
- 6B3.22** Locations of entry control points and the BA sector should be shared between entry control points and the BA sector as well as Command Support.

Additional considerations

- 6B3.23** If nominated the 'Safety Officer' should establish and maintain communications with the entry control point for the duration of the BA incident.
- 6B3.24** BA wearers and BA control operatives should be aware of the potential for limited penetration of radio signals into buildings and structures below-ground and either make other arrangements or put contingencies in place, to ensure the safety and effectiveness of communications with BA teams.
- 6B3.25** If there is an unexpected or sustained loss of communications, an assessment of risk should be undertaken to determine whether BA emergency procedures should be initiated and/or BA emergency team/s deployed (see Emergency procedures Part B-9). Situations which may inform the decision to commit a BA emergency team following loss of communications may include one or more of the following:
- unexplained loss of communications with one or all BA teams
 - prolonged loss of communications
 - significant incident deterioration linked to loss of communications
 - if telemetry is in use, consideration should be given as to whether BA teams are either in or out of telemetry signal.
- 6B3.26** If available, the Incident Commander should consider the use of cable communications equipment in the following circumstances:
- where a high-degree of intrinsic safety is specifically required (and cannot be provided via hand-held radio or other electronic communications equipment)
 - incidents requiring deep penetration into structures (eg in basements and tunnels)
 - incidents that are likely to be protracted
 - incidents where BA guidelines are required
 - where airline equipment is in use without BA being worn.
- 6B3.27** Where cable communications are being used a 'Comms Operative' will be required. The Comms Operative will pass relevant information to the person responsible for the entry control point. In the event of the failure of cable communications the Comms Operative will inform the entry control point.
- 6B3.28** Cable communications, because of their physical nature, have the potential to become damaged or broken during operations. For any unexpected or sustained loss of communications the Incident Commander should consider initiating emergency procedures as detailed in Emergency procedures Part B-9.

PART B-4

Telemetry

Key elements

- 6B4.1** The purpose of telemetry within the Fire and Rescue Service context is to provide for a technology that allows transmission and reception of a range of live and relevant data between a remote monitoring point and the BA wearer. It provides for significantly improved BA wearer safety and command and control effectiveness at incidents.
- 6B4.2** Telemetry equipment should comply with relevant British and/or the latest European Standards.

Guiding principles

- 6B4.3** The power of a radio frequency signal diminishes over distance. It will also be affected as the radio wave passes through solid objects such as the walls and floors of buildings, natural terrain, basements and tunnels etc.
- 6B4.4** To maximise the signal power of a radio frequency transmission, fire and rescue services should follow the relevant guidance from telemetry system providers and may consider, where appropriate, enhancing the signal strength through either the use of a leaky feeder and/or repeater units.
- 6B4.5** With regards to interoperability, this procedural guidance is based on the minimum functionality of this equipment. Fire and Rescue Services will need to develop their own procedures for dealing with any additional functions of which their equipment is capable. Fire and Rescue Authorities should seek to make provisions for interoperability of BA command and control procedures and/or BA equipment involving the use of telemetry, so far as is reasonably practicable (see Interoperability Part B-10).

Responsibilities

- 6B4.6** Arrangements must be made to manage and operate telemetry (if available) and to monitor the information received via telemetry at the BA entry control point throughout the duration of BA deployment.
- 6B4.7** Depending upon the scope and scale of expected BA deployment and in accordance with the operational plan, consideration may be given to providing additional functional support to the person responsible for the BA entry control point at all stages of a BA incident.

6B4.8 Duties in relation to BA for the following are detailed in Appendix 1

- Incident Commander
- BA wearer
- BA team leader
- BA Entry Control Operative
- BA Communications Operative
- BA sector commander.

Duties of command and functional officers in relation to telemetry

6B4.9 The additional duties (to those set out in Part B-1 BA entry control, and BA command and control duties and responsibilities duties, Appendix 1) to ensure that the appropriate action is taken to deal with receipt of distress alarms (automatic and manual) and/or wearer initiated withdrawal signals are as follows:

- to decide whether or not emergency selective evacuation is appropriate and which BA teams should be selectively evacuated
- to ensure that the decision to conduct an emergency total evacuation of all personnel is conveyed to all telemetry entry control officers
- to ensure that the appropriate action, based upon individual Fire and Rescue Service's standard operational procedures, is taken in the event of being advised by the Entry Control Operative that BA wearers have an unexpected and sustained loss of telemetry.

Duties at the entry control point in relation to telemetry

- to ensure that appropriate action is taken in the event of being advised that the cylinder contents of any BA wearer, still committed within the risk area, corresponds to the BA wearers 'time of whistle/warning'
- to set up and operate a telemetry entry control board/unit in a position nominated by the incident commander
- to 'log-on' all telemetry equipped BA wearers who are to be committed into the risk area through their entry control point, and to monitor the displayed cylinder pressure of all telemetry radio units logged-on to their telemetry entry control board/unit.

6B4.10 If telemetry is lost, a risk assessment should be undertaken to determine whether BA emergency procedures should be initiated and/or BA emergency teams deployed (see Part B-3 Communications, and Part B-9 Emergency procedures).

- 6B4.11** To ensure that entry control systems maintain operational continuity should the telemetry signal be lost, persons responsible for the BA entry control point must ensure that they employ robust and resilient contingency arrangements. This may or may not involve manual processes, to ensure that the incident can still be effectively managed without compromising BA wearer safety.
- 6B4.12** To ensure that appropriate action is taken to deal with the receipt and acknowledgement of telemetry distress signals (automatic and manual), ensuring that the emergency procedures in Part B-9 are implemented.
- 6B4.13** To ensure that action is taken to deal with the receipt and acknowledgement of wearer initiated withdrawal signals, as appropriate.
- 6B4.14** Initiating either an emergency selective evacuation or an emergency total evacuation repeating this as necessary where receipt is not acknowledged and informing the Incident Commander, or the appropriate command/functional officer, if, after repetition, any BA wearers remain unacknowledged.
- 6B4.15** To bring to the attention of the Incident Commander and implement any necessary actions, where telemetry indicates that the cylinder contents of any BA wearer, still committed within the risk area, corresponds to the BA wearers 'time of whistle/warning'.
- 6B4.16** To commit an emergency team, if available, in accordance with the guidance within Part B-9, using data provided via the key functions of telemetry.
- 6B4.17** To 'log-off' all BA wearers from their telemetry entry control board/unit, who have withdrawn from the risk area through their entry control point.

Duties of BA team leaders in relation to telemetry

- 6B4.18** The additional duties of the BA team leader (to those set out in Part B-1 and corresponding Appendix 1 in relation to telemetry, are as follows:
- to ensure that the appropriate telemetry signal is transmitted by each member of the BA team when a team is withdrawing
 - in the event of an emergency evacuation, ensuring that the complete BA team are withdrawn when an emergency evacuation signal (total/selective) is received by any member of the BA team
 - depending on the telemetry system employed by the Fire and Rescue Service, there may also be the additional responsibility that each BA wearer must acknowledge receipt of the evacuation signal.

Procedural guidance

- 6B4.19** The key features of BA telemetry are that it should comprise:
- a BA set with a telemetry radio unit attached that can both send and receive signals
 - a telemetry entry control board/unit that can both send and receive signals
 - compatibility with all stages of BA command and control
 - a minimum functionality, that should include the monitoring of the following key areas:
 - ‘time of whistle/warning’
 - ‘time to whistle/warning’
 - remaining cylinder pressure.
 - a system for total failure, which must allow the Entry Control Operative to manually calculate the time of whistle for the BA wearers committed into the risk area.
- 6B4.20** Telemetry radio units should have unique electronic identities that enable them to be individually logged on to a telemetry entry control board/unit at an incident.
- 6B4.21** As a minimum, the system must allow the transmission of a distress alarm signal (manual and/or automatic) from the telemetry radio unit to the telemetry entry control board/unit that the BA wearer is logged onto, indicating that the BA wearer is withdrawing from the incident for reasons of personal safety (see 6B1.62).
- 6B4.22** In the event of a total evacuation, the system must provide, as a minimum, for the transmission of an alarm signal from the telemetry entry control board/unit to all logged on telemetry radio units to cause an audible alarm to be heard by the BA wearers. This audible warning shall be clearly identifiable and/or analogous to the sounding of the standard ‘evacuation signal’ signal (ie the Acme Thunderer whistle).
- 6B4.23** In the event of partial evacuation, the system should provide for the transmission of an alarm signal from a telemetry entry control board/unit to selected logged on telemetry radio units, to cause an audible alarm and initiate an emergency evacuation of the telemetry radio unit wearer and any other members of the wearer’s BA team.
- 6B4.24** In the event of total/selective evacuation, as a minimum, the display of the telemetry entry control board/unit should include the time of whistle, time to whistle, entry time, remaining cylinder pressure, the details of all logged-on telemetry radio units and the status of the telemetry radio unit (ie in/out of telemetry, distress signals, evacuation signals).

- 6B4.25** The system should also have the provision of a downloadable record of telemetry entry control board/unit transmissions to enable an electronic reconstruction of the sequence of actions following any incident.
- 6B4.26** In addition to the minimum functions, suppliers may offer other features to improve or enhance wearer safety or operational efficiency.
- 6B4.27** Siting of the telemetry entry control board/unit should take into account the optimal position for maximising the effective range of telemetry. It will therefore, have a bearing on the location of the BA entry control point.
- 6B4.28** The procedures to be followed by individual fire and rescue services, in the event of a loss of contact or breakdown in telemetry communications, must take into account the availability of other means of communication with BA teams, such as, radio, thermal image camera feed, cable communications or even by direct speech.

Emergency total evacuation procedures

- 6B4.29** The standard evacuation signal is repeated short blasts on an Acme Thunderer whistle which should be repeated by command line managers throughout the risk area; alternatively, radio messages should be used where whistles may not be heard.
- 6B4.30** Where two or more telemetry entry control board/units are in use at the same incident, and an emergency total evacuation is required, each telemetry entry control board/unit at the scene will initiate this level of evacuation.
- 6B4.31** Nothing in this guidance modifies the objectives of emergency evacuation. The evacuation signal received by the BA wearer/s must be treated by all as though it was an Acme Thunderer whistle.
- 6B4.32** After transmitting an emergency total evacuation signal, an acknowledgement signal must be sent from each telemetry radio unit to the telemetry entry control board/unit. In the event of the acknowledgement signal not being received by the telemetry entry control board/unit, the emergency total evacuation signal must be repeated.
- 6B4.33** After sending an emergency total evacuation signal it is imperative that the person responsible for the BA entry control point checks to ensure that all BA wearers committed into the risk area through their entry control board are in telemetry. If this is not the case the person responsible for the entry control point should try to establish radio communications with the BA wearers committed into the risk area.
- 6B4.34** If it is not possible to establish communications with BA crews, then BA emergency procedures should be considered.

Emergency selective evacuation procedures

- 6B4.35** Emergency selective evacuation is an integral emergency feature available when telemetry is employed. It allows the person responsible for the BA entry control point to evacuate specific BA teams in an emergency, whilst leaving other BA teams in place. For example, it may be necessary in certain circumstances to ensure that an escape route remains protected whilst the evacuation takes place, or to evacuate a particular BA team or teams from an unacceptably hazardous situation.
- 6B4.36** An emergency selective evacuation signal is an emergency procedure and is not to be used for any other purpose.
- 6B4.37** There are specific command roles that may decide that it is necessary to implement the emergency selective evacuation procedure. The nominated person, under the overall command of the Incident Commander, should decide which BA teams are required to be evacuated by this method.
- 6B4.38** After transmitting an emergency selective evacuation signal, an acknowledgement signal must be sent from each telemetry radio unit to the telemetry entry control board/unit. In the event of the acknowledgement signal not being received by the telemetry entry control board/unit, the emergency selective evacuation signal must be repeated.
- 6B4.39** After sending an emergency selective evacuation signal it is imperative that the person responsible for the BA entry control point checks to ensure that all BA wearers committed into the risk area through their entry control board are in telemetry. If this is not the case the person responsible for the entry control point should try to establish radio communications with the BA wearers committed into the risk area.
- 6B4.40** If it is not possible to establish communications with BA crews, then BA emergency procedures should be considered (see Part B-3 and B-9).

BA wearer emergency initiated withdrawal in relation to telemetry

- 6B4.41** Telemetry provides each BA wearer the ability to initiate a signal that indicates the wearer is withdrawing from the risk area.
- 6B4.42** The decision on whether or not to signal that the BA wearer is withdrawing for reasons of personal safety is that of the BA wearer. On the initiation of a withdrawal signal, all members of that BA team must withdraw from the risk area together.

- 6B4.43** If the Entry Control Operative receives a 'withdrawal' signal from BA wearers committed to the risk area, they will acknowledge receipt of the signal and report this directly to the person responsible for the BA entry control point. An immediate assessment of risk should be undertaken to identify the subsequent actions necessary.

Distress alarm – automatic and manual in relation to telemetry

- 6B4.44** In the event of the actuation of a distress alarm (either manual or automatic), as a minimum, a signal will be transmitted to the telemetry entry control board/unit against which the telemetry radio unit is logged on to.

- 6B4.45** In circumstances where the actuation of a manual distress alarm is required, only the wearer(s) in distress should initiate the distress alarm, enabling the entry control point to determine how many BA wearers require assistance.

NOTE: In circumstances where the alarm of a BA wearer who is in distress cannot be operated, the distress alarm of another member of the BA team should be operated.

- 6B4.46** If the Entry Control Operative receives a distress signal (automatic or manual) from BA wearers committed to the risk area, they will acknowledge receipt of the signal and report this through the command line to the Incident Commander or Sector Commander and other entry control points.

- 6B4.47** Following acknowledgement of the distress signal (automatic or manual) it would be expected that the person responsible for the BA entry control point will follow normal procedures with regards to whether an immediate committal of BA emergency teams is appropriate.

- 6B4.48** If it is established that these enquiries indicate that a distress signal (automatic or manual) does not originate from a non-logged on telemetry radio unit deployed at the incident, then the Incident Commander must be notified with a view to passing this information to Fire and Rescue Control so that checks can be initiated with neighbouring incidents or fire and rescue services.

Telemetry communications signal failure

- 6B4.49** Although there are various reasons to account for a loss of telemetry, the most likely is that the telemetry radio unit is temporarily out of range of the telemetry entry control board/unit. If it becomes clear that telemetry signal has failed (other than temporarily due to penetration/range), the procedures to be followed are as indicated in Part B-3.

6B4.50 If either a telemetry entry control board/unit or telemetry radio unit becomes defective or fails to establish telemetry, an assessment should be made to identify whether either the piece of equipment is to continue to be utilised or regarded as defective.

Additional considerations

6B4.51 Users of telemetry should be aware that like any device which relies on radio transmissions, it is possible for telemetry radio units to be out of range of the telemetry entry control board/unit either because of the distance from the control board/unit or due to physical conditions at the incident, which further inhibit effective radio broadcast.

6B4.52 To ensure that BA entry control systems maintain operational continuity should the telemetry system fail, Fire and Rescue Authorities must ensure they have in place robust manual procedures to ensure that the incident can still be effectively managed at the BA entry control point without compromising BA wearer safety.

6B4.53 There may be locations where it is identified through site-specific risk assessment that signal broadcast and therefore, telemetry will not be achieved. At such locations and/or risk premises, Fire and Rescue Services should ensure that suitable alternative control measures are established to maintain effective BA command and control in the absence of telemetry.

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SECTION B-5

Search and rescue within structures

Key elements

- 6B5.1** This Part outlines the basic principles for BA command and control and a safe system of work in the deployment of BA teams for search and rescue operations.
- 6B5.2** The appropriate BA command and control procedures must be established immediately the decision is made to deploy BA wearers into a risk area for the purposes of search and rescue (in accordance with the provisions within Part B-1).
- 6B5.3** The procedure/s selected should be communicated to and understood by all relevant personnel on the incident ground.
- 6B5.4** Disciplined observance of the criteria, nature and parameters of the operational brief by all personnel are critical to the safety and effectiveness of search and rescue operations.
- 6B5.5** No search teams should operate inside a structure that contains smoke filled compartments that have the potential for any form of rapid fire progression without the protection of suitable and sufficient firefighting or fire extinguishing media (either carried by them or by another BA team/s). Furthermore, the Incident Commander should ensure sufficient personnel are deployed to ensure BA teams do not have to separate to manage hose lines whilst inside a structure.
- 6B5.6** Whilst in smoke filled compartments, when visibility is severely impaired, BA team members must remain in close proximity to each other by one of the following methods:
- attachment by short personal line
 - actual physical contact between each BA team member
 - within physical touching distance.
- 6B5.7** When negotiating specific hazards such as vertical ladders or stairs, team members may briefly separate but should only be separated by the distance created by the hazard.

Guiding principles

- 6B5.8** This guidance is premised on the notion that the person responsible for the BA entry control point will need to afford clear, unambiguous briefings and instructions to BA team/s, to include, amongst other details, the route by which the team/s are required to progress within the structure and the search and rescue methodology/procedures to be employed.
- 6B5.9** In addition, the BA team must assume responsibility for confirming understanding of the briefing and instructions and once deployed, except in extreme circumstances involving the avoidance of life-threatening situations, follow their instructions without variation.

Responsibilities

Incident Commander

- 6B5.10** The decision on which search and rescue procedure or procedures to employ on the incident ground will rest with the Incident Commander or nominated Commander within the incident command line. It is envisaged that the Incident Commander will select one search procedure for a particular incident.
- 6B5.11** The Incident Commander should select and implement the most appropriate search procedures, in accordance with any strategic pre-planning, the type of structure to be searched, the scale and complexity of the incident, the hazards and risks presented and the tasks to be achieved.
- 6B5.12** The Incident Commander is responsible at the scene for ensuring that all relevant personnel are aware of the search procedure/s that is/are in use at an incident and that appropriate briefing and communications processes are established.

BA Team Leader

- 6B5.13** BA Team Leaders must identify the potential for penetrating too far into a complex, multi-compartmented building. Within such buildings it can become increasingly difficult to maintain orientation and therefore safety, as well as the quality of any searching. The subsequent debrief may be compromised.
- 6B5.14** In addition, the BA Team Leader must remain mindful of any predetermined turn-around cylinder pressure (see Air management Part B-2).
- 6B5.15** The BA Team Leader should maintain contact with the wall (fixed reference point) as this provides the greatest degree of safety for the team in terms of orientation.
- 6B5.16** The BA Team Leader, whilst maintaining contact with the wall, will locate landmarks, such as doorways, openings, fixtures, etc. Other team members should also landmark features wherever possible. There should be a suitable exchange of information between BA team members and any landmarks should be mentally noted to assist with the BA team's egress.

Procedural guidance

The BA team brief, debrief and recording

- 6B5.17** It is essential that each and every BA team is fully briefed at the entry control point by the appropriate person in regards to the:
- nature and layout of the structure to be searched
 - the hazards and risks presented
 - the operational search procedures to be employed and equipment to be used
 - the Stage of BA command and control procedures in use (see Part B-1)
 - the introduction, nature and role/s of any other BA teams
 - any relevant air management criteria (see Part B-2)
 - communications provisions (see Part B-3)
 - emergency provisions (see Part B-9)
 - debriefing requirements
 - recording/logging methodologies
 - any other relevant information.
- 6B5.18** This brief should be repeated by the BA team and acknowledged by the briefing officer to confirm understanding.
- 6B5.19** Key information should be recorded appropriately. A suitable and sufficient record of search and rescue instructions and briefings to BA teams, debrief intelligence and any other relevant operational and planning information, should be maintained at the entry control point.
- 6B5.20** On completion of any BA deployment, the team should be fully debriefed at the entry control point by the appropriate person. The essential elements of the debriefing should also be recorded.
- 6B5.21** A resilient recording methodology should be employed at the incident. The records must be maintained not just for the duration of the incident, but subsequently, for audit, training and investigation purposes, as required by current legislation, as they provide a contemporaneous record of the instructions given to BA teams and information gained at the debrief on the completion of the wear.
- 6B5.22** Dependent upon the operational intelligence gathered, the search brief for a BA team may require the search to commence at the point of entry at which there is the greatest point of danger for casualties where the likely seat of a fire is located or, at some other designated point within the structure.

- 6B5.23** All appropriate safe systems of work, search and rescue procedures and personal safety techniques should be followed by the BA team in reaching the designated point for the commencement of the search, as well as during the search itself.
- 6B5.24** Suitable and sufficient communications procedures must be established between the entry control point and the BA team/s and maintained throughout the deployment of the BA team/s within the risk area.
- 6B5.25** Whichever search and rescue methodologies and/or procedures are employed, a resilient, suitable and sufficient recording mechanism for the search brief and debrief must be maintained. This represents risk-critical information which impacts directly on the effective command and control of any incident involving the use of BA and the tasks allocated to subsequent BA teams.

Search plans and records

- 6B5.26** Ideally, suitable plans of the structure with landmarks and hazards identified, should be provided as this significantly improves the quality and effectiveness the BA team briefing and therefore, the safety and effectiveness of the BA team/s.
- 6B5.27** Similarly, the effectiveness of the BA team debrief is also enhanced through the use of suitably annotated structural and floor plans.
- 6B5.28** Pre-prepared plans should be developed, for premises of significant risk to firefighters, wherever possible through information gained under the *Fire and Rescue Service Act* (especially, Section 7(2)(d)) and by any other means available to the Fire and Rescue Authority.
- 6B5.29** A resilient, suitable; and sufficient method of maintaining appropriate records of contemporaneous operational intelligence; BA team briefings and debriefings, and search outcomes, should be established at the entry control point.
- 6B5.30** At larger and more complex incidents, the Incident Commander may determine a need for a strategic overview of the various search and rescue activities within each sector and at each entry control point.

Fixed reference point and land marking features

- 6B5.31** The BA team should landmark any recognisable features for two purposes:
- orientation
 - to help establish whether or not the compartment has been completely searched.
- 6B5.32** As the BA team progress around the compartment, 'door sweeps' may be carried out, in order to reinforce land marking information and to check for the presence of casualties around doorways.

Compartment firefighting

- 6B5.33** Whenever BA teams are carrying out search and rescue procedures at a fire, effective compartment firefighting procedures should be employed at all times. This can be achieved through the deployment of firefighting media by the BA team carrying out the search, or through the support of additional BA team/s to provide an effective firefighting capability.
- 6B5.34** The specific details of these operational firefighting procedures and techniques are not covered in this guidance, but remain an integral feature of any search and rescue safe system of work (see Operational Guidance – Compartment fire behaviour).

Additional considerations

Search and rescue procedures

COMPARTMENT SEARCH PROCEDURE

- 6B5.35** Each compartment is mapped out systematically as the BA search and rescue teams progress, which allows for ease of orientation and a search record to be established in a systematic way (see Appendix 5).
- 6B5.36** This procedure is suitable for a range of structures, particularly complex multi-compartmented structures with many interconnecting rooms, where a methodical approach to the mapping out of compartments may be appropriate.
- 6B5.37** Large compartments may not be able to be fully cleared due to unsearched area/s in the centre of the compartment being unable to be accessed by the BA search team, whilst following the procedure safely.
- 6B5.38** Disciplined and systematic observance of the search brief by the BA team is essential.

DIRECTIONAL SEARCH PROCEDURE

- 6B5.39** A systematic and relatively simplistic procedure to apply (see Appendix 5).
- 6B5.40** This procedure is particularly suitable for domestic and smaller commercial properties, where, due to the size of normal compartments and standard and recognisable layouts, the procedure is most practicable to adopt and all rooms are largely cleared as the directional search progresses.
- 6B5.41** In larger compartments multiple teams will be required to be committed in a coordinated way to ensure the compartment is searched and crew safety is maintained.
- 6B5.42** This procedure does not necessarily clear a compartment before the BA team move on to the next compartment.

- 6B5.43** There is the potential to pass a fire compartment, which may compromise the means of escape for BA teams, unless search and rescue operations are comprehensively coordinated and an effective search plan and record process established.

Left/right hand orientation

- 6B5.44** Both search procedures will employ a left or right hand orientation, in that the team leader will use and follow the left or right hand wall as their fixed reference point to ensure that the search is orientated and systematic. This left or right hand orientation applies at all times a BA team is within the risk area, after passing through the point of entry into the structure.
- 6B5.45** Other than under the most extreme and exceptional circumstances, the BA Team Leader will remain in touch contact with the wall or fittings integral to the wall at all times. Maintaining the wall as a fixed reference point is a cornerstone of the safety and effectiveness of these procedures.

Actions on locating casualties

- 6B5.46** Upon locating a casualty the BA Team Leader should relay this information to the entry control point as soon as possible. The other members of the team should carry out a proximity search around the casualty to ensure there are no further casualties close by.
- 6B5.47** The BA team members should at this stage take a gauge check to ensure effective air management is maintained. Confirmation of this information with the BA Team Leader should take place and where possible, the entry control point notified of BA team members' air supplies and the rescue and withdrawal decisions of the BA Team Leader, accordingly.
- 6B5.48** In most circumstances, a BA team exiting with a casualty should have priority over other teams in the immediate vicinity.
- 6B5.49** If undertaken in a safe systematic manner, tactical ventilation makes for a more effective search by making the conditions more tenable for casualties and firefighters within a structure.

PART B-6

BA guidelines

Key elements

- 6B6.1** This part provides guidance for a safe system of work for the use of BA guidelines, including both the laying of and searching off guidelines.
- 6B6.2** The purpose of a BA guideline is to enable:
- a BA team in a risk area to retrace their steps to the BA entry control point
 - subsequent BA teams to readily locate a team of BA wearers
 - subsequent BA teams to locate the scene of operations; and/or subsequent BA teams to enter and search large/complex structures.

Guiding principles

- 6B6.3** It is acknowledged that there are circumstances where there is little alternative to the use of the BA guideline. For example: when entering and searching where hose lines are submerged; where the hose has been hauled aloft; within specific industrial premises where the use of certain firefighting media might prove hazardous, or in some cases, catastrophic.
- 6B6.4** However, the deployment of BA guidelines should be determined on the basis of a suitable and sufficient assessment of risk and in accordance with an overall operational plan. Additional risk mitigation and control measures should be established and sufficient resources made available before deployment commences.
- 6B6.5** An operational plan involving the use of BA guidelines will require the provision of suitable and sufficient resources being available at the incident before operations can commence. By their very nature, BA guideline operations are resource intensive and should be planned for accordingly.
- 6B6.6** Before deploying BA guidelines, the Incident Commander should consider the use of alternative and/or simultaneous operational techniques to assist in Fire and Rescue Service' operations and enhance firefighter safety. These may include the adoption of tactical ventilation techniques.
- 6B6.7** The BA guideline should be used where no other practical or appropriate means are available such as hose lines for tracing the route to the entry control point or searching an area within an affected premise.

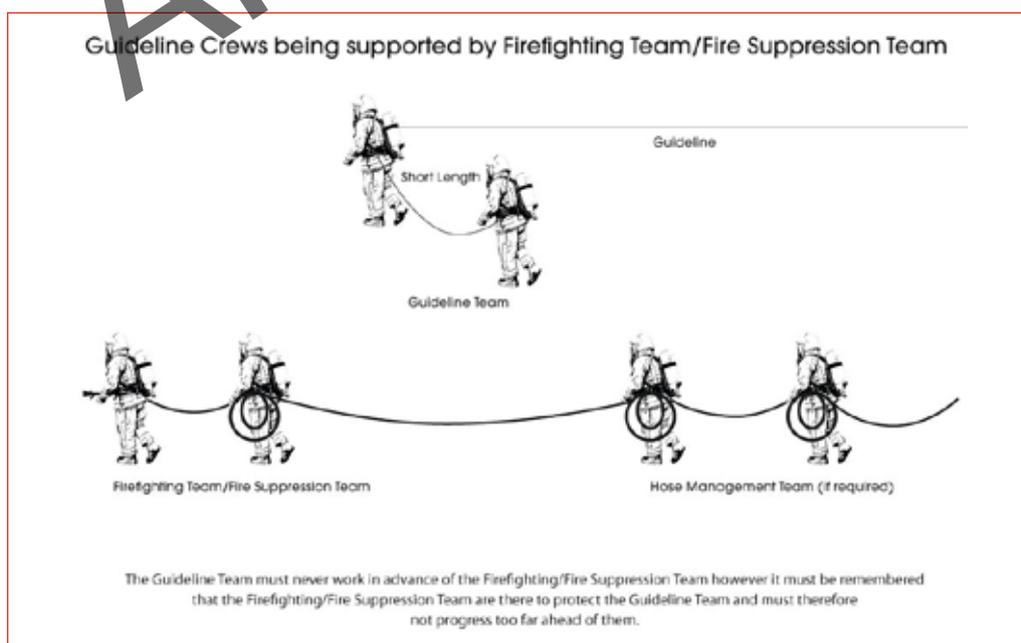
- 6B6.8** The level of complexity of any incident and the advantages to be gained must be evaluated before the introduction of BA guidelines. The Incident Commander must ensure a suitable and sufficient assessment of risk against task has taken place prior to the introduction of BA guidelines, and that the reason for that decision is recorded.
- 6B6.9** Stage II BA Entry Control Procedures must be in operation before BA guidelines are brought into use (see Part B-1). Appropriate BA emergency arrangements, involving the provision of sufficient BA emergency teams standing-by at each BA entry control point, must therefore, be established before BA guideline operations can commence (see Part B-9).
- 6B6.10** It is essential that good communications are established and maintained throughout the deployment of the BA team/s. BA teams laying BA guidelines must carry suitable communications equipment.
- 6B6.11** Should the needs of an operational incident entail the use of BA teams for duties involving both BA guidelines and hose reels/main jets through the same BA entry control point, the following principles should be adopted:
- Incident Commanders should ensure an assessment of risk has been carried out and recorded at the command point/incident command unit
 - all BA teams deployed into the risk area should have prior knowledge of the hazards identified in the risk assessment and have received appropriate briefing and instructions on the route they are to follow
 - subject to the operational plan in place and the assessment of risk of potential escalation of the incident, the Incident Commander should ensure sufficient resources are available at the incident ground to accommodate the introduction of BA guidelines if required.
- 6B6.12** The exit direction on all guidelines should be clearly and easily identifiable by touch. (See Appendix 2).
- 6B6.13** Guideline laying and/or search and rescue BA teams should not enter a risk area involving fire and/or flammable gases without appropriate firefighting media. This may be carried by the search and rescue BA team themselves, or preferably by support firefighting BA teams working closely with them.
- 6B6.14** The guideline team should not operate in advance of any firefighting BA team, as the firefighting BA team will adopt fire suppression techniques to render the environment safe. If the firefighting BA teams have to withdraw, the BA guideline team should also withdraw.

Responsibilities

- 6B6.15** BA guidelines are to be used only on the instructions of the Incident Commander or with his/her delegated authority.
- 6B6.16** Details of the main or branch guideline to which individual BA teams are committed must be recorded on the entry control board by the Entry Control Operative.
- 6B6.17** The Entry Control Operative must ensure that BA teams are briefed prior to entry (in accordance with the guidance set out in Parts B-1 and B-3).
- 6B6.18** The guideline laying team should not search off it or fight the fire.
- 6B6.19** The firefighting team is there to protect the guideline laying team, and any search off the guideline will be undertaken by subsequent teams deployed for that particular task.

Procedural guidance

- 6B6.20** The term 'guideline' defines the special line which is used either as 'a main guideline' to facilitate an initial search and to indicate a route between an entry control point and the scene of operations, or, alternatively, as 'a branch guideline', where it is necessary to traverse or search more than six metres off a main guideline. The method of use of the line for either purpose is the same.
- 6B6.21** The term 'personal line' defines a special line of six metres in length secured to the BA set of the wearer. The personal line may be attached by the BA team member to a BA guideline to enable the wearer to follow the guideline and search off it up to the limit of the personal line.



6B6.22 Additional support BA teams may be deployed in conjunction with a guideline laying or search and rescue BA team for the purposes of, for example:

- hose management
- thermal imaging camera use
- protecting the means of escape of the initial BA team/s
- further hose-management to protect the means of escape protection BA teams
- support for casualty retrieval.

6B6.23 The use of BA guidelines can be sub divided into two operational practices:

- laying of guidelines
- following or searching off guidelines.

6B6.24 The BA guideline containers should be securely fitted to the set of the BA Team Leader in a way that allows them to be detached easily in the event of an emergency. Examples are set out in the following photographs:

Example 1: Securing BA guideline



Example 2: Securing BA guideline



- 6B6.25** When extended penetration into a large or complex structure is required an additional BA guideline should be carried by the team.
- 6B6.26** A BA guideline must be stowed in such a way that the running end pays out first.
- 6B6.27** A main guideline leading from an entry control point will be designated A or B using one of the tallies provided for this purpose (see Appendix 2).
- 6B6.28** Any main guideline tally required must be attached securely to the line before the BA team enter the risk area.
- 6B6.29** Unless the BA guideline is to be used to extend an existing main guideline or to form a branch guideline, it is to be secured to an immovable object outside the risk area in safe air, before the BA team enter the risk area.
- 6B6.30** Relief BA teams must ensure they follow the correct main guideline/branch line.
- 6B6.31** To avoid potential confusion and maintain manageable lines of communication and span of control at the BA entry control point, there must be no more than two main guidelines in use at any one entry control point.
- 6B6.32** No more than one guideline may be laid along a search side (ie two BA guidelines cannot be laid along the same wall). However, near to the point of entry into a structure two lines may be laid, one on either side of a route prior to them splitting into defined left/right search patterns.
- 6B6.33** Guidelines should not cross over each other inside a structure or share tie off points. Should two guidelines converge then one of the guidelines should be terminated and secured to a tie off point a minimum distance of two metres from where the lines would have met.

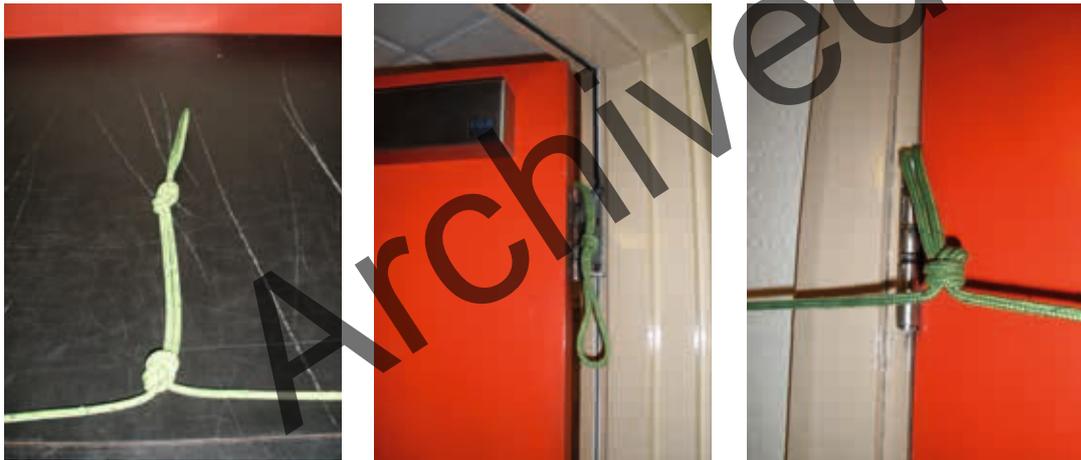
6B6.34 A main guideline, when laid, may consist of a number of lines joined together. When the guideline is being extended the BA team leader must inform the Entry Control Operative who will then inform the Sector, Operations or Incident Commander and/or BA Sector Commander, as appropriate. When the guideline has been extended the BA Team Leader should inform the Entry Control Operative to ensure a suitable and sufficient record is maintained.

Securing a BA guideline

6B6.35 The BA guideline is to be secured at intervals to suitable objects on the route by members of the BA team other than the team leader. The guideline should be kept as taut as possible using as few tie off points as is necessary. The line should be kept off the floor, preferably between shoulder and waist height and secured on the side of the search. Crossing over from one side to another is to be avoided as far as possible.

6B6.36 Where no other means of securing the line are available the following alternative methods may be considered:

Example 1: Use of the door jamb

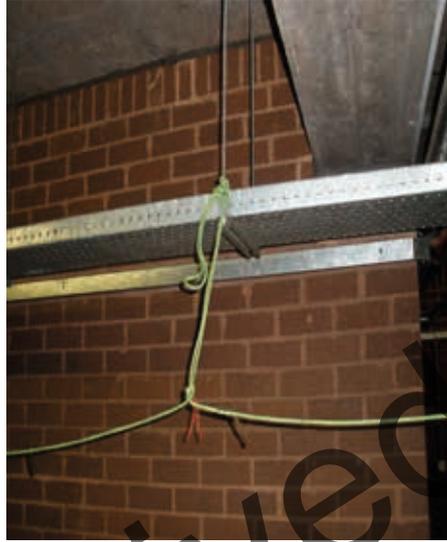


- a half metre loop is created in the line using an overhand knot, then a second knot is tied in the loop
- the loop is slid between the door and the jamb with a knot either side of the hinge
- the door can now be closed and the line held above the hinge.

Example 2: Use of a high tie-off point

6B6.37 If the only tie off point is a high object to maintain the line at the correct level the following method can be adopted: A loop is created by tying an overhand knot in the line then the loop is tied off around the high object using a round turn and two half hitches. The length of the loop will vary with the height involved. See below photograph as an illustration.

Example 2: Use of a high tie-off point



Negotiating a vertical ladder

6B6.38 When a guideline route involves a vertical ladder a tie off point must be created at both the bottom and the top of the ladder. BA teams should take into account the position of these tie off points when tying off to avoid hindering following BA wearers using the ladder. See the photograph below as an illustration.

Negotiating a vertical ladder



Encountering doorways and openings

- 6B6.39** When laying a guideline, BA teams should not pass closed doors without first investigating around the doorway. The door sweep procedure may be adopted (see Glossary) following an appropriate dynamic risk assessment, and in conjunction with normal firefighting/fire-gas suppression techniques for the protection of BA teams. Where possible, these checks and techniques should be undertaken by firefighting BA teams that are supporting the guideline BA team/s.
- 6B6.40** As well as establishing landmarking features for the BA team/s and checking for casualties behind doorways, these techniques will: contribute toward maintaining safe access and egress for both themselves and subsequent BA teams; assist in identifying and dealing with any fire compartment/s.

Encountering small rooms/compartments

- 6B6.41** When laying a BA guideline, it should be remembered that its length is limited. Tying off the guideline unnecessarily also consumes a significant amount of time. Therefore, when searching rooms that are known or are discovered to be small, the guideline should be gathered up and taken out of the room. The advantage of this method is that:
- the guideline can be used more effectively for extending further into the incident
 - time will be saved when exiting the incident as only the most direct route will be marked
 - if exiting carrying casualties there will be fewer ties off points and doorways to negotiate.

Extending a guideline

- 6B6.42** A BA guideline can be extended by clipping the snap hook of another line onto the looped end then unclipping it from the container; see the below photograph as an example.

Extending a guideline



(1) When the first line has been fully run out...



(2) The snap hook from the second line can be attached to the looped end of the first line...



(3) The first line can then be unclipped from the container.

6B6.43 The advantage of this method is that time is saved by not having to transfer the second line between wearers and at no time is the BA Team Leader not attached to the main guideline. The empty line bag can be either left attached to the line or removed altogether.

Withdrawing from the risk area

6B6.44 If a BA team laying a guideline has to withdraw before the objective is reached, the BA Team Leader should first ensure that they are clipped on to a secured section (between the last two tie off points) of the guideline by their personal line before releasing the guideline container. Then, by following the guideline, the BA team can retrace their steps from the risk area. The same procedure should be adopted for an emergency withdrawal. Where it is not possible to secure the guideline container to a tie off point before withdrawal the withdrawing BA team should inform the entry control point operative.

6B6.45 If possible, the guideline container should be secured to a tie off point before withdrawal. To achieve this when withdrawing, BA teams have the option to create a new tie off point or to retrace their steps to the last tie off point gathering up the slack line. This decision is based upon the distance travelled from the last tie off point and therefore the amount of line to be gathered up. Any slack line gathered up should be attached to the container with a half hitch. The container should then be secured to the nearest tie off point to allow easy location of the container by subsequent teams.

BA teams meeting on a guideline

- 6B6.46** BA teams leaving the incident area should always take precedence over incoming teams because the team leader will have calculated their turn-around pressure to allow exit before time of whistle/warning. If delayed whilst withdrawing the team may not achieve this.
- 6B6.47** To allow teams to pass on a BA guideline, the incoming teams should kneel down as close to the guideline as possible with the team leader holding the karabiner of their personal line still on the line. If individual team members are clipped onto the line their karabiners will need to be pushed together. The outgoing team leader can then negotiate the incoming teams' karabiner(s) as they would a tie off point: See illustration in the photographs below.

Passing on a BA guideline



Branch guidelines

- 6B6.48** Branch guidelines are to be used where the distance of the area of search from the main guideline is greater than the length of one personal line.
- 6B6.49** The number of branch guidelines deployed from a single BA entry control point will be limited to four.
- 6B6.50** Branch guidelines are designated numerically, "1", "2", "3" or "4", by the Entry Control Operative. The number of holes in the tally representing the number of the branch guideline (see Appendix 2). It is essential that once deployed all references to branchlines are made in relation to the branchline tally number and not to its numerical position in relation to the entry control point.

- 6B6.51** One method of attaching the tally is to tie an overhand knot on the bight approximately one metre from the snap hook and attach the branchline tally to the loop created by the knot before the BA team enter the risk area (see below):

Attaching a branchline tally to the line



Attaching and laying a branch guideline

- 6B6.52** A branchline must be securely attached to the main guideline. It is important that the branchline is attached away from any tie off points.

Attachment of branchline to the main guideline



- 6B6.53** The branch guideline should be tied off as soon as possible after attaching it to the main guideline. This prevents the main guideline being deflected down the route of the branchline.
- 6B6.54** For safety reasons and to avoid potential confusion, branch guidelines will not normally be extended. However, such an extension may be required in certain circumstances following a suitable risk assessment. At the point at which the extension to the branchline takes place, the BA Team Leader should inform the Entry Control Operative, who will in-turn inform the Incident Commander.

- 6B6.55 On re-joining a main guideline from a branchline, the BA Team Leader should check the first set of tabs they encounter to ensure that they are travelling in the correct direction. A message should then be sent to the entry control point for recording purpose that this transition has occurred.
- 6B6.56 At all times, the BA Team Leader must remain in close communication with the BA entry control point.

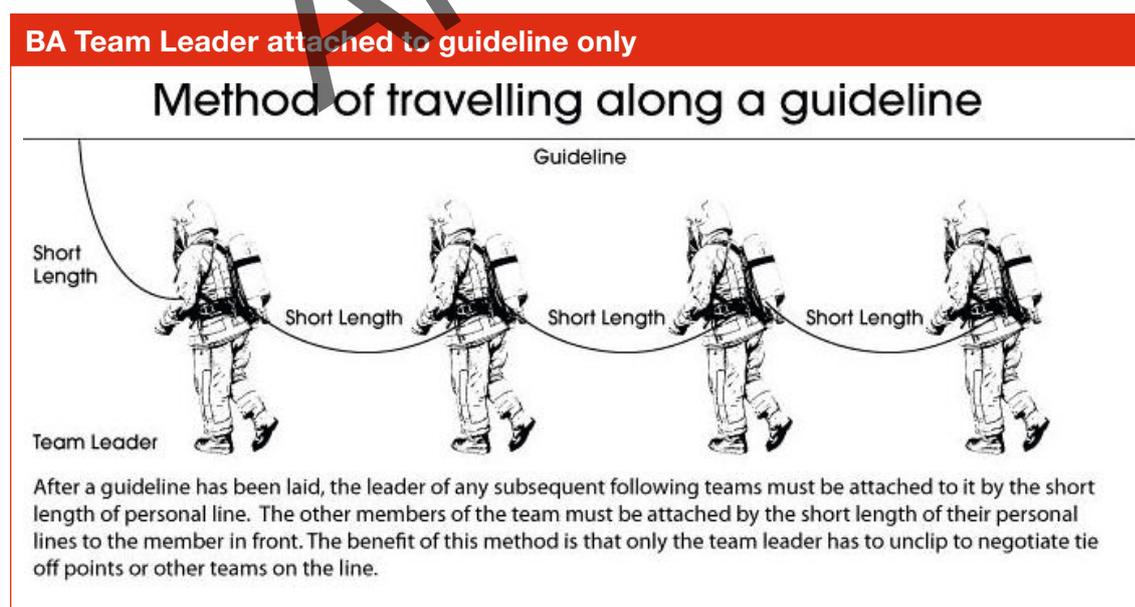
Purpose of a personal line

- 6B6.57 The personal line allows members of a BA team to attach themselves individually to a guideline using the 1.25m length of line or for the team leader to attach to the line and for subsequent team members to attach to each other using their 1.25m lines. It also permits a search to be extended from a main or branch guideline to the full extent of one personal line (6m).

Traversing a guideline

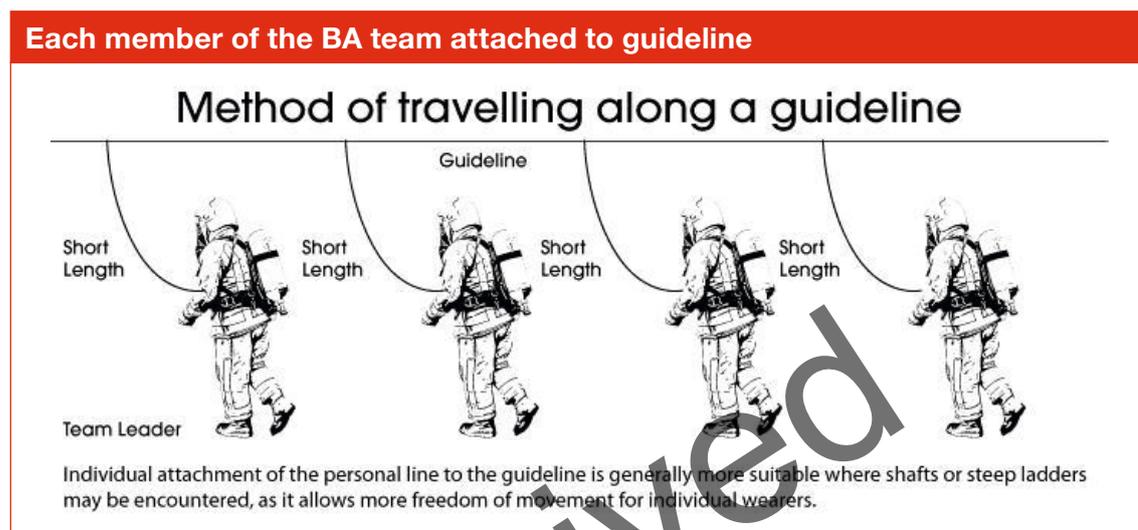
METHOD 1: BA TEAM LEADER ATTACHED TO GUIDELINE ONLY

- 6B6.58 Whilst laying a BA guideline, good practice indicates that wherever possible all BA team members – apart from the BA Team Leader, who will be attached to the main guideline – will attach via their personal line to the wearer in front.
- 6B6.59 However, this technique may not apply in certain circumstances, such as when negotiating shafts, vertical ladders, sewers, etc. Under these circumstances it is permissible for each member of the team to clip on individually to the guideline to traverse the hazard and then to resume the original traversing method once the hazard has been negotiated.
- 6B6.60 This method is illustrated in the below diagram, which shows a BA team of four.



METHOD 2: EACH MEMBER OF BREATHING APPRATUS TEAM ATTACHED TO GUIDELINE

- 6B6.61** In this method, each member of the BA team is attached to the BA guideline and maintains physical contact distance with their BA team colleague/s. When adopting this method, however, it is essential that BA team members remain within physical contact distance of the remaining members of the team unless traversing a specific hazard such as a vertical ladder
- 6B6.62** This method is illustrated in the below diagram, which again involves a BA team of four.

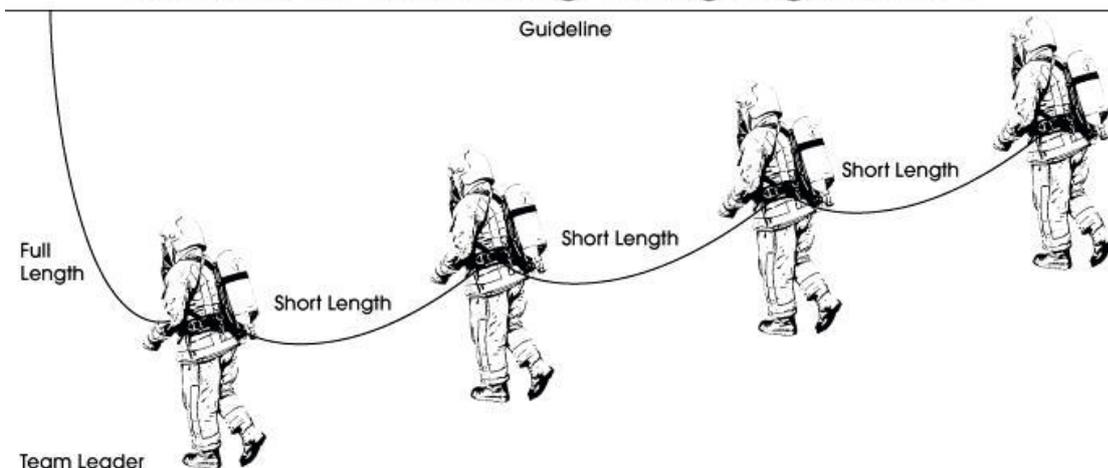


Searching off guidelines

- 6B6.63** When searching off a BA guideline, the BA Team Leader will attach their personal line to the guideline and the other member/s of the team will attach themselves by means of their short personal line to their immediately preceding team member.
- 6B6.64** Only the BA Team Leader should extend their personal line to 6m, all other team members should remain between the team leader and the guideline.

Searching off guidelines

Method for searching along a guideline



To search off a guideline, the personal line of the team leader may be deployed to the limit of its length and all the other team members should search inside the team leader. Using this method no one should stray further than 6m from the guideline.

Search coordination and records

- 6B6.65** Wherever possible, the Incident Commander or BA Sector Commander should obtain risk information and building and structural plans which will allow for operational planning for the use of BA guidelines at the incident.
- 6B6.66** Appropriate plans, if available, and search records should be maintained at the BA entry control point by the Entry Control Operative. These plans and all relevant operations information should be duplicated at Command Support.
- 6B6.67** BA teams should ensure that areas searched are effectively communicated to the BA entry control point, who in turn will communicate information to the (geographical) Sector Commander, and where appointed the BA Sector Commander. A comprehensive and accurate search and rescue record can then be established at Command Support, to avoid duplication of search and rescue activity. The quality and effectiveness of the BA team/s debriefing processes are therefore, critical to the safety and effectiveness of the overall operational plan.

Additional considerations

Operational preplanning

- 6B6.68** Fire and Rescue Authorities are required to collect information on premises that may present a significant hazard to Fire and Rescue Service personnel. This may include information gained under the *Fire and Rescue Services Act*, such as 7(2) (d) information, industrial on-site plans and local risk based geographical information.

- 6B6.69** These processes should identify structures that may benefit from the use of BA guidelines and may therefore warrant an enhanced operational attendance. This information should be used to inform preplanning of incidents. The strategic siting and mobilising arrangements of suitable resources to facilitate the use of BA guidelines at those premises should be identified during this process.
- 6B6.70** In addition, steps may be taken during such preplanning, to enhance the effectiveness of radio communications and telemetry within structures.

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PART B-7

BA ancillary equipment and additional procedures

PART A: BA ANCILLARY EQUIPMENT

Key elements

- 6B7.1** The level of intrinsic/electrical safety of the ancillary equipment provided should be appropriate to that of the hazard to be encountered and cognizant of the existing standards applicable to the BA set and integral equipment.
- 6B7.2** Intrinsically safe BA ancillary equipment deployed at an incident is to be supported by control measures to ensure effective compliance by all BA teams.
- 6B7.3** Briefing and debriefing BA teams will confirm the type of BA ancillary equipment required for the tasks to be undertaken. Effective debriefing will also confirm that the equipment is proving suitable and effective in the operational conditions encountered within the incident.
- 6B7.4** The advantage associated with the deployment of BA ancillary equipment at an incident is to enhance the safety and efficiency of the BA team in the tasks being undertaken.
- 6B7.5** The duration of operational use of electrical equipment governed by a battery source will be necessarily limited. Batteries will require regular replacements or recharging at extended incidents.

Guiding principles

- 6B7.6** The purpose of this Part is to outline the general principles for the selection of and the command and control procedures associated with BA ancillary equipment.
- 6B7.7** Equipment that is integral to the BA set eg distress signal unit and the personal line, must comply with any relevant British Standard and EN standards.¹
- 6B7.8** All BA ancillary equipment must be used as detailed in standard operational procedures and maintained and serviced in accordance with the manufacturers' instructions.

¹ BS EN 137:2006 Respiratory protective devices – Self-contained open-circuit compressed air breathing apparatus with full face mask – Requirements, testing, marking.

Procedural guidance

Criteria for use of BA ancillary equipment

- 6B7.9** Unlike a controlled industrial environment, the types and degrees of hazards posed at an emergency incident, specifically from a potentially flammable atmosphere, will be dependent on a large number of environmental and situational factors. These will have implications for the safe use of low wattage battery powered equipment associated with BA.²
- 6B7.10** Additional BA ancillary equipment should only be deployed within the risk area following a suitable and sufficient risk assessment. The risk assessment should identify the benefits conferred by that equipment toward the safety and effectiveness of BA wearers, against the additional hazards, if any, presented by the carrying and use of that equipment within the risk area, particularly in a potentially flammable/explosive atmosphere.

Additional considerations

- 6B7.11** The provision and use of non-intrinsically safe electrical equipment may be considered appropriate for all normal operational requirements, where such provision confers a significant benefit to the safety and effectiveness of BA teams. Such equipment may include, for example, hand-held radios and thermal image cameras.
- 6B7.12** Operational pre-planning such as:
- Site specific risk information and plans
 - Section 7(2)(d) inspections
 - Generic Risk Assessments,
- may also identify the need for the provision of an appropriate standard of intrinsic/ electrical safe ancillary equipment for BA teams in situations and/or at specific risk sites within the Fire and Rescue Authority area.
- 6B7.13** Further consideration should also be given by the Incident Commander to any expert advice provided at the scene of the incident and any further dynamic conditions which may influence the scene of operations.
- 6B7.14** Providing intrinsically safe BA ancillary equipment does not itself make the incident safe from fire or explosion.
- 6B7.15** Consideration should also be given to:
- briefing the crews on any other environmental concerns or risk avoidance considerations within the structure or incident site

² Ignition probability of flammable gases, Health and Safety Executive, contract research report 146/1997, WS Atkins Safety & Reliability

- the standard and correct use of the firefighters' clothing/personal protective equipment.

PART B: PARTIAL BA SET REMOVAL

Key elements

- 6B7.16** This procedure may be considered for self-rescue purposes in extreme circumstances.
- 6B7.17** It may therefore, be deemed appropriate in those rare circumstances where a BA wearer has become entrapped and the dangers are too great to await rescue.

Guiding principles

- 6B7.18** The purpose of this Part is to determine general principles and criteria for the partial removal of a BA set, to allow the BA wearer, while still breathing from the set, to negotiate a restricted opening or space.

Responsibilities

BA team leader

- 6B7.19** The BA Team Leader should consider the physiological effects of the environment and the increased air consumption of wearers during partial BA set removal. Frequent gauge checks must therefore be undertaken and, where possible, communicated to the BA entry control point.
- 6B7.20** Subject to any information and instructions received, prior to adopting partial BA set removal techniques to negotiate any obstruction or restriction the BA Team Leader should consider the availability of safe alternative exit routes and/or the use of adopting entrapped procedure.

Procedural guidance

- 6B7.21** A BA team encountering an unforeseen confined space or restriction, on egress from a risk area, should seek to communicate with the BA entry control point for further information; guidance; additional instructions; and details of other actions being undertaken from the BA entry control point.

Additional considerations

- 6B7.22** Partial BA set removal is an additional technique available to BA wearers for the purposes of self-rescue in extreme circumstances where no other safe means of egress from the risk area is available or adopting entrapped procedure presents an intolerable risk to the safety of the BA team.

PART C: AIRLINES

Key elements

- 6B7.23** The purpose of airline is to supply air to the wearer by means of the transfer of air from another cylinder, located remotely from the wearer.
- 6B7.24** In accordance with the standard system of operating when wearing self contained BA, airline teams will consist of a minimum of two personnel.
- 6B7.25** Each airline team will be equipped with suitable communications that will enable each team to communicate with the airline entry control point.
- 6B7.26** Airline can be used in the following situations:
- where extended air supply to self contained BA wearers is required
 - where extended/continuous BA operations are required
 - in restricted space incidents.

Guiding principles

- 6B7.27** The purpose of this Part is to outline general principles for the deployment of airline equipment in the context of BA command and control procedures.

Responsibilities

Incident Commander

- 6B7.28** The Incident Commander should be aware of the location of all airline entry control points, and whilst it is permissible for self contained BA wearers to utilise the same entry control point, an additional self contained BA entry control board must be established and maintained with a dedicated BA Entry Control Operative.

Procedural guidance

- 6B7.29** The location of the airline entry control point should take into account and be sited in such a way that it complies with those procedures laid out in Part B-1, and in addition it will take account of the:
- length and amount of airline required
 - number of personnel required to operate it
 - distance to the scene of operations.
- 6B7.30** In addition, an airline should be positioned in such a way that its location is easily identified by airline wearers.

6B7.31 The command, control and deployment of airlines require the use of specific operating procedures and crews who are properly trained and competent in their use. Fire and Rescue Authorities must ensure that any such procedures are in accordance with this guidance and any other relevant recognised systems and protocols (see Part B-10 and B-11 for further guidance on interoperability and national resilience).

Extended air supply to self-contained BA

6B7.32 This describes those situations where airline is used either:

- in conjunction with (full) compressed air BA; or
- to supplement the air supply of a self-contained BA wearer in an emergency.

6B7.33 In the former case, the airline supply must be connected to the BA and the wearer should receive the air supply through the face mask of the apparatus; the cylinder valve of the apparatus would normally remain closed and the content of the cylinder held for use in an emergency. These incidents may include but are not limited to:

- Decontamination incidents for those who have been committed to the incident and/or for those undertaking decontamination operations. Airline equipment may be provided in the form of short lengths, up to 10 metres in length, for specific purposes. These may be used to augment the air supply to self-contained BA wearers during decontamination procedures.

6B7.34 These are incidents at which the use of self-contained BA is precluded or less effective due to the limited duration provided by the cylinder. These incidents include, but are not limited to:

- an incident in the open at which airline is used to provide a breathable atmosphere without the weight of a self-contained BA set, for example, in a high dust environment.
- incidents that require long travel times to access the working area.

Restricted space incidents

6B7.35 These are incidents where the working environment affords limited or no access to personnel using self-contained BA. These incidents could include but are not limited to:

- rescues from confined spaces with restricted access, for example rescue from silos, sewers or ship's holds.

Additional considerations

- 6B7.36** For many operations involving an airline there may be a need for the use of air monitoring equipment.
- 6B7.37** In particular, should an airline be in operation (see Part B-1), air monitoring equipment should be made available and sited in an appropriate position adjacent the entry control point. There must also be adequate provision to deal with the movement and re-location of such equipment, and for the possible withdrawal of the airline team or teams should it become necessary to re-locate the entry control point.
- 6B7.38** For many operations involving airline, consideration should be given to the use of line communications equipment.
- 6B7.39** In the event that a decision is made to commit an emergency team, due consideration should be given as to whether or not it is possible to commit wearers in self-contained BA as opposed to airline BA. However, the use of self-contained BA in such circumstances does not preclude the requirement to have a suitably equipped airline emergency team available.
- 6B7.40** Airline has the capability of extending the duration of self-contained BA by means of the second person attachment. This could be particularly advantageous where a self-contained BA wearer has become trapped and due to the nature of the entrapment it is impossible to replace the wearer's cylinder.
- 6B7.41** During prolonged periods of breaking in through structural obstructions, airline can reduce the stress on wearers by removing the requirement to wear a self-contained BA. This can be particularly advantageous where the wearer is using heavy breaking in equipment.
- 6B7.42** The use of airline reduces the overall weight imposed on a BA wearers and can provide a limitless supply of air. However, at all times airline equipment is in use, the physiological limitations of the wearer should be considered.
- 6B7.43** Airline is susceptible to mechanical damage which could compromise the air supply to the wearer. Appropriate care and protective arrangements should therefore be maintained.
- 6B7.44** Airline wearers must manage the laying and recovery of the airline in order to make effective progress at an incident.

SECTION B-8

Welfare of BA wearers

Key elements

- 6B8.1** The purpose of this Part is to provide guidance in order to safeguard the welfare, safety, and effectiveness of BA wearers prior, during, and post incident.
- 6B8.2** The welfare of BA wearers should be addressed on each and every occasion that BA is deployed.
- 6B8.3** Wearing BA and personal protective equipment restricts the body's ability to maintain ideal body temperature. When the wearer is also working in hot and humid conditions this situation is exacerbated. If the task undertaken involves a heavy workload such as rescuing a casualty or carrying equipment the core body temperature will rise and fluid will be lost in the form of sweat.
- 6B8.4** Research has shown that regular training in BA will increase an individual's ability to cope with this additional weight and the physiological demands that may be involved. Firefighters should bear in mind the need to assess the manual handling aspects of any tasks they have to undertake, by considering the task, load, working environment and their individual capacity.
- 6B8.5** All personnel have a responsibility to ensure that they arrive fit for duty.

Guiding principles

- 6B8.6** BA wearer welfare, safety and effectiveness should be addressed prior to, during and post-deployment of the BA wearer.
- 6B8.7** The selection of personal protective equipment for BA wearers must be appropriate to the environment into which they are to be deployed and the tasks to be undertaken (eg chemical suits).
- 6B8.8** Wherever possible firefighters intended to be used as BA wearers should not be used for other functions requiring high levels of physical effort eg transporting equipment up stairs during high-rise incidents. If personnel have already worn BA and are to be re-deployed in BA they should rest and recuperate.

Responsibilities

- 6B8.9** Incident Commanders should take the factors outlined above in 'Key elements' into account when selecting firefighters to wear BA, detailing tasks and ordering reliefs.

- 6B8.10** Incident Commanders should consider the physiological effect that prior activities might have upon an individual or team's wellbeing and their ability to safely undertake their task when deployed to use BA.
- 6B8.11** Studies have shown that individuals do not necessarily maintain themselves in a hydrated state on a daily basis, especially when performing physically demanding tasks in hot and humid conditions. Individuals should be aware of their own personal fluid requirements and consume adequate amounts of water throughout the day to remain hydrated.

Procedural guidance

- 6B8.12** Where possible, actions should be taken to improve the working conditions of BA teams deployed into to the risk area. For example, by means such as tactical ventilation or using spray branches to reduce temperatures within the hazard areas.
- 6B8.13** Wherever possible, all BA team members should share tasks, roles and functions and where appropriate, BA Team Leaders should consider team and task rotation. The designated team leader should, however, always maintain a leadership role within the BA team.
- 6B8.14** BA teams should consider whether it is necessary to leave equipment in the hazard area to reduce the workload when withdrawing.
- 6B8.15** All BA wearers should monitor their team members for signs of heat stress, such as dizziness, nausea, abdominal pain or a burning sensation of the skin. Under such circumstances, the whole BA team should immediately withdraw from the risk area.
- 6B8.16** Wherever appropriate, and subsequent to the findings of risk assessment, 'dressing down' of personal protective equipment, away from the scene of operations, to allow for the venting of body heat and the reduction of the resulting physiological burden, should be a normal procedure pre and post-deployment.
- 6B8.17** Relief BA teams should be planned to take account of the physiological load imposed on the BA teams and their need for rest and recovery and the Incident Commanders should be aware of the hazards associated with wearers being re-committed.
- 6B8.18** At an incident where BA operations are likely to be arduous or protracted, consideration should be given to the establishment of a rest and recovery area. Where possible, this area should be supervised by an officer who will be responsible for managing rest, recuperation and refreshments for BA wearers. This officer will report to the BA Sector Commander, where appointed.
- 6B8.19** The rest and recovery area should be set up adjacent or as near as possible to command vehicle/unit or Command Support area (if it is established), but in any case, the position selected should be in an area that is clean, dry and cool.

- 6B8.20** A temporary structure may be utilised, in some circumstances.
- 6B8.21** The following equipment may be considered if a rest and recovery area is to be established; temporary structure, space blankets, signage, benches and tables, generator and lighting, first aid kit, resuscitator, dry clothing, cups, drinking water and toilets. This list is not exhaustive.
- 6B8.22** Where refreshments are provided for crews, it should be noted that at hazardous materials incidents eating and drinking is only to be allowed under the direction of the hazardous materials and environmental protection officer or scientific advisor where available.
- 6B8.23** Appropriate health and safety recording systems must be maintained for BA wearers who have experienced heat-related illness and injury.
- 6B8.24** In order to optimise recovery between BA deployments and maximise performance and safety prior to being redeployed as a BA wearer, personnel should be afforded a period of time in which to rest and rehydrate. Table 1 (below) provides some guidance on rest and rehydration periods, however the actual time afforded should be based on the task undertaken; time committed; and conditions encountered by the wearers.

| Table 1: Ideal rest and recovery procedures ³ | | |
|--|-------------|-------------------------------------|
| Initial BA deployment conditions | Rest period | Water to be consumed (ideally cool) |
| DEPLOYMENTS | | |
| Ambient | 30 minutes | 500ml |
| Hot and humid | 60 minutes | 1000ml |

- 6B8.25** Particular attention should be made to firefighters who have been working in confined spaces with limited ventilation (eg basements, ships holds). If the work has been particularly arduous, the recovery time should be extended.
- 6B8.26** Once the recovery period has elapsed or clearance has been given to leave the rest area, personnel will report to the Sector Commander, as directed, for redeployment.

³ CLG Fire Research Technical Report 18/2008: "Core Temperature, Recovery and Re-Deployment during a Firefighting, Search and Rescue Scenario", CLG, December 2008 (see Chapter 7).

Additional considerations

Heat stress – symptoms

- 6B8.27** Heat stress is due to excessive sweating. Body temperature remains more or less normal while the excess heat is given off in the evaporation of sweat from the body. Sweat consists of salt and water which is lost appreciably during heavy and prolonged sweating. A salt/water deficiency can cause cramps, headaches, weakness and fainting, and finally collapse.
- 6B8.28** Firefighters and Incident Commanders must be made aware of the symptoms of heat disorders, which may be displayed, by themselves and their operational colleagues. These include:
- a feeling of being unwell, including tiredness, headaches, dizziness, nausea, and vomiting
 - breathing difficulties/shallow rapid respiration
 - rapid pulse, which may be bounding or weak
 - extreme thirst and mouth dryness
 - muscle cramps
 - poor control over movements/stumbling/weakness
 - irritability.

Heat stress – treatment

- 6B8.29** Where heat stress is identified or suspected the individual(s) should dress down and drink cool water. If possible warm, not cold, water should be sprayed onto the affected individual(s) and they should, where possible, be fanned to aid in the process of cooling by evaporation. Special consideration should be paid to head cooling in this way (where available the use of positive pressure ventilation fans on low power to provide an air flow may be beneficial). Wrist/radial cooling with cool water also aids in core temperature cooling but acts more slowly than the methods identified above.

PART B-9

Emergency arrangements

Key elements

- 6B9.1** This Part details the procedures that BA wearers should adopt when they require emergency assistance.
- 6B9.2** The standard evacuation signal is repeated short blasts on an Acme Thunderer whistle which should be repeated by command line managers throughout the risk area. Alternatively, radio messages should be used where whistles may not be heard.
- 6B9.3** Consideration must be given to the provision of suitable and sufficient emergency arrangements on all occasions that BA is deployed at incidents.
- 6B9.4** The full nature and extent of those emergency arrangements should be proportionate to all reasonably foreseeable risks to BA wearers, in accordance with the principles (and subject to any relevant minimum provisions) set out in this guidance.
- 6B9.5** Due to the potential additional resource implications, Incident Commanders must consider the provision of BA emergency arrangements (including the potential need for BA emergency teams), during the initial stages of Fire and Rescue Service operations and as part of their overall operational plan.
- 6B9.6** Entry control arrangements for BA emergency teams must not be any less than those for wearers already committed into the risk area.
- 6B9.7** All emergency teams should be equipped with appropriate communications equipment. Additional guidance on the preparation and planning necessary when considering the requirements and suitability of emergency arrangements can be found in the *Health and Safety Executive publication Confined Spaces Regulations 1997, Regulation 5, Emergency arrangements*.

Guiding principles

- 6B9.8** The purpose of this Part is to provide guidance in regards to BA emergency arrangements, including the provision of BA emergency teams and the criteria for their deployment into a risk area.
- 6B9.9** The purpose of emergency procedures is to provide for effective arrangements for prompt and effective emergency assistance to BA wearers in distress.

- 6B9.10** The need for emergency teams will largely depend on the nature of the risk and the situation that is being dealt with. Emergency arrangements should always be a consideration of the Incident Commander each time BA is deployed, but the nature and scale of those arrangements is driven by the risk presented to the firefighters.

Responsibilities

Fire and Rescue Service Command and Control

- 6B9.11** On receipt of a BA emergency message, Fire and Rescue Service Control will mobilise as a minimum:
- one further fire fighting pumping appliance, and
 - make a request for the attendance of the Ambulance Service.

Incident Commander

- 6B9.12** The Incident Commander should regard this mobilisation as a minimum provision. The full nature and extent of the emergency resources requested from the incident ground should be suitable and sufficient to meet any emerging requirements and/or reasonably foreseeable risks.

BA wearer in distress

- 6B9.13** BA wearers should indicate that they are in distress by operating the distress signal unit. Such action should be taken if there is a risk to life or severe injury to any BA wearers in the BA team; if the BA team feel they cannot evacuate safely from the incident by their own unaided efforts; or if they are unable to trace their route to their exit point.
- 6B9.14** In such circumstances, the BA wearer, or their BA Team Leader or colleague, should consider the following actions:
- inform the entry control point, including the phrase 'BA emergency'
 - establish communications with the entry control point and inform them of the situation, current location and intentions
 - where possible, retrace steps to the entry control point
 - carry out gauge checks and inform the entry control point of cylinder pressures (in those cases where telemetry equipment would not deliver such information automatically)
 - carry out a risk assessment and decide whether it is appropriate to remain at current location or to locate to a safe waiting area
 - if unable to retrace steps to the exit, locate an alternative exit, eg window/door, in the immediate vicinity and attempt to attract attention

- where appropriate, adopt 'entrapped procedures' to conserve air whilst awaiting rescue
- operate the distress signal unit of any persons affected (in the unlikely event that a distress signal unit fails to activate, the device of another member should be operated).

6B9.15 Where a distress signal unit has activated accidentally, the BA Team Leader should inform the entry control point. A decision should then be made as to whether the team should return to the entry control point or whether another team is deployed into the risk area with a distress signal unit key to reset the unit.

BA TEAM/S IN A RISK AREA ON HEARING A DISTRESS SIGNAL UNIT

- contact should be made with the entry control point to inform them that a distress signal unit alarm is audible (BA Team Leaders will need to consider that communication with the entry control point could be difficult in close proximity to the activated distress signal unit)
- on hearing the distress signal unit from another team within a risk area, BA Team Leaders should instigate a gauge check to determine if sufficient air reserves exist within the team to investigate the source and render assistance
- rendering assistance to a BA team in distress should take precedence over existing tasks, unless it is determined that their activities are risk critical and if uncompleted may compromise the safety of other BA wearers within the risk area
- entry control point should be informed of the intentions of the BA team
- the BA team should not take unnecessary risks, such as entering large or complex areas without the means to retrace their steps.

BA EMERGENCY TEAM ON LOCATING DISTRESSED BA WEARER/S

- silence the distressed BA wearer's distress signal unit to improve communications – The distress signal unit must remain active following silencing
- obtain verbal confirmation from distressed wearer/s into the nature of the emergency (if possible)
- inform entry control point that the distressed wearer/s have been located and request further support BA teams for assistance as required
- take gauge readings of distressed wearer/s
- take gauge readings of BA emergency team
- render any on scene emergency assistance as required
- following an assessment of risk, determine and implement a safe action plan to remove distressed wearer/s from the risk area.

Procedural guidance

- 6B9.16** Pre-planned BA emergency procedures will facilitate the provision of suitable and sufficient emergency arrangements at an incident, which will significantly enhance the safety of operational BA wearers, in case of emergency.
- 6B9.17** Effective BA emergency procedures will provide for prompt assistance to BA wearers who may be in distress and/or require emergency assistance whilst within the risk area.
- 6B9.18** The provision of suitable and sufficient BA emergency arrangements will require appropriate additional resources to be readily available at the incident and Incident Commanders should take this into account when determining incident resourcing and their operational tactics.
- 6B9.19** In those situations where BA emergency teams are established, the deployment of those teams should be considered when any of the following conditions arise, or have the potential to arise, subject to an appropriate assessment of risk by the person responsible for the entry control point:
- any wearer fails to return to the entry control point by the time calculated as the point at which their low pressure warning device will activate and cannot be contacted by any means to confirm their safety and well-being
 - a distress signal is either heard or received by a telemetry device – unless it can be immediately confirmed that it is due to accidental activation
 - where audible or visual indicators suggest a BA wearer appears to be in distress or imminent danger
 - prolonged and unexplained breakdown in communications (Part B-3)
 - at the request of a BA wearer within the risk area.
- 6B9.20** Subject to the nature of the BA emergency situation presented and to ensure suitable protection of the BA emergency team, the person responsible for the BA entry control point may determine the need to establish full, additional BA deployment operations. This may consist of, not only the initial BA emergency search and rescue team, but firefighting, fire/vapour/gas-suppressant, hose-management, and assistant casualty-handling BA team/s.
- 6B9.21** Where BA wearers require (or appear to require) emergency assistance, the person responsible for the supervision of the entry control point should take immediate steps to contact all BA teams within the risk area to determine which BA wearer/s or team/s is/are in distress. Where available, the use of radios, telemetry or other means of electronic communications will assist in the identification of the team/wearers.
- 6B9.22** The person responsible for the entry control point should then provide the other BA teams in the risk area with information, which may allow them to assist with the affected wearers' safe egress from the risk area.

NOTE: None of the above should preclude anyone with responsibilities or duties at the entry control point from initiating a radio assistance message, 'BA emergency', where necessary and based upon the above criteria.

6B9.23 Once a BA emergency has been declared, Fire and Rescue Service Control must be informed immediately. The radio message must include the key phrase 'BA emergency'.

Emergency arrangements

6B9.24 Establishment of BA entry control should include the consideration and provision of suitable and sufficient emergency arrangements. Notwithstanding the minimum emergency requirements detailed for Stage II BA entry control (see para 6B9.27 below), the nature and extent of these arrangements must be determined in line with the operational plan and therefore, be suitable, sufficient and proportionate to the risks presented and all reasonably foreseeable BA emergency events.

6B9.25 In the case of Stage II BA entry control these arrangements will include and in all other cases may include the provision of BA emergency teams and equipment, such as firefighting media and first aid items, at each entry control point.

6B9.26 Where the provision of BA emergency team/s are deemed appropriate under BA entry control procedures other than Stage II, steps should be taken to ensure such provision at the earliest available opportunity. The full nature and extent of these emergency arrangements will be dictated by the prevailing circumstances and determined on the basis of risk.

6B9.27 Below is a summary of minimum BA emergency arrangements requirements:

STAGE I BA ENTRY CONTROL

- Incident Commander must give consideration to the provision of BA emergency arrangements on all occasions where BA is to be deployed
- BA emergency arrangements must be suitable and sufficient to meet all reasonably foreseeable requirements and determined on the basis of risk assessment
- these may or may not involve the provision of BA emergency team/s
- where the provision of BA emergency team/s is preferred, they should be provided at the earliest available opportunity
- however, where the provision of standby BA emergency teams is considered necessary, but resources available are insufficient to afford immediate provision, the Incident Commander should give serious consideration toward adopting 'defensive' tactical mode of operations at the incident, pending the arrival of additional resources.

STAGE II BA ENTRY CONTROL

- Incident Commander must give consideration to the provision of suitable and sufficient BA emergency arrangements on all occasions where BA is to be deployed
- the full extent of the BA emergency arrangements must be determined on the basis of risk assessment
- the minimum provision in all cases under Stage II will be at least one BA emergency team at each and every BA entry control point, rigged and standing by throughout the period that BA is in use
- a separate BA entry control board/telemetry board should be provided to accommodate the deployment of additional BA teams as BA emergency team/s and marked accordingly at the BA entry control point.

6B9.28 **NOTE:** Minimum requirements for BA emergency team provision:

- a minimum of two BA wearers will be required for every emergency team
- however, the number of members of the BA emergency team must be at least equal to that of the largest BA team deployed within the risk area from that entry control point
- BA emergency team/s will be equipped with cylinders of at least equivalent maximum duration to the BA of the wearers committed to the risk area for which the entry control point is responsible.

BA emergency team/s – contingency and stand-by arrangements

6B9.29 When determining BA emergency arrangements and BA emergency team stand-by provisions at the BA entry control point, the planning and contingency process should take account of all reasonably foreseeable risks and eventualities.

6B9.30 Contingency planning should include the provision of suitable protection arrangements for BA emergency teams and should also take into consideration the extreme physiological demands placed on BA wearers tasked with assisting or rescuing BA wearer colleague/s in distress.

6B9.31 In accordance with the good practice guidance toward affording BA team/s suitable protection when entering risk areas comprising potentially flammable, explosive or otherwise hazardous environments, as detailed elsewhere within this guidance (see particularly, Part B-5 and Part B-8), consideration should be given to the protection and support arrangements for BA team/s deployed in an emergency capacity into the risk area.

6B9.32 Where BA emergency teams are provided, they will stand by in close proximity to the entry control point and receive regular and relevant update information, such as briefings given to BA teams, layout of the risk area, details of areas searched, etc.

- 6B9.33** The level of personal protective equipment provided for the BA emergency team will be determined by the requirements of the incident and risk assessment. However, emergency teams must be equipped with at least the same standard of personal protective equipment as those wearers committed into the risk area.
- 6B9.34** BA emergency team/s personnel should rig (but not don or start up) in BA and standby at the entry control point and remain available for immediate deployment, until instructed otherwise (i.e. either deployed or stood down).
- 6B9.35** In order to take account of BA wearers' welfare and physiological readiness for deployment, account should be taken of ambient temperatures and weather conditions when deciding upon the standard of dress and other provisions necessary for the BA emergency team whilst standing-by (See Part B-8 for further information on BA wearer welfare).

BA emergency team composition

- 6B9.36** The number of BA wearers making up the BA emergency team, as well as the number of BA emergency teams, should be suitable and sufficient to complete all reasonably foreseeable emergency tasks.
- 6B9.37** The number of BA wearers making up BA emergency teams must be at least equal to that of the largest team deployed or likely to be deployed from that entry control point into the risk area.

Equipping of BA entry control point

- 6B9.38** A separate BA entry control board/telemetry board should be provided at the BA entry control point, readily available to accommodate the deployment of BA emergency team/s.
- 6B9.39** Additionally, the person responsible for the BA entry control point should ensure the provision of any additional equipment that might be needed for use by BA emergency team/s and that such equipment is tested and ready for immediate use.

Equipping of BA emergency teams

- 6B9.40** The BA emergency team shall be provided with such equipment considered to be suitable and sufficient to meet the needs of all reasonably foreseeable emergency events.
- 6B9.41** All equipment that might be required by the BA emergency team must be tested and assembled and readily available for immediate deployment.
- 6B9.42** The cylinder capacity and duration of the BA sets of the BA emergency teams must be at least equivalent to the highest capacity and duration of the BA wearers deployed within the risk area for which the emergency arrangements are deemed to apply.

- 6B9.43** In particular, consideration should be given to the provision of the following equipment for BA emergency teams:
- radio communications
 - a means of providing a supplementary air supply to a BA wearer
 - any other specialist equipment provided for this purpose (eg thermal imaging camera).
- 6B9.44** Other equipment that may be provided could include such items as distress signal unit key – for the purposes of silencing the distress signal unit within the risk area and improving communications at the scene, drag mats, breaking-in gear, etc.

Deployment of BA emergency team/s

- 6B9.45** The person responsible for the entry control point is responsible for the instigation of emergency procedures and/or the deployment of emergency teams, including BA emergency team support arrangements (as detailed above).
- 6B9.46** The person responsible for the entry control point is therefore also responsible for all other elements of entry control procedures in relation to BA emergency team deployment. Including briefing and debriefing BA emergency team/s and maintaining a suitable record of all relevant operational and risk information, decisions made, tasks given to BA emergency teams and any other relevant information.
- 6B9.47** BA emergency team call signs will identify both the entry control point from which they are deployed and their emergency team status. For example, BA team Alpha Emergency – one, BA team Bravo Emergency – one, etc.
- 6B9.48** Following the deployment of any BA emergency team, arrangements must immediately be made for the provision of replacement BA emergency teams.
- 6B9.49** This deployment should take account of and afford protection to the BA emergency team/s as well as any BA wearers in distress.
- 6B9.50** BA emergency team deployment should also be recorded on a separate, new BA entry control board/telemetry board, and marked “BA emergency team/s”.
- 6B9.51** Prior to deployment into the risk area, the person responsible for the entry control point should suitably brief BA emergency teams. Wherever possible, all appropriate entry control point team members should be present for this briefing. The BA emergency team briefing should include:
- any relevant information, regarding, for example, the BA team size, route, tasks, last known locations
 - all hazards identified during the risk assessment process

- control measures which should be used for the protection of the BA emergency team/s
- specific details of their task
- any other relevant information.

6B9.52 In accordance with the briefing protocol outlined in Part B-3, the brief should be repeated by the BA emergency team leader and acknowledged by the person giving the briefing to ensure confirmation of understanding of the whole BA team.

Additional considerations

Summoning assistance

6B9.53 Radio communications should be utilised wherever possible to summon assistance.

6B9.54 If radio communications are not in use, BA wearers may gain the attention of other team members or BA teams by loud, slow and regular hand clapping (These actions do not constitute a distress signal).

Entrapped procedure

6B9.55 The aim of the entrapped procedure is to allow a BA wearer to maximise the duration of the available air in their BA set, in the event of becoming trapped or being unable to withdraw from the risk area.

6B9.56 No provision exists for conserving the air supply in an open circuit BA set other than by the wearer moderating demand for air by using the least possible energy. When the BA wearer becomes aware that it is not possible to escape the risk area the following actions should be taken:

- contact the entry control point by radio (if possible)
- operate the distress signal unit
- relax as much as possible in the circumstances by assuming a reclined or seated posture
- breathe calmly and gently to minimise air usage.

6B9.57 Any supplementary air supply function should not be operated. The cylinder valve should not be adjusted, other than to check that it is fully open.

6B9.58 Once the safety margin has been reached the low-pressure warning device will operate. In the case of an air-operated low-pressure warning whistle device, the air consumed is minimal. Electronic low-pressure warning devices do not use any air to operate.

Distress to wearer procedure

- 6B9.59** Incidents may occur when a BA set fails, resulting in distress to wearer. Under the *Reporting of Injuries, Diseases and Dangerous Occurrences Regulations* (RIDDOR 1995) 'any malfunction of BA while in use or during testing immediately prior to use in such a way that had the malfunction occurred while the apparatus was in use it would have posed a danger to the health and safety of the user must be reported to the Health and Safety Executive.
- 6B9.60** Malfunctions that arise during routine maintenance are not reportable under RIDDOR.
- 6B9.61** The term malfunction does not include leakage into a facemask due to poor face fit or a failure arising from an external source, such as falling debris or entanglement.
- 6B9.62** All distress to wearer situations should be properly investigated and may be reportable to the Health and Safety Executive under RIDDOR 1995.

APPLICATION OF THE DISTRESS TO WEARER PROCEDURE:

- immediately impound the BA set
 - complete any administration relevant to the investigation
 - place the BA set and relevant administration into a tamper proofed container, which should then be sealed and labelled
 - inform incident commander and fire and rescue service command and control
 - secure the BA set in a safe place until a full investigation can be carried out by a competent person.
- 6B9.63** There are specific additional BA emergency arrangements in relation to the use of airlines (see Part B-7 in connection with airlines).

Impounding a BA set

- 6B9.64** In order to ensure that a thorough investigation of any set malfunction can be undertaken, the Incident Commander must ensure that appropriate action is followed when impounding a BA set.
- 6B9.65** The following action must therefore be carried out:
- Impound the BA set and place it in a large plastic bags including:
 - the BA tally
 - the facemask
 - the cylinder
 - the log book.

6B9.66 Record the following information:

- the cylinder pressure prior to closing the cylinder valve
- the precise number of turns required to close the cylinder valve
- the time the wearer entered the incident
- the time the wearer left the incident
- any other information regarding the condition of the set that is obvious, without carrying out a detailed inspection
- any remarks made by the wearer or other members of the BA team.

6B9.67 This information could be recorded either on the 'remarks' column of the entry control board or in a notebook. Contemporaneous notes should then be made by the wearer (if possible); BA team; Incident Commander and other witnesses.

6B9.68 A full investigation should then be carried out by an appropriately qualified officer.

6B9.69 The Fire and Rescue Service must then report the dangerous occurrence to the Health and Safety Executive.

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PART B-10

Interoperability

Key elements

- 6B10.1** This Part provides guidance for the interoperability of BA command and control procedures between Fire and Rescue Authorities, and to provide a common framework for safe and effective systems of work when working alongside the other emergency services and, wherever possible, other public sector, private and commercial fire and rescue organisations.
- 6B10.2** Further, the *National Police Improvement Agency Guidance on Multi-Agency Interoperability*⁴ describes the purpose of interoperability as “to increase public and personnel safety through improved multi-agency communication and coordination”.

Fire and Rescue Services National Framework⁵ Chapter 1 Safer Communities

- 6B10.3** Each Fire and Rescue Authority must produce an integrated risk management plan that identifies and assesses all foreseeable fire and rescue related risks that could affect its community, including those of a cross-border, multi-authority and/or national nature.
- 6B10.4** Fire and Rescue Authorities must collaborate with other Fire and Rescue Authorities to deliver interoperability.
- 6B10.5** Interoperability between Fire and Rescue Authorities includes, but is not limited to:
- compatible communications systems, control rooms and equipment
 - common command and compatible control and co-ordination arrangements
 - effective information, intelligence and data sharing
 - compatible operational procedures, and guidance with common terminology
 - compatible training and exercising (both individually and collectively)
 - cross border working with other English Fire and Rescue Authorities and those in the devolved administrations.

⁴ NPIA Practice Improvement: Guidance on Multi-Agency Interoperability 2009 (National Policing Improvement Agency, on behalf of Ambulance Chief Executive Group, Chief Fire Officers Association, and Association of Chief Police Officers)

⁵ DCLG Fire and Rescue National Framework for England 2012

- 6B10.6** Fire and Rescue Authorities should review the effectiveness of ‘cross-border’ integration arrangements with neighbouring authorities and set these out appropriately in their integrated risk management plans.

Civil Contingencies Act 2004

- 6B10.7** Each local resilience forum area is required to co-operate with other ‘Category 1 responders’ to ensure there is an effective approach to ‘emergency preparedness’ and ‘emergency response and recovery’.
- 6B10.8** For further information refer to *Incident Command Manual, Chapter 3: Command within the United Kingdom Resilience Framework*.⁶

Category 1 responders liaising at the scene



Guiding principles

Cross-border working and interoperability between Fire and Rescue Services

PRE-PLANNING

- 6B10.9** Large-scale events have re-emphasised the importance of well integrated services across authority boundaries and the evidence for the potential gains in effectiveness and efficiency this can help deliver is clear. In taking forward development of their integrated risk management plans authorities need to ensure their plans and operational practices are properly integrated with their neighbours and consider the joint resources they have available to respond to incidents of every type and size. The implementation of the National Resilience programme also supports this.⁷

⁶ HM Government Fire and Rescue Service Manual, Vol. 2, Fire Service Operations: Incident Command. 3rd Edition, 2008.

⁷ National Framework, *ibid*.

- 6B10.10** In response to events, a framework was developed through partnership consultation across the blue light services around the United Kingdom. Produced by the National Policing Improvement Agency on behalf of the Ambulance Chief Executive Group, the Chief Fire Officers Association, the Association of Chief Police Officers and the Association of Chief Police Officers in Scotland, the resulting document *Guidance on Multi-agency Interoperability* was published in 2009.⁸ This guidance contains principles that may also be used by other category one and two responders under the *Civil Contingencies Act 2004*.
- 6B10.11** The joint guidance introduces the notion of an ‘interoperability continuum’, based on the five capabilities of:
- Governance
 - Standard operational procedure
 - Technology
 - Training and exercises
 - Usage.
- 6B10.12** Focussing on the development of common and integrated common operating picture/standard operational procedures across the emergency services, it is therefore, suggested that this guidance represents the benchmark standard and the basis for all BA command and control procedures.

Responsibilities

Multi-agency interoperability

- 6B10.13** The following should also be considered in the development of enhanced interoperability and safe and effective working between Fire and Rescue Services, with other emergency services and with other industries and organisations:
- mutual understanding
 - familiarity and trust
 - experience and expertise in relation to command and control involving multiple agencies
 - familiarity with organisation’s culture and structures
 - terminology and key individuals
 - training and exercising together
 - organisations are equipped with the necessary skills and attributes to respond with professionalism at all levels.

⁸ NPIA Guidance on Multi-Agency Interoperability, *ibid*.

Procedural guidance

Fire and rescue operations involving the use of BA

6B10.14 Each Fire and Rescue Service should ensure effective procedures for interoperability in fire and rescue operations involving BA, particularly with neighbouring Fire and Rescue Authorities and wherever, possible, all other UK Fire and Rescue Authorities.

Entry control procedures between neighbouring Fire and Rescue Services

6B10.15 BA teams should be assembled with wearers utilising the same specification and duration BA. Wearers from different fire and rescue services must not be formed into teams unless they are wearing exactly the same specification BA equipment and follow the same procedures.

6B10.16 Where telemetry or other electronic systems are not available, BA wearers must ensure that they highlight their maximum cylinder capacity and duration to the person responsible for the entry control point to ensure the correct duration table is utilised as the planning basis for time of whistle/low pressure warning device or other earlier return time to the entry control point.

6B10.17 Any radio communications should be compatible between all wearers in a BA team and the entry control point, but at least between the BA Team Leader and the entry control point.

6B10.18 BA wearers from neighbouring Fire and Rescue Services, which use the same specification BA sets and associated equipment, may insert their BA tallies (where used) into each others' BA boards at an incident, where a suitable pre-planning agreement is in place and sufficiently tested and exercised (see Part B-1).

Category 1 responders co-operation at scene



Working with the other emergency services

THE POLICE SERVICE

6B10.19 Within each Police Service there are units who are trained to use respiratory protective equipment as part of their working practices. Her Majesty's Inspectorate of Constabularies and The National Police Improvement Agency identified the need for the Police Service to be able to operate in a potentially contaminated environment following chemical, biological, radiation, nuclear explosive (CBRN(E)) incidents. This has led to the Agency providing for the centralised training of dedicated teams being formed and trained in the use of CR1, BA and gas tight suits.

6B10.20 Other areas of the Police Service's work requiring respiratory protective equipment capability are:

- entering known 'drug factories' where the use of hazardous chemicals are expected
- working in underground train systems to gather evidence following or to prevent serious incidents
- work conducted by the Serious Organised Crime Agency (SOCA)
- work conducted by Specialised Fire Arms Units.

6B10.21 Appropriate nationally determined safe systems of work protocols based on this guidance, and specifically developed for interoperability with the Police Service, should be complied with, in the determination of local operational procedures.

THE AMBULANCE SERVICE AND HAZARDOUS AREA RESPONSE TEAMS (HART)

6B10.22 The Government document *Emergency Response and Recovery* states that the Ambulance Service should endeavour to sustain life through effective emergency treatment of casualties. To meet this obligation especially in a chemical, biological, radiological and nuclear explosives scenario, the Department of Health introduced the Ambulance Service Hazardous Area Response Teams. These teams will work along side the Fire and Rescue Service and the Police Service within the inner cordon of an incident and provide medical support to casualties involved in the following types of incidents:

- chemical, biological, radiological and nuclear explosives and other hazardous materials incidents
- large fires
- transport incidents involving casualties
- suspicious drug manufacturing or suspected terrorist weapon manufacture
- support to the military during operations in the UK
- firearms incidents
- certain public order incidents.

6B10.23 Appropriate nationally determined safe systems of work protocols, based on this guidance, and specifically developed for interoperability with the Ambulance Service and its hazardous area response teams, should be complied with, in the determination of local operational procedures.

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PART B-11

National Resilience

Key elements

6B11.1 The principles and frameworks established within this guidance for a safe system of work in the command and control of BA should be followed in all situations and circumstances that BA is deployed.

Operational use of BA at National Resilience incidents

6B11.2 Incidents where National Resilience capabilities are deployed may require BA to be worn by Fire and Rescue Service personnel undertaking mass decontamination, detection identification and monitoring, urban search and rescue and related roles.

6B11.3 At such incidents, the BA deployed will be that provided and maintained by local authority Fire and Rescue Authorities.

6B11.4 Command and control of BA operations at such incidents should be carried out with strict adherence to Fire and Rescue Service policy.

Guiding principles

6B11.5 This Part outlines the advantages conferred from the adoption of common practices; safe systems of work; and interoperability between Fire and Rescue Authorities, other emergency services and others in the command and control of BA operations, toward enhancing National Resilience.

6B11.6 This guidance therefore, applies to all areas of Fire and Rescue Service pre-planning, preparedness and operational response activity, including the command and control of BA used in conjunction with the deployment of Fire and Rescue Service National Resilience capabilities.

6B11.7 Consistency in adherence to an agreed national safe system of work for the deployment and command and control of BA, for all operational activity, contributes toward both the safety and effectiveness of BA operations and the enhancement of national emergency preparedness, response and resilience.

National Resilience capability assets

6B11.8 The delivery of enhanced capabilities by the UK Government's New Dimension Project has equipped UK Fire and Rescue Services to resolve catastrophic incidents requiring a response coordinated and resourced at national level. The

capabilities of mass decontamination; detection, identification and monitoring; urban search and rescue; high volume pumping; and enhanced logistics support, now operate as 'National Resilience'.

Additional considerations

Further guidance

6B11.9 For all operations involving National Resilience capabilities, the National Resilience Assurance Team issues tactical guidance documents and standard operational procedures on behalf of Communities and Local Government (DCLG).

6B11.10 These ensure that national standards are met and good practice is followed by giving clear instructions on the specific procedures to be adopted at incidents where National Resilience resources are deployed. These documents are designed to complement and enhance existing Fire and Rescue Service guidance (such as this operational guidance) therefore mitigating risk to personnel and promoting interoperability between Fire and Rescue Authorities.

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Section 7

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See also, Section 8: Legal Framework.

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National Guidance Literature Review – Record of obsolete, superseded and extant BA guidance

- a English national guidance relating to BA deemed obsolete, due to their being earlier repealed or superseded, or now deemed not operationally or technically relevant, and hereby withdrawn
- b English national guidance relating to BA hereby deemed obsolete and withdrawn, by virtue of being subsumed into or superseded by this operational guidance
- c English national guidance relating to BA remaining extant
- d English national guidance, relating to other respiratory protective equipment and/or other operational guidance projects, remaining extant (but not specifically considered within this guidance)
- e Summary of identified relevant support research documents.

(A) Due diligence: National guidance literature review – record of obsolete, superseded and extant BA guidance

English National Guidance relating to BA deemed obsolete, due to their being earlier repealed or superseded, or now deemed not operationally or technically relevant, and hereby withdrawn.

| Type of Guidance | Document Title |
|------------------|---|
| FSC 32/1960 | Selection of BA wearers |
| DCOL 571/1961 | Oxygen for BA |
| DCOL 595/1961 | Air compressors for BA |
| DCOL 46/1965 | Ultra lightweight cylinders for compressed air BA |
| FSC 49/1966 | Self contained BA and distress signal warning device for use with BA |
| DCOL 07/1966 | Charging BA cylinders |
| DCOL 21/1967 | Compressed air BA |
| FSC 19/1969 | Operational procedure for use with BA |
| DCOL 50/1970 | BA distress signal units |
| FSC 40/1970 | Operational procedure for use with BA tallies and duration tables for compressed air sets |
| FSC 11/1971 | BA distress signal units classification of sizes of fires |
| FSC 16/1972 | Care and maintenance of service pattern respirators |
| FSC 03/1975 | BA – British standards and joint testing memorandum |
| DCOL 28/1975 | 'Figaro' Low Frequency Fireground Communication System |
| FSC 38/1975 | The recharging of firemen's BA cylinders |
| DCOL 09/1975 | BA British Standards and Joint Testing Memorandum |
| DCOL 49/1975 | BA – British Standards and Joint Testing Memorandum |
| DCOL 71/1975 | BA British Standards and Joint Testing Memorandum |
| DCOL 37/1976 | A. BA – British Standards and Joint Training Memorandum |
| DCOL 28/1976 | BA British Standards and Joint Testing Memorandum |
| DCOL 55/1976 | Inspection and testing of ultra lightweight BA cylinders to specifications LASW 1 |
| DCOL 50/1976 | Directorate of Telecommunications FSC FC/DT/76/1 dated 3 June 1976 (Telecommunications systems developments and forecast requirements for additional radio equipment) Item 13 Personal radio for use with BA (Figaro) |
| DCOL 27/1977 | British Standards and joint testing memorandum – BA |
| DCOL 26/1978 | Inspection and testing of ultra lightweight BA cylinders |
| DCOL 13/1978 | BA British Standards and Joint Testing Memorandum 1. Aga 2111 CABA |
| DCOL 62/1978 | BA British Standards and Joint Testing Memorandum 1. Siebe Gorman Airmaster Mk.II CABA |
| DCOL 42/1978 | 2. Inspection and testing of ultra lightweight BA cylinders |

| Type of Guidance | Document Title |
|---------------------|---|
| DCOL 10/1979 | BA British Standards and Joint Testing memorandum 1. Chubb no.1 Mk.II CABA |
| FSC 10/1979 | B: Tabard for BA officers |
| DCOL 23/1980 | BA British Standards and Joint Testing Memorandum |
| DCOL 03/1985 | B. BA entry control board watches |
| DCOL 04/1989 | B. Periodic inspection and test of BA cylinders |
| MOF Bk 6 | Manual of Firemanship book 6 BA and resuscitation |
| FSC 07/1990 | 4. Approval of BA |
| FSC 06/1990 | C. Approval of BA |
| DCOL 06/1992 | 2. Radio equipment for use with BA |
| DCOL 09/1992 | Minor amendment of DCOL 6/1992 |
| TB 1/1994 | Periodic inspection and testing of fire service equipment |
| DCOL 12/1996 | D. Electric lamp for fire brigade use with BA – Home Office specification JCDD/21 |
| DCOL 02/1999 | C. Periodic inspection and testing of BA and other gas cylinders |
| DCOL 06/2001 | E. BA facemask fit – interim guidance |
| DCOL 02/2001 | E. Inspection and testing of BA cylinders |
| DCOL 18/1980 | Siebe Gorman Airmaster MK 2 BA |
| DCOL 20/1980 | Siebe Gorman Airmaster MK 2 BA |
| DCOL 36/1977 | Ultra lightweight cylinders |
| DCOL 40/1974 | Cylinders for BA |
| MOF Pt6A Chap 32(2) | Obsolete – CFOA RPG Minutes 27/01/10 |
| FSC 08/1976 | Chemical Decontamination Procedures for Personnel and Equipment Obsolete – replaced by FSC 10/1981 |
| DCOL 27/1977 | MOF Book 3 BA introduced |
| JCDD 19/1 | Distress signal warning device for use with BA |
| JCDD 38 | Requirement specification for automatic distress signal unit |
| DCOL 05/1991 | 5. Ultra lightweight cylinders for BA |

(B) English National Guidance relating to BA hereby deemed obsolete and withdrawn, by virtue of being subsumed into or superseded by this operational guidance

| Type of Guidance | Document Title |
|------------------|--|
| DCOL 10/1991 | Item 7: Fireground Communications: The Certification of Intrinsically Safe Radio Equipment |
| DCOL 09/1994 | B. The wearing of BA by paramedics |
| DCOL 08/1995 | A. Radio equipment for use with BA |
| FSC 27/1975 | Report of the joint working party on incidents in pressurised atmospheres |
| TB 1/1997 | Technical Bulletin 1/97: BA Command and Control Procedures |

| Type of Guidance | Document Title |
|------------------|--|
| DCOL 08/1997 | O. Introductory Cover, re. TB1/1997: BA Command and Control Procedures |
| DCOL 02/2003 | A. BA facemask fit – further guidance |
| DCOL 02/2004 | Item C. BA facemask fit |

(C) English National Guidance relating to BA remaining extant

| Type of Guidance | Document Title |
|----------------------------|--|
| DCOL 31/1971 | The use of BA by men with beards or sideburns |
| TB 1/1972 | Problems Associated with Fire Service Operations in Pressurised Atmospheres |
| FSC 33/1972 | Use of BA by firemen with beards and/or sideburns |
| FSC 22/1974 | Training of firemen in BA |
| DCOL 87/1976 | Fire Service Technical College Brigade Instructors' Courses 1977/78 BA Instructors' Courses 1977/78 |
| FSC 08/1981 | Training of firemen in BA |
| FSC 11/1981 FSC 11/1991 | Analysis of fire service training requirements objectives for the BA Instructors' Course and the Road Traffic Accident Instructors' Course |
| JCDD 19/2 | Requirement specification for cable communication equipment for use with BA |
| DCOL 04/1988 | Fireground Communications – Further Guidance on the Procurement and Use of Radio with BA |
| FSC 09/1989 | 2. BA and fire training premises |
| JCDD 39 | Specification for a manually operated evacuation signal unit (ESU) |
| DCOL 05/1994 | B. Specification for a manually operated evacuation signal unit (ESU) |
| DCOL 03/1995 pt C | C. The use of BA by HM Customs and Excise staff |
| DCOL 03/1995 pt B | B. The use of BA in confined spaces (training reference) |
| DCOL 09/1996 | e. Guidance on the Application of Risk Assessment in the Fire Service |
| FSM Vol 1 | Fire Service Manual Volume 1 Fire Service Technology Equipment and Media |
| DCOL 01/2001 | H. BA – quality of breathing air |
| MAOEFRaRC | Medical and Occupational Evidence for Recruitment and Retention Code |
| FSC 27/2005 | Periodic inspection and testing of BA cylinders |
| FSC 64/2006 | Periodic inspection and testing of BA cylinders (2) |
| FSC 31/1960 | Unable to locate – remains Extant |
| DCOL 14/1980 | Training of firemen in BA |

| Type of Guidance | Document Title |
|---|---|
| DCOL 9/1996 | Item B Telemetry & Item C Tacvent |
| FSC 15/1977 | Analysis of Fire Service training requirements |
| FSC 17/1970 | Basic training of wholetime men |
| FSC 17/1979 | Analysis of Fire Service training requirements |
| FSC 18/1980 | Analysis of Fire Service training requirements |
| FSC 2/1971 | Basic training of part-time (retained) men |
| FSC 47/1978 | Analysis-of-Fire-Service-Training-Requirements |
| FSC 8/1977 | Operational Procedures for the use of BA |
| MOF Bk 2 Chap 11 | Lines used in the Fire Service |
| MOF Bk 3 Chap 11 Sect 4 Sub-section 6 & 7 | Entering the compartment and Hazards in the HX Foam |
| TB 1/1993 | Operational incidents in tunnels and underground structures |
| FSC 10/1976 | MOF Bk 10 – Building Construction & Fire Protection Introduced |
| JCDD 40 | Radio telemetry at incidents |
| DCOL 04/2000 | Fire Brigade Inter-operability |
| DCOL 6/1986 | Review of the use of Personal Radio |
| DCOL 06/1983 | D. Safe Working with High Expansion Foam |
| MOF Bk 11 Chap 4 | Fighting the Fire |
| BS 10999 – 2010 | Specification for distress signal units for the fire and rescue service |

(D) English National Guidance, relating to other respiratory personal equipment and/or other operational guidance projects, remaining extant (i.e. not specifically considered within this guidance)

| Type of Guidance | Document Title |
|------------------|---|
| TB 2/1971 | Fires involving fertilisers |
| TB 1/1973 | Identification of fertilisers involved in fires. Ammonium nitrate fertilisers |
| DCOL17/1976 | Respirators issued to fire brigades for protection against radio-active dust |
| DCOL 40/1979 | A. Respiratory hazards to firemen from incidents on farms |
| FSC 10/1981 | Chemical decontamination procedures for personnel and equipment |
| TB 1/1971 | Fires involving fertilisers |
| TB 2/1993 | Incidents involving radioactive material |
| FSC 33/1973 | Working Party – Hazardous freight |

(E) Summary of identified supporting Research Documents

| Type of Guidance | Document Title |
|--|---|
| FRDG 13/1996 | Study of the Physiological Effects of Wearing BA |
| FRDG 05/1997 | Development of a revised BA guideline system |
| FRDG 11/94 | An investigation into a high technology alternative to BA guidelines |
| Fire and Rescue Service Circular 55/2004 | The Building Disaster Assessment Group – Key Research Findings, 8th December 2004 |
| Fire Research Technical Report 1/2005 | Operational Physiological Capabilities of Firefighters: Literature Review and Research Recommendations |
| Fire Research Technical Report 2/2005 | Physiological Assessment of Firefighting: Search and Rescue in the Built Environment |
| Fire Research Technical Report 18/2008 | Core Temperature, Recovery and Re-Deployment a during Firefighting, Search and Rescue Scenario, DGLG, December 2008 |

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Section 8

Legal framework

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Introduction

- 8.1** Fire and Rescue Authorities need to be aware of the following legislation. It is relevant to the command and control of BA at operational incidents and also in the training environment.
- 8.2** Note though that this section does not contain detailed legal advice about the legislation. It is just a summary of the relevant legislation, as applied to Fire and Rescue Authorities, firefighters and respiratory protective equipment. You should confirm with your legal team your Fire and Rescue Authority's compliance with this legislation.

General Fire and Rescue Authority legislation

- 8.3** **Fire and Rescue Services Act 2004:** this is the main Act which affects Fire and Rescue Authorities. Amongst other things, it obliges Fire and Rescue Authorities (in section 7) to secure the provision of the personnel, services and equipment (including BA) that are necessary efficiently to meet all normal requirements and also to secure the provision of training for such personnel.
- 8.4** **Fire and Rescue Services (Emergencies) (England) Order 2007:** The Order obliges Fire and Rescue Authorities to make provision for decontaminating people following the release of chemical, biological, radiological and nuclear contaminants (article 2) and also to make provision for freeing people from collapsed structures and non-road transport wreckages (regulation 3). The Order also obliges Fire and Rescue Authorities that have specialist resources such as chemical, biological, radiological and nuclear or urban search and rescue resources (which may include specialist BA) to use those resources outside their own areas to an extent reasonable for dealing with an emergency (regulation 5).
- 8.5** **Civil Contingencies Act 2004:** Section 2(1) states, among other things, that Fire and Rescue Authorities shall maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur the Fire and Rescue Authority is able to perform its functions so far as necessary or desirable for the purpose of preventing the emergency, reducing controlling or mitigating its effects or taking other action in connection with it.
- 8.6** **The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005:** Fire and Rescue Authorities must cooperate with each other in connection with the performance of their duties under Section 2(1) of the Civil Contingencies Act 2004. In addition, the Regulations state that Fire and Rescue Authorities may facilitate cooperation by entering into protocols with each other (regulation 7), that Fire and Rescue Authorities may perform duties under section 2(1) jointly with one another and make arrangements with one another for the performance of that duty (regulation 8). Such arrangements can include the inter-operability of BA equipment.

8.7 Corporate Manslaughter and Corporate Homicide Act 2007: Whilst this is not part of Health and safety law it is linked to health and safety requirements. Fire and Rescue Authorities will be criminally liable for the death of a person if the way in which they manage or organise their activities (for example in relation to the command and control of BA):

- amounts to a gross breach of the duty of care owed to the person, and
- the gross breach causes a person's death (section 1).

Health and Safety legislation

8.8 Health and Safety at Work etc Act 1974: this Act applies to all employers in relation to health and safety. It is a wide ranging piece of legislation but in very general terms, imposes the general duty on Fire and Rescue Authorities to ensure, so far as is reasonably practical, the health, safety and welfare at work of all of their employees (section 2(1)).

Section 7 requires employees to take reasonable care of themselves and of other persons who may be affected by what they do or fail to do at work.

8.9 Management of Health and Safety at Work Regulations 1999: obliges Fire and Rescue Authorities, amongst other things, to make suitable and sufficient assessment of the risks to the health and safety of firefighters to which they are exposed whilst on duty (regulation 3(1)(a)); to implement any preventive and protective measures on the basis of the principles specified in the Regulations (regulation 4); to make arrangements for the effective planning, organisation, control, monitoring and review of the preventive and protective measures (regulation 5) and to provide such health surveillance as is appropriate having regard to the risks to health and safety which are identified by the risk assessment (regulation 6).

8.10 Provision and Use of Work Equipment Regulations 1998: obliges Fire and Rescue Authorities to ensure that work equipment is constructed or adapted as to be suitable for the purpose for which it is used or provided (regulation 4(1)). Fire and Rescue Authorities must have regard to the working conditions and to the risks to the health and safety of firefighters which exist in the premises in which the equipment (including BA) is to be used and any additional risk posed by the use of that equipment (regulation 4(2)). The Regulations also contain provisions about maintenance, inspection, specific risks, information and instructions and training regarding work equipment.

8.11 Personal Protective Equipment (PPE) at Work Regulations 1992: obliges Fire and Rescue Authorities to ensure that suitable personal protective equipment (including BA) is provided to firefighters (regulation 4(1)). The Regulations contain provisions as to the suitability of personal protective equipment, compatibility of personal protective equipment, assessment of personal protective equipment,

maintenance and replacement of personal protective equipment, storage for personal protective equipment, information, instruction and training regarding the personal protective equipment and the use of personal protective equipment.

- 8.12** Any personal protective equipment purchased by an Fire and Rescue Authority must comply with the *Personal Protective Equipment Regulations 2002* and be 'CE' marked by the manufacturer to show that it satisfies certain essential safety requirements and, in some cases, has been tested and certified by an approved body.

Specific legislation regarding respiratory protective equipment

- 8.13 Control of Substances Hazardous to Health Regulations 2002:** Fire and Rescue Authorities must ensure that the exposure of firefighters to substances hazardous to health is either prevented or, where prevention is not reasonably practicable, adequately controlled (Regulation 7(1)). Where it is not reasonably practicable for Fire and Rescue Authorities to prevent the hazardous exposure of firefighters, Fire and Rescue Authorities must, amongst other things, provide firefighters with suitable respiratory protective equipment (which must comply with the *Personal Protective Equipment Regulations 2002* and other standards set by the Health and Safety Executive). Where respiratory protective equipment is provided to meet the requirements of these Regulations, Fire and Rescue Authorities must ensure that the respiratory personal equipment is properly used; that it is maintained in an efficient state, in efficient working order, in good repair and in a clean condition; that it is thoroughly examined and tested at suitable intervals (Regulation 9 (1) (3)); and that it is properly stored and replaced if defective.
- 8.14 Ionising Radiations Regulations 1999:** Fire and Rescue Authorities must, amongst other things, provide firefighters with adequate and suitable respiratory protective equipment so as to restrict the exposure of firefighters to ionising radiation. Fire and Rescue Authorities who provide respiratory protective equipment pursuant to the Regulations must take all reasonable steps to ensure that it is properly used (regulation 8). Any respiratory protective equipment provided pursuant to the Regulations must comply with the *Personal Protective Equipment Regulations 2002* and other standards set by the Health and Safety Executive (regulation 9). Fire and Rescue Authorities must also ensure that all respiratory protective equipment provided pursuant to the Regulations is thoroughly examined at suitable intervals and is properly maintained; and that it is appropriately stored (regulations 10 and 9 respectively).
- 8.15 Control of Lead at Work Regulations 2002:** Fire and Rescue Authorities must ensure that the exposure of firefighters to lead is either prevented or, where this is not reasonably practicable, adequately controlled. Where it is not reasonably practicable for Fire and Rescue Authorities to prevent the exposure of firefighters to lead, Fire and Rescue Authorities must, amongst other things, provide

firefighters with suitable respiratory protective equipment (which must comply with the *Personal Protective Equipment Regulations 2002* and other standards set by the Health and Safety Executive). Where respiratory protective equipment is provided to meet the requirements of these Regulations, Fire and Rescue Authorities must ensure that the respiratory protective equipment is properly used (regulation 6); that it is maintained in an efficient state, in efficient working order, in good repair and in a clean condition; that it is thoroughly examined and tested at suitable intervals; and that it is properly stored and replaced if defective (regulation 8).

- 8.16 Control of Asbestos Regulations 2006:** Fire and Rescue Authorities must ensure that adequate information, instruction and training is given to those of firefighters who are or who are liable to be exposed to asbestos, or who supervise such employees, so that they are aware of, amongst other things, the purpose, choice, limitations, proper use and maintenance of respiratory protective equipment (regulation 10). Where it is not reasonably practicable for Fire and Rescue Authorities to prevent the exposure of firefighters to asbestos, Fire and Rescue Authorities must, amongst other things, provide firefighters with suitable respiratory protective equipment (which must comply with the *Personal Protective Equipment Regulations 2002* and other standards set by the Health and Safety Executive) (regulation 11). Where respiratory protective equipment is provided under these Regulations, Fire and Rescue Authorities must ensure that the respiratory protective equipment is properly used (regulation 12); and that it is maintained in an efficient state, in efficient working order, in good repair and in a clean condition; that it is thoroughly examined and tested at suitable intervals (regulation 13).
- 8.17 Dangerous Substances and Explosive Atmospheres Regulations 2002:** Fire and Rescue Authorities are obliged to eliminate or reduce risks to safety from fire, explosion or other events arising from the hazardous properties of a “dangerous substance”. Fire and Rescue Authorities are obliged to carry out a suitable and sufficient assessment of the risks to firefighters where a dangerous substance is or may be present (regulation 5). Fire and Rescue Authorities are required to eliminate or reduce risk so far as is reasonably practicable. Where risk is not eliminated, Fire and Rescue Authorities are required; so far as is reasonably practicable and consistent with the risk assessment, to apply measures to control risks and mitigate any detrimental effects (regulation 6(3)). This includes the provision of suitable personal protective equipment (regulation 6(5)(f)).
- 8.18 Confined Spaces Regulations 1997:** No firefighter must enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry (regulation 4(1)). If entry to a confined space is unavoidable, firefighters must follow a safe system of work (including use of BA) (regulation 4(2)) and put in place adequate emergency arrangements before the work starts (regulation 5).

- 8.19 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (“RIDDOR”):** For the purposes of this section, regulation 3 is particularly relevant because it obliges Fire and Rescue Authorities to notify the Health and Safety Executive of any “dangerous occurrences”. RIDDOR defines dangerous occurrences to include “any incident in which BA malfunctions (a) while in use, or (b) during testing immediately prior to use in such a way that had the malfunction occurred while the apparatus was in use it would have posed a danger to the health or safety of the user”. A dangerous occurrence is not deemed to include failure of BA while it is being used in a mine or maintained or tested as part of a routine maintenance procedure. In addition, Fire and Rescue Authorities should keep a record of any such dangerous occurrences (regulation 7).
- 8.20** Further information about RIDDOR, including details of how to report dangerous occurrences, can be found at www.hse.gov.uk/RIDDOR/riddor.htm.
- 8.21** Fire and Rescue Authorities should be aware that RIDDOR is generally relevant to them – this note only focuses on how RIDDOR deals with BA failures.

Further reading

- 8.22** Operational guidance on the management of risk in the operational environment has been issued in the past. In particular, refer to:
- Fire Service Manual volume 2 (3rd edition) “Incident Command”
 - Fire and Rescue Operational Assessment Toolkit 2009
 - Integrated risk management plan guidance notes
 - Fire Service Health and Safety Guide (volume 1, “A Guide for Senior Officers”, volume 2 “A Guide for Fire Service Managers”, volume 3 “A Guide to Operational Risk Assessment” and “Dynamic Management of Risk at Operational Incidents”)
 - Health and Safety Executives guidance booklet HSG53: Respiratory protective equipment at work: A practical guide.
- 8.23** The adoption of the principles set out in this guidance will assist Fire and Rescue Authorities in achieving suitable and sufficient risk assessments and appropriate corresponding risk control measures such as those referred to in this and other similar documents.
- 8.24** The Fire Service College maintain a bibliography of technical guidance to which fire and rescue services can refer (Fire Service Manual, Fire Service Circulars, Dear Chief Officer letters, Dear Firemaster Letters, Technical Bulletins, JCCD Specifications, British and European Standards, Approved Codes of Practice, Health and Safety Executive guidance). In addition, technical guidance is available on the Communities and Local Government website and at the Chief Fire and Rescue Advisor (CFRA) library. However, Fire and Rescue Authorities should maintain copies of these documents within their own libraries.

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Section 9

Abbreviations

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Standard abbreviations

A

ARA Analytical Risk Assessment

B

BA Breathing Apparatus

C

CABA Compressed Air Breathing Apparatus

CBRNE Conventional, Chemical, Biological, Radiological and Nuclear

CFRA Chief Fire and Rescue Adviser

CLG Communities and Local Government

D

DCOL Dear Chief Officers Letter

DH Department of Health

DIM Detection, Identification and Monitoring

DSU Distress Signal Unit

E

ECB Entry Control Board

ECO Entry Control Operative

ECP Entry Control Point

EDBA Extended Duration Breathing Apparatus

ET Elapsed Time

F

Ffr Firefighter

FRA Fire and Rescue Authority

FRDG Fire and Research Development Group

FRS Fire and Rescue Service

FSC Fire Service Circular

FSM Fire Service Manual

G

GRA Generic Risk Assessment

GTS Gas Tight Suit

H

HART Hazardous Area Response team (DH Ambulance Service)

HSE Health and Safety Executive

I

IC Incident Commander

ICS Incident Command System

IRMP Integrated Risk Management Plan

J

JCDD Joint Council for Design and Development

L

LPM Litres Per Minute

LPWD Low Pressure Warning Device

LPWW Low Pressure Warning Whistle

LRF Local Resilience Forum

M

MCA Maritime and Coastguard Agency

MOF Manual of Firemanship

MOG Maritime Operations Group

MOG FRS Maritime Operations Group Fire and Rescue Service

N

NPIA National Policing Improvement Agency

O

OC Operations Commander

P

PPE Personal Protective Equipment

R

RCC Regional Control Centre

RIDDOR The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995

RPE Respiratory Protective Equipment

R&R Rest and Recovery

RVP Rendezvous Point

S

SC Sector Commander

SDBA Standard Duration BA

SOCA Serious and Organised Crime Agency

SOP Standard Operational Procedure

T

TAP Turn-Around Pressure

TB Technical Bulletin

TEC board/unit Telemetry Entry Control Board/Unit

TIC Thermal Imaging Camera

TOW Time of Whistle

TRU Telemetry Radio Unit

TTW Time to Whistle

Suggested working abbreviations for use on entry control board

- 9.1** The following working abbreviations are recommended for use on the BA entry control board, to achieve consistency across entry control points and Fire and Rescue Authorities. The same abbreviations should therefore, be used by all personnel at the incident.
- 9.2** **NOTE:** Whilst working abbreviations may be deemed appropriate for use on the BA entry control board at an incident, for brevity, speed of completion in time-critical situations and due to space constraints on the BA board, any additional BA records maintained at the BA entry control point or at BA sector command should be written in full.
- 9.3** Recommended working abbreviations:
- | | |
|-------------|---|
| BGL | Branch guideline (1, 2, 3 or 4) |
| CFFT | Compartment firefighting team |
| CL | Casualty located |
| CSP | Compartment search procedure |
| DSP | Directional search procedure |
| FFT | Firefighting team |
| HM | Hose management |
| HRJ | Hose reel jet |
| J | Main jet/branch (45mm; 51mm or 70mm) |
| LH | Left hand (denoting orientation of search) |
| MGL | Main guideline (“A” or “B”) |
| RE | Re-entry |
| RH | Right Hand (denoting orientation of search) |
| SRT | Search and rescue team |
| TIC | Thermal image camera |
| TL | Team leader |
| TOW | Time of whistle/warning device |
| TTW | Time to whistle |

Examples of use of working abbreviations

EXAMPLE 1: HOUSE FIRE (2 PUMP ATTENDANCE UNDER STAGE 1)

1. BA team Alpha-1: **FFT 45mm J RH DSP 1st floor bedroom:**
= Firefighting team 45mm main jet. Right hand directional search procedure. 1st floor bedroom.
2. BA team Alpha-2: **HM for Alpha-1 RH DSP 1st floor front bedroom:**
= Hose management team for BA team Alpha-1. Right hand directional search procedure. 1st floor.
3. BA team Alpha-1 on exiting structure with casualty and being immediately recommitted under initial duration: **CL 1st floor bedroom. RH DSP 1st floor HRJ**
= Casualty located in 1st floor front bedroom, recommitted to first floor with hose reel jet using right hand directional search procedure.
4. BA team Alpha-2: **FFT 45mm J RH DSP 1st floor front bedroom**
= Firefighting team 45mm main jet. Right hand directional search procedure. 1st floor bedroom.

EXAMPLE 2: COMMERCIAL STRUCTURE (UNDER STAGE 2 WITH MULTIPLE PUMPS AND MULTIPLE ENTRY CONTROL POINTS IN USE, AND BA GUIDELINES IN USE)

1. BA team Alpha-3: **CFFT for Alpha-4 45mm J RH MGL ground floor**
= Compartment Firefighting BA team Alpha -3, supporting BA team Alpha-4. 45mm main branch. Working on main guideline "A".
2. BA team Alpha-4: **MGL A. RH-lay ground floor**
= BA team Alpha-4 laying main guideline "A" on right-hand lay ground floor.
3. BA team Alpha-5: **HM for Alpha Three 45mm J RH MGL-lay ground floor**
= BA team Alpha -5, hose management for BA team Alpha-3, working on main guideline "A".
4. BA team Bravo-1: **SRT LH CSP 45mmJ 1st floor**
= BA team Bravo-1: Search and rescue BA team using left-hand compartment search procedure and a 45 mm main branch on 1st floor.
5. BA team Bravo-2: **HM for Bravo 1 LH CSP 45mm J first floor**
= BA team Bravo-2: Hose management team for Bravo-1, 45 mm main branch left hand compartment search procedure on 1st floor

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Section 10

Glossary of terms

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| Term | Definition |
|--|---|
| Air Consumption Rate – Actual | The actual rate at which compressed air is used by a BA wearer using self-BA during operational (or training) activity. |
| Air Consumption Rate (Notional) – Planning Guidance Rate/s | An operational safety planning guide appropriate to the rate of air consumption expected for the average BA wearer during operational activity. This guidance figure, along with pre-determined calculations for safety margin and working duration of the cylinder, will ascertain an expected time for the low pressure warning device to operate and provide long-stop planning guidance for the deployment of emergency teams, in the absence of any mitigating information available or arrangements already in place at the entry control point. |
| Airline | A means of providing or augmenting a breathable air supply to a wearer from a detached air supply. |
| Air Management | The safe, effective and efficient management of available BA air supplies, by the individual BA wearer, the BA Team Leader and the person responsible for BA entry control, to ensure air/work evaluation and management to achieve BA wearer welfare and safety and operational objectives. This will necessarily involve managing the wear to meet any turn-around pressure, specified exit pressure and report to BA entry control point pressure criteria. This will more than likely include (for example) appropriate selection of BA wearers at the entry control point; the use of appropriate air consumption rate/s and duration tables; the use of telemetry; appropriate tasking and briefing of BA team/s; use of an appropriate turn-around pressure (where required); regular gauge readings by both the BA wearer and the team leader; and regular/dynamic communications between the BA team and the entry control point, etc. |
| BA (BA) | Self contained respiratory protective equipment. |
| BA team (BA team) | A number of BA wearers designated to work together in the risk area. |
| BA Comms Operative | An individual appointed by the Incident Commander, Sector Commander or BA Entry Control Point Supervisor to maintain communications with the BA teams within the risk area, thereby relieving the Stage II Entry Control Operative of these additional tasks. Such a provision will improve the span of control criteria for the management of the entry control point. |
| BA Guideline | The term “guideline” defines the special line which is used either as a “main guideline” for initial search and to indicate a route between the entry control point and the scene of operations, or, alternatively, as a “branch line”, where it is necessary to traverse or search deeply off a main guideline. |

| Term | Definition |
|---|---|
| BA Sector | A Functional Command Support Sector, designated as part of the Command Support structure, to support BA operations, resourcing and logistics and any other BA requirements. |
| BA Sector Commander | An individual designated by the Incident Commander to take responsibility for the functional command BA sector, designated as part of the Command Support structure. This officer will report to the Incident Commander or the Command Support Officer, as required, and will take responsibility for all BA resourcing and logistics particularly when operations are expected to be protracted. This individual will therefore, liaise directly with sector commanders and Entry Control Operatives, as required and any other officers considered necessary. |
| BA set | Comprises any equipment that is integral to the BA set. This will necessarily include the distress signal unit and the personal line. |
| BA ancillary equipment | Equipment that is not integral to the BA set, but which may be used in conjunction with BA command and control procedures and/or BA operations, to enhance the safety and/or effectiveness of fire and rescue service operations. This may include, for example, a torch/lamp for illuminating the scene of operations, telemetry, radio communications, thermal imaging camera, etc. |
| BA team leader | A BA wearer designated to lead a team of BA wearers. |
| BA wearer | An individual nominated to wear BA. |
| Close proximity (of BA wearers within a team) | A maintenance of a physical connection between BA wearers within a team, such as use of the personal line, or remaining in direct arms length or touching distance, whilst operating within the risk area. |
| Command | Refer to Incident Command System Manual. |
| Command line | Refer to Incident Command System Manual. |
| Command point | Refer to Incident Command System Manual. |
| Command support | Refer to Incident Command System Manual. |
| Command team | Refer to Incident Command System Manual. |
| Compartment search procedure | A structural risk area search procedure employed whereby a BA team will search a compartment within a building or structure before moving on to a further compartment, usually proceeding on a right-hand or left-hand search basis (as designated at the entry control point). |
| Confined space ⁹ | Defined under the <i>Confined Spaces Regulation 1997</i> . Two features are necessary to make a place a 'confined space'; namely an element of enclosure coupled with the creation of a reasonably foreseeable "specified risk". |

⁹ See, (i) Health & Safety Executive Operational Circular OC 288/7: The Confined Space Regulations 1997, version 1, 29th May 1998; (ii) Health & Safety Executive: Safe Work in Confined Spaces, Confined Space Regulations 1997, Approved Code of Practice, Regulations and guidance; and (iii) Health & Safety Executive: Safe Work in Confined Spaces, leaflet INDG258, revision 7, September 2006.

| Term | Definition |
|------------------------------|---|
| | <p>A confined space can be any space of an enclosed nature where there is a risk of death or serious injury from hazardous substances or dangerous conditions (eg lack of oxygen).</p> <p>Some confined spaces are fairly easy to identify, eg enclosures with limited openings: storage tanks, silos, reaction vessels, enclosed drains, sewers, etc. Others may be less obvious, but can be equally dangerous, for example: open-topped chambers, vats, combustion chambers in furnaces etc, ductwork, unventilated or poorly ventilated rooms, etc. It is not possible to provide a comprehensive list of confined spaces. Some places may become confined spaces when work is carried out, or during their construction, fabrication or subsequent modification.</p> <p>The definition of a confined space also brings the activities of the Fire and Rescue Service into scope not only when attending incidents in confined spaces, but also when attending compartment fires (eg rooms in domestic or industrial buildings).</p> |
| Control | Refer to Incident Command Manual. |
| Directional search procedure | That search procedure employed whereby a BA team will progressively search through a building or a structure, whilst remaining orientated against and/or in contact with either the left-hand or the right-hand wall (as designated at the entry control point), without necessarily fully searching each compartment. |
| Distress signal unit | A device that emits at least an audible signal for summoning aid in the event the user becomes incapacitated or needs assistance, or for signaling evacuation, for use by Fire and Rescue Service personnel when wearing BA. It must be capable of being activated both automatically on immobility of the wearer of the distress signal unit and manually operated separately by the wearer. |
| Donned (in BA) | Where the BA wearer is both 'rigged in BA' and 'under air'; the BA wearer is therefore, breathing air from the BA set. |
| Door sweep | The purpose of the 'door sweep' is to both reinforce "landmarking information" and maximise the chances of locating a casualty on either side of a doorway during BA search and rescue operations within a structure. It involves the BA team carrying out a proximity search on either side of a doorway including behind the door (of approximately 1 - 2 m arc). |
| Duration table | Duration tables and/or calculators are provided as a guide to the average duration of a BA cylinder, based on the amount of air likely to be used by a BA wearer at a given incident type (ie normal fire service operations, or complex and/or strenuous BA wear involving sustained increased physical activity). |

| Term | Definition |
|-------------------------|--|
| Emergency team | A number of BA wearers designated to stand by at the entry control point(s) for emergency purposes. |
| Entrapped procedure | The aim of entrapped procedure is to allow a BA wearer to maximise the duration of the air contents of the BA set in the event of becoming trapped and being unable to withdraw from the risk area. |
| Entry Control Operative | An individual under the command and direction of either the Incident Commander or Sector Commander, nominated to monitor the wearing of BA through an entry control point, complete BA entry control point records, follow and implement appropriate procedures as directed, and notify the officer responsible for the entry control point of any relevant information, issues or significant events. |
| Entry control point | The position for the command and control, deployment and monitoring of BA wearers in a risk area. |
| Euhydrated | Normal state of body water content; absence of absolute or relative hydration or dehydration. |
| Evacuation signal | <p>A method of signalling immediate evacuation of all personnel, particularly BA wearers, from the risk area, in case of emergency or identification of unsafe working conditions.</p> <p>The standard evacuation signal consists of repeated short blasts on the Acme Thunderer whistle. The whistle must be used for this purpose only.</p> <p>The use of appropriate radio and/or telemetry communications, where available, may also be used, in place of or in conjunction with the Acme Thunderer whistle. A further advantage of telemetry equipment involves the facility for selective evacuation.</p> <p>Where BA teams within a structure may not be able to hear the Acme Thunderer whistle, alternative provision for emergency evacuation of BA teams must be established by the Incident Commander.</p> |
| Extended duration BA | BA with a cylinder capacity of over y litres/or, a working duration of between 30 and 60 minutes (at 58 litres per minute air consumption rate). |
| Forward command post | Refer to Incident Command System Manual. |
| Full duration | The period during which BA is expected to provide respiratory protection from the moment the cylinder valve is opened, and the first breath taken until the cylinder is exhausted. |

| Term | Definition |
|--|--|
| Generic risk assessment | A fundamental element of the Fire and Rescue Service risk assessment process. To support Fire and Rescue Authorities in satisfying their regulatory requirements, under the Management of Health and Safety at Work Regulations 1999 (MHSWR), a series of generic risk assessments have been produced by government. |
| Hazard | A hazard is anything that may cause harm. |
| Incident Commander | Refer to Incident Command System Manual. |
| Incident log | A timeline record of all significant decisions, actions and information received that is used to develop the operational plan and inform the de-briefing process. |
| Inner cordon | Refer to Incident Command System Manual. |
| Intrinsic safety (of electrical BA equipment in flammable/explosive atmospheres) | Intrinsic safety (IS) is a protection technique for safe operation of electronic equipment in explosive atmospheres. Intrinsically safe equipment is designed to limit the energy available to create a spark or heat surfaces, under both normal and "fault" conditions. |
| | There are varying standards of electrical safety, regulated under BSI and EN. |
| Long duration BA | BA with a working duration of over 60 minutes. |
| Low pressure warning device | A pneumatic and/or electronic whistle/visual warning that is designed to operate when the remaining cylinder contents fall below a designated cylinder pressure and provide only the safety margin of compressed air. |
| Operations Commander | Refer to Incident Command System Manual. |
| Personal line | The term "personal line" defines a special line secured to the BA set of the wearer. The short (1.25m) section of the personal line may be used to attach on to the BA Team Leader or other members of the team, in order to remain within "physical contact" of their team member. The long (6m) section of the personal line may be attached to the BA guideline, in order to enable the wearer to search off the guideline to the limit of their personal line. |
| Point of access | The point of access to a building or structure or area. |
| Point of entry | That part of the fireground or incident through which a BA team under air enter a structure, compartment or otherwise designated risk area, on the instructions of the entry control point. |
| Pressurised atmosphere | Any atmosphere that is pressurised above ambient pressure. These generally describe engineered features to protect escape routes, or to assist the emergency services in rendering assistance in the event of rescues or firefighting. |

| Term | Definition |
|------------------------------------|---|
| Pressurised workings | Any pressurised atmospheres that fall within the statutory definition of pressurised workings, contained within Pressure Systems Regulations 2000 (PSSR) which fall under the Health and Safety at Work etc Act 1974. These are generally commercial workings and may include such areas as tunnels during construction, etc. |
| Rigged in BA | Where the BA wearer has the BA set in place on the body and is not 'under air', but is ready to go 'under air' on instruction to do so. The individual is therefore, breathing air from the environment, rather than from the BA set. |
| Risk | Risk is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be. |
| Risk area | That part of the incident ground to which BA command and control procedures should be applied. |
| Risk assessment | Refer to Generic Risk Assessment Guidance. |
| Safe air | An environment where the air is breathable and will not be harmful without the use of respiratory protection. |
| Safe system(s) of work | Refer to Incident Command System Manual. |
| Safety | Refer to Incident Command System Manual. |
| Safety margin | The period during which the low pressure warning whistle/device operates. This period should equate to 20 per cent of the full cylinder charge and is reserved for emergency use. |
| Sector Commander | Refer to Incident Command System Manual. |
| Self-contained BA | BA where the breathing gas supply is carried by the wearer. ¹⁰ |
| Span of control | Refer to Incident Command System Manual. |
| Stage I BA Entry Control procedure | The minimum level of control used for the deployment and management of BA wearers into a compartment, structure or other significant risk environment. The adoption of Stage I procedures requires that sufficient resources are available to deliver the full operational/tactical plan safely and effectively (however, initial deployment may be used in exceptional circumstances). |

¹⁰ From EN 132 1999

| Term | Definition |
|-------------------------------------|--|
| Stage II BA Entry Control procedure | The level of control required for the deployment and management of BA at incidents that are deemed to present a higher risk to firefighters than that expected at a Stage I incident and a higher level of BA Entry Control will be required. That is: there will be more than one entry control point in use; and/or, more than three BA teams are to be deployed into the risk area at any one time; and/or, more than six BA wearers will be deployed at any one time; and/or, BA guidelines will be required; and/or relief BA teams will be required; and/or the incident is likely to be protracted. |
| Standard duration BA | BA with a cylinder capacity of between x and y litres/or, a working duration of less than 30 minutes (at 50 litres per minute air consumption rate). |
| Susidiarity | The principle that a central body will permit its member functions to have control over those issues, decisions, etc., that are deemed more appropriate to the local level. ¹¹ |
| Tactics | Refer to Incident Command System Manual. |
| Telemetry | Telemetry is that technology that allows for remote measurement, reporting and recording of information. In the context of the deployment of BA, BA wearer information is transmitted to the BA entry control point. |
| Turn-around pressure | The pre-determined cylinder pressure at which the BA team should commence their withdrawal from the risk area, so that the entry control point is reached before the low-pressure warning whistle operates. |
| Under air | The breathing of air from the BA set by the wearer. It commences from the point at which a BA wearer dons the face mask of a BA set and actuates the first breath mechanism, to when the first breath mechanism is re-set and the mask is removed. (see also 'donned in BA and 'rigged in BA). |
| Working duration | The period during which BA is expected to provide respiratory protection from the moment the first breath is taken or breathing commences until the moment at which the low pressure warning device starts to operate. |

¹¹ (Derived) from Chambers Compact English Dictionary, 2001, © Chambers Harrap Publishers Ltd 2000

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Section 11

Appendices

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APPENDIX 1

BA command and control procedures roles – duties and responsibilities

Incident Commander – duties in relation BA command and control¹²

11A1.1 When reaching decisions on control of risk, the Incident Commander is responsible for:

- determining, on the basis of suitable and sufficient risk assessment, whether BA is required to deal with the incident
- determining, on the basis of suitable and sufficient risk assessment, the appropriate procedures and level of BA command and control
- the adoption of any other appropriate safety precautions required to be implemented in conjunction with the use of BA for specific risks (eg chemical protective clothing)
- the siting and number of entry control points
- BA entry control point support arrangements (where a (geographical) Sector Commander has not been appointed)
- nominating – or specifically delegating responsibility for the nomination of – a person to be responsible for each BA entry control point/s to manage and monitor the implementation of BA entry control procedures and establish a/ the BA entry control points to the risk area
- establishing and communicating responsibilities for suitable and sufficient briefing and debriefing of BA teams, in accordance with the principles and procedures contained within this guidance
- establishing suitable and sufficient, resilient systems and processes for the logging and recording of all relevant BA command and control information
- determining and communicating the appropriate structural search procedures, where appropriate
- assessing the need for the use of BA guidelines
- determining the need for BA cable communications
- the need to appoint a BA Sector Commander

¹² See also, ICS Manual

- BA wearer welfare requirements (where a BA Sector Commander has not been appointed)
- the implementation of the additional procedures for BA wearer distress
- the sufficiency of BA and associated equipment available to deal with the incident and the need to request any additional assistance required (where a BA sector commander has not been nominated)
- appropriate BA emergency arrangements
- appropriate provision of relief BA teams at entry control points in a timely fashion
- arrangements for communicating with the persons responsible for entry control points via the command line
- ensuring that a single procedure and/or level of BA Control is applied to the whole incident
- ensuring that all personnel are aware which BA entry control procedures and/or stage is in use
- the Incident Commander (and, where appropriate, the Operations Commander and Sector Commanders) should all concentrate effort and resources to maintaining a high degree of command and control and management over BA operations and should ensure that the procedures adopted comply with this guidance.

BA wearer

BA wearers duties on station/pre incident¹³

- Ensure that if nominated and/or required to wear BA that a suitable and sufficient face mask seal can be achieved
- Ensure that prior to using BA, the apparatus is checked and functioning correctly by carrying out the tests as recommended by the manufacturers and Fire and Rescue Service procedures and in accordance with this guidance
- Ensure test records for individual BA sets are completed following testing; this may include the recording of the cylinder number fitted to the apparatus at the time of testing
- Ensure competencies are maintained for their BA role and associated tasks including fire behaviour awareness. This should also include any specialist equipment or operating systems that are required

¹³ See also, Section 6A of this guidance

- BA wearers should be aware of the responsibilities of persons with BA command and control responsibilities, including the BA Team Leader, the person responsible for entry control point and the BA Entry Control Operative, as detailed within this guidance.

BA wearers duties at an incident

- Ensure BA is donned and fitted correctly in safe air
- Ensure they are fully aware of their brief, tasks and instructions, where and how they are required to enter the risk, any identified hazards and any limitations on the duration of the wear (on the instructions of the person responsible for the entry control point)
- On instruction from the person responsible for the entry control point, to start up the BA set and complete required apparatus pre-entry checks and proceed to the BA entry control point
- Test communications equipment with BA Entry Control Operative/BA Communications Operative to ensure functionality, that the required radio channel is selected and ensure the channel selection is 'locked' (if appropriate and depending on the communications system in use)
- Test telemetry equipment, if in use, with BA Entry Control Operative to ensure functionality
- Ensure personal protective equipment is fitted correctly
- If detailed to use firefighting media, such as hose reel/hose line, ensure all equipment is tested by operation prior to entering
- Check cylinder contents just prior to entry to the risk and calculate/select an appropriate turn around pressure (as required), in agreement with person responsible for BA entry control point
- Hand BA tally to the BA Entry Control Operative before entering the risk area (for all stages, ensure tally is located into the BA entry control board with the 'time in' completed)
- If utilising gas tight suits, guidelines or specialist equipment follow the appropriate procedures
- Carry out safe movement at all times, utilising safe and effective firefighting and/or search and rescue techniques
- Maintain contact and regular verbal communication with the BA team leader and other members of the BA team and update them regarding any relevant information including hazards and gauge readings
- Regularly check their pressure gauge (and prompt other members of the team to do so) whilst in the risk area, monitor air consumption closely to allow sufficient duration to withdraw safely to the BA entry control point before the low pressure warning whistle/device sounds

- Carry out gauge checks more frequently when working hard as air consumption can increase dramatically reducing estimated duration times
- Assist the BA Team Leader with brief and task, memorising route in and out of the risk, and pass radio messages to BA entry control point if required to do so by BA Team Leader
- Constantly monitor conditions and re-evaluate risk, be especially observant regarding signs of potential backdraught and flashover and the integrity of the structure/compartments for signs of potential collapse
- Immediately report to BA entry control point on exiting risk, collect BA tally from the person responsible for the BA entry control point, shut down set (where telemetry is in use the BA wearers should shut down the BA set prior to collecting the BA tally from the BA Entry Control Operative)
- Assist team leader with debrief (as required) ensuring that any information of use to teams entering the risk area, or the Incident Commander, is made known to the person responsible for the BA entry control point. If applicable draw a basic plan (or utilise any plans available) to identify the route, any hazards, location of casualty/s and clearly mark areas that have been searched to assist any further BA teams
- Where requested to do so by entry control point, report to BA Sector Commander.

BA wearer's duties post wear

- **Welfare:** On completion of a wear ensure they and others within the team are not suffering effects of heat stress and on the instructions of the relevant officer, relax personal protective equipment, allow to cool down, hydrate as soon as possible and rest and recuperate
- Wearers must report any accidents, injuries or near-miss events in line with their Fire and Rescue Service policy and procedures
- **Hygiene:** As soon as possible after wearing BA clean and wash hands to reduce the risk of contamination from the risk area, avoid BA or personal protective equipment coming into contact with the skin and mouth especially prior re hydrating/wiping face etc
- Ensure apparatus is thoroughly cleaned; fitted with a fresh cylinder; and tested as required. Any defects found during routine testing (or during use) must be reported in line with Fire and Rescue Service's procedures.

BA Team Leader

11A1.2 An appropriate member of the BA team will be nominated as Team Leader.

11A1.3 The duties of a BA Team Leader are to:

- ensure the team is fully briefed by the person responsible for the entry control point before deployment into the risk area
- co-ordinate gauge checks and ensure that the team return to the BA entry control point before any low pressure warning whistle/device activates, or, if appropriate, within limits previously agreed with the Incident Commander to prevent undue exposure to difficult or strenuous conditions
- monitor the working conditions and be aware of potential physiological effects that they may cause to team members and working duration
- provide regular updates to the entry control point on the progress of the team and any other information relevant to the Incident Commander such as conditions, layout and hazards.

11A1.4 The BA Team Leader is responsible for the conduct of the team during the time that it is within the risk area. The Team Leader should base decisions for action on:

- the training and experience gained from previous incidents
- information received by communications from outside the risk area
- sensory perception inside the risk area (eg noise, temperature)
- information from BA and associated equipment (eg gauges, whistles, alerts, thermal imaging cameras, etc)
- information from other team members.

11A1.5 A BA Team Leader's duties also extend to decisions about when to withdraw from the risk area, and whether circumstances are such that a team of four may be split up into two teams of two.

BA Entry Control Operative

11A1.6 The BA Entry Control Operative will:

- Set up and operate the BA entry control board in either Stage I or II BA control
- Record BA wearers entry and monitor their estimated air supply
- Apply the procedures for use of related BA equipment (telemetry etc)
- For identification purposes, wear a black and yellow chequered BA control tabard
- Take up the position nominated by the person responsible for the entry control point

- Provide a BA entry control board, complete with suitable waterproof marker if required
- Identify the BA entry control board, annotate with details and indicate clearly on the Board the BA command and control procedure an/or Stage that is in operation, the name of the person responsible for the BA entry control point and the name of the BA Entry Control Operative
- BA entry control points will be identified by use of the phonetic alphabet. The first entry control point that is established will be identified as 'entry control point Alpha'. Additional entry control point's will be identified using the next subsequent phonetic identification ie Bravo, Charlie, Delta etc. The call sign should be clearly written on each entry control board
- In accordance with Service procedures ensure time on the BA entry control board clock is correct or amended
- Receive the tallies of BA wearers and check that the name of the wearer and the cylinder pressure at the time of entry into the risk area are correct
- In the absence of a BA Communications Operative maintain communications with BA teams operating inside the risk area
- Enter the 'Time In' on each tally
- Clearly identify on the BA entry control board, the BA team member responsible for communications and ensure radio channels identified and equipment is tested before entry into the risk area
- Place each tally in a slot on the BA entry control board so that the tallies of each team of wearers are together and are indicated as a team by bracketing the tallies using the waterproof marker. Where BA entry control boards are not telemetry enabled the earliest 'time of whistle/warning device' being clearly indicated
- Overwrite the names of the BA set wearers onto the BA entry control board with a water proof marker in case they become dislodged

Examples of BA wearers bracketed-in to indicate that they are committed as a BA team, plus the earliest time of whistle/warning device



- Where telemetry is not available calculate the 'time of whistle/low pressure warning device' for each wearer and enter this in the appropriate section of the BA entry control board, opposite the tally. The 'time of whistle/device' should be calculated using the method adopted within the fire and rescue authority, but based on this guidance
- The BA wearer and team leader should be advised to withdraw from the risk area at a predetermined pressure gauge reading
- Acting on the instructions of the Incident Commander, if necessary, restrict the length of exposure in difficult or strenuous conditions and determine an earlier time of exit from the risk area
- Take into account any elapsed time since entry of BA wearers who entered the risk area under the use of an automated BA entry control board or initial deployment
- Monitor the time to whistle/warning device where it is provided by an electronics contents gauge/indicator incorporated with the BA set (telemetry system)
- Indicate the location of teams in the column provided and record details on the BA entry control board as necessary
- When BA teams exit the risk area, remove their tallies from the BA entry control board and return them to the respective wearers
- Liaise (by radio, runner, etc) with other entry control points and inform them of the names of any BA wearers who leave the risk area other than via the BA entry control point at which they entered
- Where a BA team re-enters a risk area annotate the BA entry control board accordingly
- Fully advise the person responsible for the entry control point and BA Communications Operative when appointed, with all information gathered leading up to the transition from Stage I to Stage II BA entry control
- Keep the person responsible for the entry control point fully informed of all relevant developments or requirements related to the wearing of BA and the operational aspects of the incident, using information gained from BA wearers at the incident
- At a cross-border incident, or incidents involving other emergency services be alert to potential monitoring issues, in accordance with local requirements, agreements, and/or /memorandums of understanding, etc
- In the absence of a BA Comms Operative, carry out a communications check (radio or cable communications) prior to BA wearers entry into the risk area
- In the absence of a BA Comms Operative, inform the person responsible for the entry control point of any prolonged breakdown in communications with BA teams

- At Stage II BA entry control, the BA Entry Control Operative will attach BA main and branch guideline tallies to the appropriate line as necessary and annotate the BA entry control board with details of which team has been committed on which line. The BA Entry Control Operative will remove the tallies when removed
- Ensure that if it becomes necessary to use additional entry control boards, tallies remain on the initial entry control board under the monitoring of the Entry Control Operative (tallies must NOT be transferred to a second entry control board until the wearers collect their tallies and the initial entry control board can be disestablished)
- Where a fresh individual replaces an existing BA Entry Control Operative at a BA board and assumes their duties, this must be under the strict command and supervision of the person responsible for the BA entry control point
- Synchronise the clock of the entry control board and the BA Sector Commander's clock if necessary. Where clocks cannot be physically synchronised then the time difference should be noted and recorded accordingly
- At radiation incidents, the BA Entry Control Operative must record the quartz fibre dosimeter or electronic personal dosimeter reading on entry of the wearer and (whilst wearing appropriate protection) check the dosimeter reading and record it when they leave the risk area. A permanent record of the exposure of each wearer to radiation should be made and passed to the Incident Commander at the conclusion of the incident
- Implement BA emergency procedures as appropriate.¹⁴ That is:
 - under Stage I and/or additional procedures or initial BA deployment should an emergency situation arise, the BA Entry Control Operative will:
 - immediately inform the person responsible for the entry control point and/or the Incident Commander
 - if the person responsible for the entry control point is not available, notify the Incident Commander, or ultimately, Fire and Rescue Service Control
 - take whatever action that is practicable in the circumstances
 - it is essential that the BA Entry Control Operative notifies the person responsible for the entry control point or other supervisory officer that a BA emergency exists before taking action assisting BA wearers from an incident
 - work in conjunction with Command Support.

¹⁴ See Chapter 10 for full details of Emergency Procedures

- under Stage II: Should an emergency situation arise under Stage II Entry control procedures, the BA Entry Control Operative will, in addition to the above:
 - inform the Incident Commander (or other nominated officer) and all other entry control points
 - request replacement BA emergency teams, for any teams deployed into the risk area.

BA Communications Operative

- 11A1.7** A BA Communications Operative should be appointed when the incident Commander/Operations Commander/Sector Commander implements a greater level of control and supervision as the risk and demands of the incident increase. In general, consideration should be given to the provision of BA Communications Operatives at each entry control point under Stage II BA entry control.
- 11A1.8** The BA Communications Operative will report to and take instruction from the person responsible for the BA Entry Control Point, and work alongside the BA Entry Control Operative.
- 11A1.9** The function of the BA Communications Operative will be to send and receive messages between BA teams and the BA entry control point. Communications will be undertaken in liaison with the BA Entry Control Operative and the person responsible for the BA entry control point.
- 11A1.10** This relieves the person responsible for the entry control point and the BA Entry Control Operative of the responsibility of communicating with BA teams.
- 11A1.11** BA Communications Operative responsibilities will include:
- providing appropriate communications equipment
 - maintaining a position in close proximity to the BA Entry Control Operative
 - carrying out a communications check with BA teams prior to entry into the risk area
 - monitoring BA teams progress within the risk area
 - informing and updating the person responsible for the entry control point of any relevant information received by radio, cable or other means of electronic communications relating to the progress of BA operations
 - advising the person responsible for the entry control point of any prolonged breakdown in communications with BA teams.
- 11A1.12** The BA Communications Operative will not undertake any other BA entry control duties.

BA sector commander

- 11A1.13** The BA Sector represents a functional Command Support sector within the incident command system structure at the incident ground.
- 11A1.14** The purpose of the function is to coordinate and support BA resourcing, logistics and operations.
- 11A1.15** The BA sector will logistically support BA operations at incidents where a large number of BA resources are required or where the nature of the incident dictates additional BA resources. Examples might include hazardous materials, tunnels, confined space, protracted incidents, etc.
- 11A1.16** The BA sector will be commanded by a BA sector commander, appointed by the Incident Commander.
- 11A1.17** The BA sector commander will:
- be appointed by and report to the Incident Commander
 - be clearly identified by suitable wording on their Sector Commander tabard
 - be responsible for incident BA resources and logistics
 - be responsible for BA wearers' post-BA wear welfare, and establish an appropriate rest and recuperation area
 - be located at Command Support and work alongside and closely with other Command Support colleagues
 - maintain communications with all BA entry control points
 - may be supported by assistants where necessary, identified by wearing appropriate 'BA sector assistant' tabards.
- 11A1.18** The BA sector commander shall:
- identify the location of each BA entry control point, record the name (ensure a record is made) of each BA Entry Control Operative and establish communications with BA entry control points
 - establish and record the availability of BA, associated equipment and personnel at the incident
 - take account of any time variations between BA entry control board clocks
 - establish and record the requirements for relief teams of BA wearers from each of the BA entry control points
 - have available sufficient BA wearers to provide the relief teams required by each BA entry control point and dispatch them to arrive at the BA entry control point at least five minutes before required
 - provide BA emergency team resource requirements to BA entry control points

- maintain suitable and sufficient resilient records
- note that the full extent of the role of BA Sector Commander will be dependent on the complexity of the incident and the number of wearers in use.

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APPENDIX 2

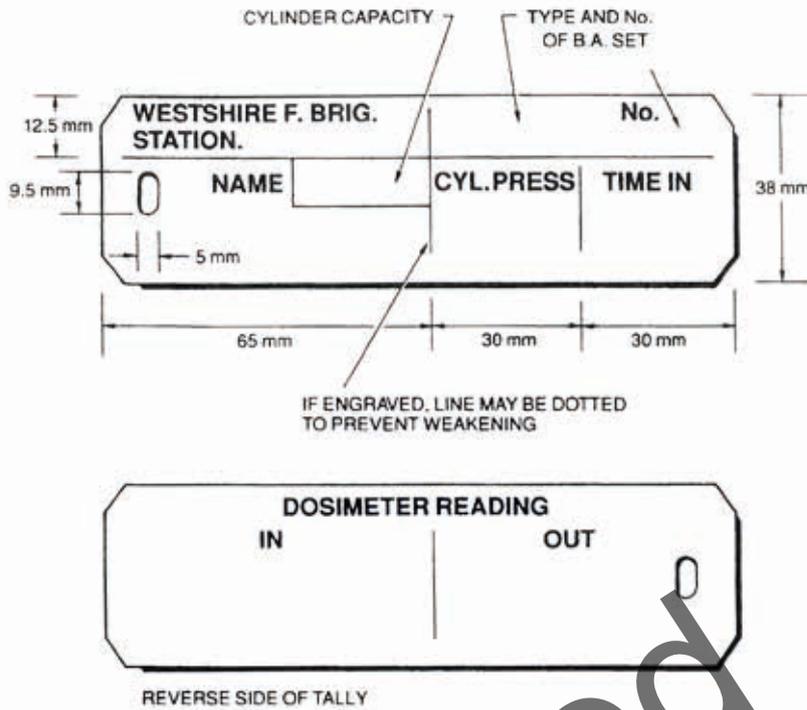
BA command and control procedures equipment descriptors

11A2.1 This Appendix contains general descriptors for equipment used in the command and control of BA, for which there are no British or European Standards,

(i) The following is an example of a BA **Entry Control Board**. However there will be variations of these depending on the individual needs of the fire and rescue services and whether or not BA telemetry is being used.

| | | | |
|---|--|------------------|---------|
| ENTRY CONTROL POINT No | ANYSHIRE FIRE SERVICE | | STAGE |
| | BA ENTRY CONTROL BOARD | | |
|  | <div style="border: 1px dashed black; padding: 5px; color: red;">Space for Duration Tables</div> | | |
| IDENTIFICATION | TIME OF WHISTLE | LOCATION OF TEAM | REMARKS |
| <div style="border: 1px dashed black; padding: 5px; color: red;">Slots for securing BA Wearer Tallies</div> | | | |
| | | | |
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| | | | |
| | | EMERGENCY | TEAM |
| | | EMERGENCY | TEAM |

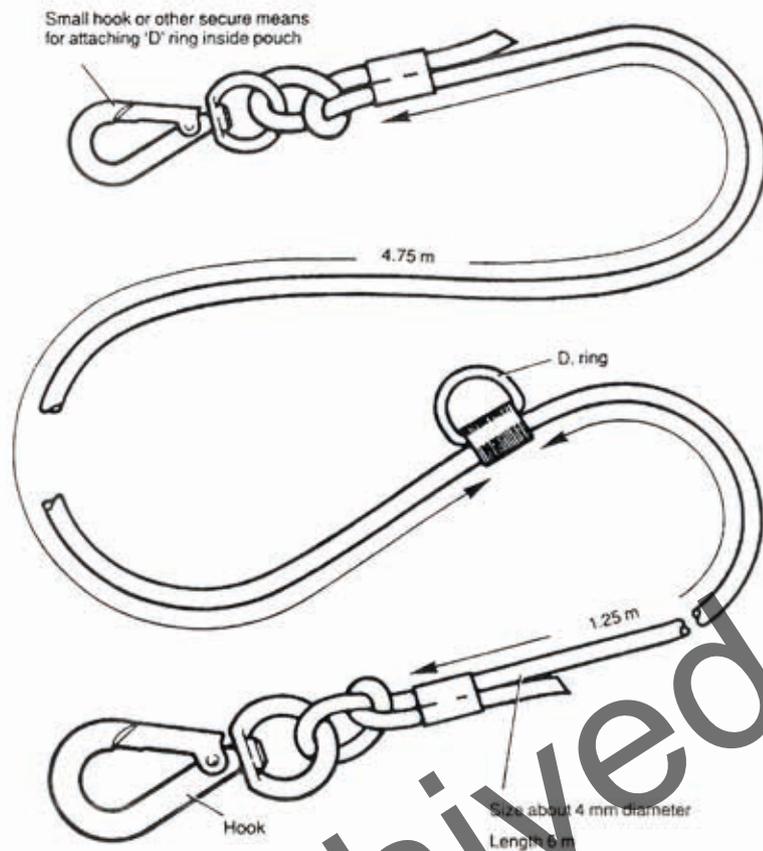
(ii) BA tally



These tallies will be yellow in colour signifying compressed air.

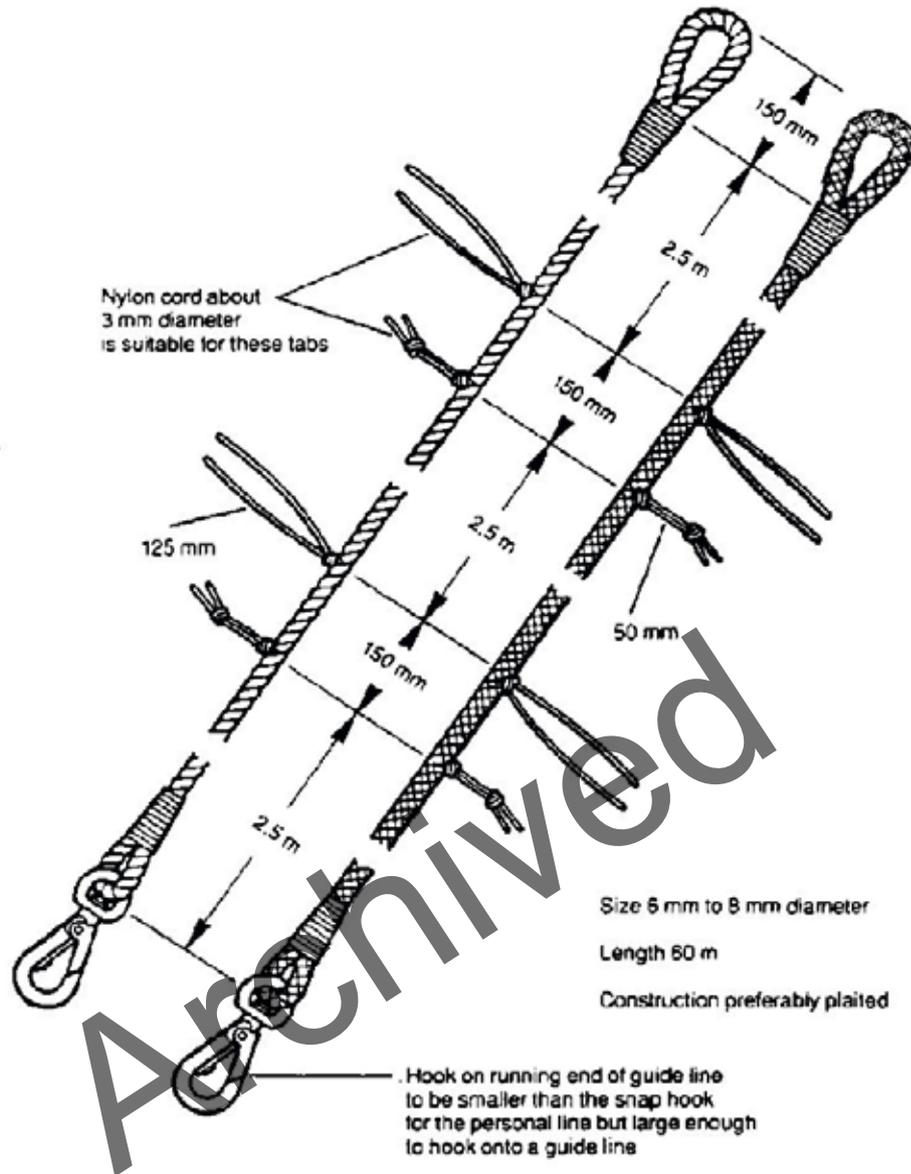
- 11A2.2** For a tally used in conjunction with a telemetry board the dimensions will vary to conform to the particular entry control system. The colour of the tally must remain the same and the information detailed is still required.

(iii) Personal line



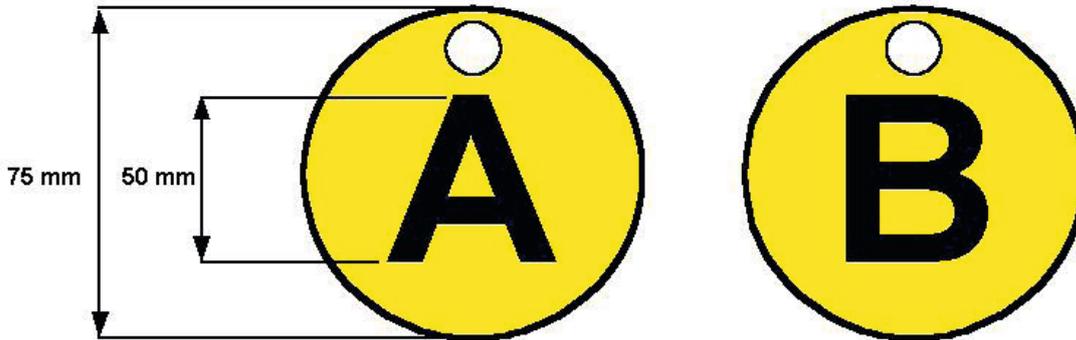
- 11A2.3 Snap hooks shall not be made of magnesium, titanium, aluminium or alloys due to the possibility of frictional sparks.
- 11A2.4 Alternative designs of personal line are acceptable provided the lengths remain consistent; an alternative to the D-ring is in place to define between the two parts of the line (ie a knot) and the securing method to the BA guideline is adhered to.
- 11A2.5 The personal line should be contained in an appropriate pouch and secured to the waist belt of the BA set so it is easily and readily accessible to the BA wearer.

(iv) BA guideline



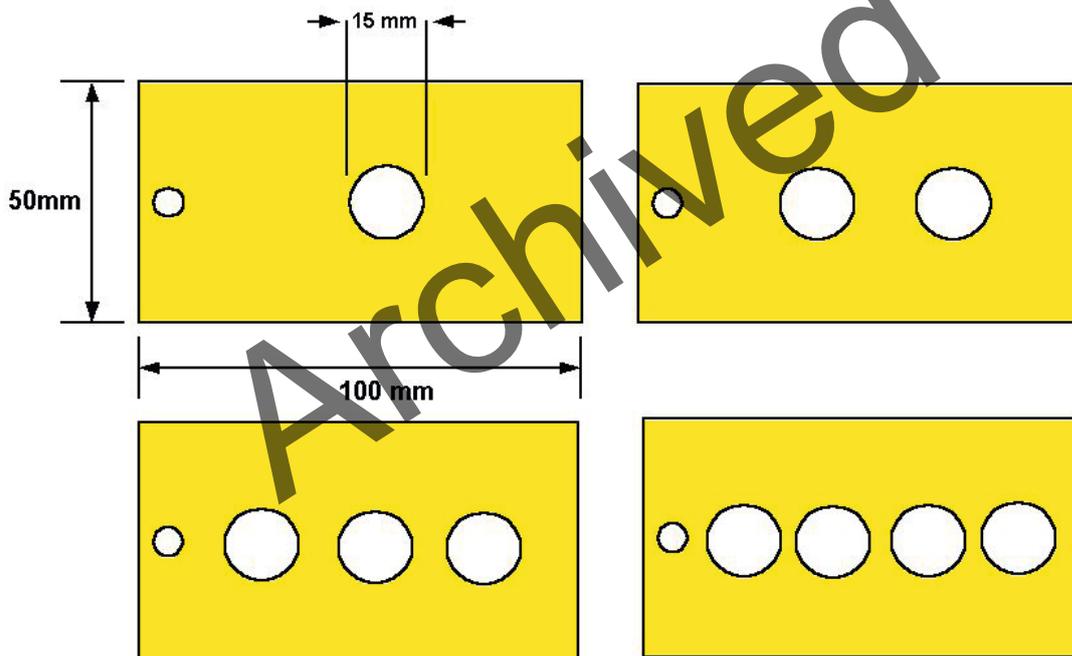
(v) BA main guideline identification tallies

BA guideline tallies – consist of a maximum of two for each BA entry control point, identified as follows:



(vi) BA branchline identification tallies

Branch guideline tallies – consist of a maximum of four for each BA entry control point, identified as follows:



APPENDIX 3

BA facemask donning procedure and facemask seal testing

1. Facemask donning procedure

- 1.1 This donning procedure is appropriate to all occasions that BA is worn, including training, operational incidents and when taking over a set at the start of a shift or other time as appropriate.
- 1.2 Correct facemask fit is essential if the best possible face seal is to be achieved. The ideal fit is achieved when all straps are tensioned and the chin and temple straps of the mask run in the direction of the mask strap tongues. In order to get the best possible fit the following points should be taken into account.
- 1.3 Loosen all head harness straps, including the centre head strap, to their full extent.
- 1.4 Place the facemask against the face by sliding it up to ensure that the chin is securely placed in the chin cup. Ensure that hair does not compromise the facemask seal area. This may be more easily achieved if the wearer leans forward whilst fitting the mask.
- 1.5 Where multiple adjustable straps are fitted, adjust the bottom and middle straps progressively and evenly in pairs to ensure that the head harness is 'square' on the back of the head, finishing with the top strap. The fit should be secure and comfortable but not over-tight.
- 1.6 BA wearers should visually check that each team members' head harness is positioned correctly on the head, with the straps in line with the mask tongues and evenly tensioned, before fire hoods and helmets are donned. Repeat steps 1.2 to 1.4 if necessary.

2. Facemask seal test

- 2.1 It is appropriate that the effectiveness of the facemask seal is tested on every occasion that BA is donned with the intention of breathing from it. However in some operational situations it may be necessary to conduct an assessment of risk to establish the practicality of carrying out the full-face seal test.
- 2.2 The rigorous application of this test when taking over a set at the start of a shift, or other time as appropriate, will ensure that the wearer is satisfied that they can achieve an effective seal with that particular facemask.
- 2.3 Procedures for testing the facemask seal are as follows:

- 2.4 Hold breath and turn off the air supply to the mask keeping a hand on the cylinder valve.
- 2.5 Observe the pressure gauge for approximately eight seconds whilst moving the head up and down and side to side. There should be no discernible movement of the pressure gauge. (The purpose of this is to ensure that the mask is properly fitted to the face.)
- NOTE:** Extreme movement of the head may cause some leakage, but this should cease once the head is returned to a more central position and/or the head movement is less severe.
- 2.6 Breathe steadily to exhaust the residual air in the system while observing the pressure gauge until the gauge shows empty and noting the activation of the low pressure warning whistle/device.
- 2.7 Turn the cylinder valve back on and take two or three normal breaths.
- 2.8 Hold breath and again turn off the air supply to the mask keeping a hand on the cylinder valve.
- 2.9 Breathe steadily until the air is exhausted and inhale to cause the mask to collapse onto the face.
- 2.10 Hold the breath for approximately eight seconds to ensure that the facemask remains firmly 'sucked down' onto the face. If there is a defect with the facemask or a poor fit between the face and the mask, the wearer will be unable to generate a vacuum inside the mask, thereby preventing the continued collapse onto the face.
- 2.11 Turn on the air supply and breathe normally.
- 2.12 If a leak is identified during any part of these tests, the facemask should be re-fitted with particular attention to correct adjustment of the harness but without over-tightening the harness and the tests re-applied.

3 Positive pressure protection

- 3.1 Provided that BA facemasks are donned correctly and the facemask seal tests are fully applied, positive pressure can be expected to provide compensation for any slight mismatch between the face seal and the face during use and will thus ensure adequate protection to the wearer.
- 3.2 In the event that a gross facemask seal leak is identified, despite rigorous application of the above procedures, fire and rescue services should seek to provide an alternative mask (eg different model, size, design, etc) that provides an adequate fit for the individual.

- 3.3** If a suitable alternative mask is not readily available, fire and rescue services should consult with their BA supplier to seek a suitable modification to the mask (eg alteration to the mould, insert, etc). Should this option prove necessary, quantitative fit testing of the individual, using appropriate apparatus is recommended to demonstrate the improvement in fit.

4 Monitoring

- 4.1** All existing BA wearers should be assessed to ensure that they can achieve an effective face fit.
- 4.2** It is recommended that a suitable record of completing this donning procedure, and gaining a satisfactory facemask seal test result, be made on the first occasion that it is formally undertaken by each employee and whenever the wearer experiences facial changes (weight change, surgery, etc).
- 4.3** Fire and rescue services shall ensure that appropriate systems are in place to establish that the above procedures are fully applied on every occasion that BA is donned with the intention of breathing from it.

5 New BA wearer

- 5.1** For the purpose of this guidance, new BA wearers are considered to be new employees, inter-Fire and Rescue Service transfers, personnel returning to operational duties after a significant period of time involved in non- BA duties, personnel whose facial features have altered significantly through weight change dental work or similar and where the Fire and Rescue Service's BA supplier changes.
- 5.2** Sufficient training shall be provided to ensure that individuals can apply the facemask donning procedure correctly. Each individual shall then complete the facemask seal test identified in this guidance. All such training shall be recorded in the individual's personal training record.
- 5.3** Should a gross facemask seal leak remain despite rigorous application of the above procedures the process detailed in paragraphs 3.2 and 3.3 shall be applied.

6 Training

- 6.1** The guidance provided on facemask donning procedures and facemask seal testing shall be formally incorporated into initial, refresher and BA instructor training.

APPENDIX 4

The Independent Panel on Air Consumption Rates

Air consumption rates and duration tables

- An operational planning guidance figure for **standard duration BA** (SDBA) complying with EN 137 has been established at a rate of **50 litres per minute**
- An operational planning guidance figure for **extended duration BA** (EDBA) has been established at a rate of **58 litres per minute**. This higher figure is to account for the additional physiological burden imposed by the increased weight of the extended duration BA set
- Fire and Rescue Authorities will need to determine their own preferred method for calculating duration tables, in accordance with this guidance and the particular specifications of their own BA sets.

11A4.1 An example of a duration table, with consumption rates set at 50 litres per minute for standard duration BA and 58 litres per minute for extended duration BA, is included below.

Example:

Assumptions made for this example:

- For standard duration BA, a single eight litre cylinder can be charged to 300 bars. The safety margin remains at a minimum of 10 minutes duration. This gives a minimum volume of air (irrespective of the cylinder size) required of 500 litres for Standard Duration BA. This equates to 504 litres of air and therefore, the low-pressure warning device set at 70 bars. This gives a maximum working duration of 1656 litres, or 33 minutes (at 50 lpm)
- For extended duration BA, a twinned 6.8 litre cylinder charged to 300 bars
- The safety margin remains at a minimum of 10 minutes duration. This gives a minimum volume of air (irrespective of the cylinder size) required of 580 litres for extended duration BA
- For extended duration BA, in this example, this equates to 673 litres of air (this figure is higher than the 580 litres required above due to the low pressure warning device being set at the minimum allowed under EN 137 and at this setting it gives a higher volume than required) and the low-pressure warning device set at 55 bars (lowest setting allowed under EN 137). This gives a maximum working duration of 2999 litres or 52 minutes (at 58 lpm).

APPENDIX 5

General principles for search and rescue procedures

- 11A5.1** Whilst there is a range of standard operational procedures available for search and rescue operations within structures, search and rescue procedures are generally premised around one of two basic methodologies. These two methodologies are referred to as compartment search procedure, and directional search procedure. Both are systematic and effective methods for searching structures and for locating sources of fire and any persons that may be within the structure who require rescue.
- 11A5.2** The basic principles underpinning these two methodologies are 'compartment search procedure' and 'directional search procedure' expounded below

Compartment search procedure

- 11A5.3** The fundamental principle of this procedure is that a BA team will attempt to fully search each compartment they enter before moving on to the next compartment.
- 11A5.4** On receiving and confirming their brief, the BA team will move to the point of entry and enter the risk area. The search may start at the point of entry or from another designated point, in accordance with the brief given at the entry control point. At all times within the risk area the team will maintain a left or right hand orientation and use the corresponding wall as their fixed reference point. At the point designated in the brief they will commence a compartment search procedure.
- 11A5.5** On entry into the first (primary) compartment to be searched, the perimeter and, in the case of small-to-medium sized compartments, the centre of the compartment, are searched at the same time. This is achieved by the team leader maintaining contact with the wall and the remaining member/s of the team searching out into the centre of the compartment. Remaining at ninety degrees to the wall as far as possible will maximise the distance the team can cover out into the centre of the compartment. This will also ensure that the search is systematic. As the team progress around the compartment, they should carry out a door sweep around any doors encountered and then continue to progress around the compartment.
- 11A5.6** In large compartments, it may not be possible for a BA team to systematically search and clear the entire space, whilst remaining in touch contact with the wall. In such situations, where it is determined that these larger compartments also need to be searched, alternative procedures and techniques should be considered, such as the use of: larger BA teams; multiple BA teams searching the compartment in a coordinated manner; tactical ventilation; positive pressure ventilation; and BA guidelines/branch guidelines.

- 11A5.7** When the BA team have fully traversed the perimeter of the compartment they are searching and returned to the initial point of access into the compartment (which should additionally be identified by the presence a hose line at the access point) they will progress to the next compartment by maintaining a left or right hand wall orientation, as briefed at the entry control point, and enter the first compartment they identified off the compartment in which they are currently located. The same procedure will then be repeated for that and any subsequent compartments.
- 11A5.8** Regardless to which methodology is used, searches should be thorough and include spaces, where a person or child may hide, such as underneath and in beds, wardrobes, and cupboards.
- 11A5.9** On completion of the search, or at the pre-planned turn-around pressure, or at any point during the wear as the BA Team Leader determines, the BA Team Leader should ensure that orientation with the wall is maintained, albeit the direction of travel reversed in order that the team may exit the structure.

Directional search procedure

- 11A5.10** The fundamental principle of this procedure is that BA search teams will search in a specific left or right hand direction. The overall intention of the procedure is to clear all compartments but not necessarily before moving between compartments.
- 11A5.11** The fundamental difference between this and compartment search procedure is that here a BA team will immediately progress through the first door they locate in any compartment in the specified left or right hand direction, before fully searching the compartment they are currently in.
- 11A5.12** On receiving and confirming their brief, the BA team will move to the point of entry and enter the risk area. The search may start at the point of entry or from a designated point in accordance with the brief given at the entry control point. At all times within the risk area the team will maintain a left or right hand orientation using the left or right hand wall as their fixed reference point. At the point designated in the brief they will commence a directional search procedure.
- 11A5.13** On entry to the compartment from where the search is to commence, the BA team will attempt to maximise the area searched within the entire structure by attempting to search the perimeter and the centre of any compartment at the same time, using the same methods (including door sweeps) as detailed in compartment search procedure.
- 11A5.14** On completion of the search, or at the pre-planned turn-around pressure, or at any point during the wear as the BA Team Leader determines, the BA Team Leader must ensure that orientation with the wall is maintained, albeit the direction of travel reversed in order that the team may exit the structure.

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