LONDON FIRE BRIGADE

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Freedom of Information request reference number: 6212.1

Date of response: 07/01/2022

Request:

I am writing to request information and or any policies heald by the brigade involving the use of Breathing Apparatus both Standard and Extended Duration Including donning doffing and minimum crew requirements to commit teams at incidents.

Further to this, I would also like to request any information and or policy the brigade holds on the use of breathing apparatus in a Chemical, Biological, Radiological, Nuclear, and high yield Explosives (CBRNE) Capacity including the donning and doffing requirements (including the need for and types of decontamination available to the brigade) and different levels of CBRNE Protection available to firefighters both on frontline DLPs, FRUs or DIM Units.

Response:

The only policy about breathing apparatus, available in the public domain, is policy number 466: *Respiratory protective equipment - breathing apparatus - operational procedures*, which I have attached to this email.

I have also attached the Brigade's internal policy, number 476: *RPE - BA Drager PSS7000 Technical Information*.

The London Fire website provides a lot of information about the proposal for the replacement of the breathing apparatus equipment currently used by the Brigade and you can find it, via this weblink:

https://www.london-fire.gov.uk/media/5698/lfc-0480-replacement-of-respiratory-protective-equipment-rpe.pdf

I hope you find this information of use but if you have any further questions, please do let me know.

We have dealt with your request under the Freedom of Information Act (FOIA) 2000. For more information about this process, please see the guidance we publish about making a request on our website.

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Respiratory protective equipment - breathing apparatus – operational procedures

New policy number:	**466**
Old instruction number:	**OPS:B160:a1**
Issue date:	**17 November 2006**
Reviewed as current:	**22 May 2018**
Owner:	**Assistant Commissioner, Operational Policy**
Responsible work team:	**RPE and Hazmat PPE**

Contents

1 Introduction

1.1 This policy details the procedures to be adopted when self-contained breathing apparatus (BA) is used. Respiratory protective equipment (RPE) will be used when personnel are committed to atmospheres with the potential to cause respiratory discomfort or injury. Incident commanders (IC) are to ensure that a sufficient level of control (both incident management and breathing apparatus control) is in place to support BA wearers and to prevent the uncontrolled use of BA resources. BA is the default level of RPE for fires and other incidents presenting an acute respiratory hazard.

1.2 This policy must be used in conjunction with other operational procedures in order to resolve incidents where respiratory protection is considered necessary.

1.3 The command details in this policy complement policy number 238 - Incident command procedures and policy number 408 - Incident command.

1.4 Technical guidance for standard duration breathing apparatus (SDBA) and extended duration breathing apparatus (EDBA) can be found in policy number 476 - Respiratory protective equipment – breathing apparatus – Dräger PSS 7000 – technical information. Guidance for BA telemetry can be found in policy number 760 - Respiratory protective equipment - Dräger PSS Merlin telemetry equipment – technical information.

1.5 For incidents requiring respirators see policy number 759 – Respiratory protective equipment - Dräger FPS 7000 – respirator face mask – operational procedure and technical information.

1.6 This policy has been prepared by the RPE and Hazmat PPE Team. If you have any questions relating to this policy please email RPE and Hazmat PPE mailbox.

2 Purpose of BA procedures

2.1 The purpose of BA and associated control procedures is to reduce the risk of respiratory discomfort or injury to personnel and provide safe systems of work when BA is used. It is important that personnel who may be required to wear BA or undertake BA control duties understand and properly implement these procedures at all times.

2.2 This policy has regard to the following RPE legislation and approved codes of practice as well as other health and safety legislation:

- National Operational Guidance Programme – Foundation for Breathing Apparatus.
- National Operational Guidance Programme – Breathing Apparatus Training Specification.
- Control of Substances Hazardous to Health Regulations: 2002.
- Ionising Radiations Regulations: 1999.
- Control of Lead at Work Regulations: 2002.
- Control of Asbestos Regulations: 2012.
- Dangerous Substances and Explosive Atmospheres Regulations: 2002.
- Confined Spaces Regulations: 1997.
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations: 2013.

3 Definition of terms

3.1 Acute respiratory risk – this type of risk will be associated with hazardous atmospheres with the potential to cause immediate respiratory injury if the face mask were removed.

3.2 BA sector – is a functional sector with a designated sector commander BA. This will support BA operations, resourcing and logistics and any other BA requirements (this is the new term for BA main control).

3.3 BA team – a number of BA wearers designated to work together in the risk area.

3.4 BA wearer – all personnel trained and nominated to wear breathing apparatus.

3.5 Communications operative (Comms-Op) – the person responsible for maintaining communications between BA teams and entry control point (ECP).

3.6 Distress signal unit (DSU) – an automatic or manually actuated alarm that indicates a BA wearer is in distress.

3.7 Entry control operative (ECO) – the person responsible for monitoring and maintaining the entry control board (ECB).

3.8 Entry control point (ECP) – the position for the command and control, deployment and monitoring of BA wearers into a risk area.

3.9 Entry control point supervisor (ECPS) – provides a greater level of control at an ECP and is appointed when Stage II entry control is used.

3.10 Entry point (EP) – point of entry into a risk area.

3.11 Incident commander (IC) – the person in overall command of an incident at a particular time (see policy number 431 – Incident commander and monitoring officer). This term is used throughout the policy to identify the individual that has responsibility for ensuring the practices and procedures detailed in the policy are put in place and carried out. (the implementation of, and the functions within, the procedures may be delegated to another individual, but responsibility for them remains with the IC).

3.12 Low pressure warning – electronic or pneumatic warning that the safety margin has been reached.

3.13 New entry – the BA wearer is wearing BA for the first or second time, the BA set has cylinder contents at or above the minimum entry pressure of **240** bar when reporting to the ECO.

3.14 Re-entry – the BA wearer has closed down BA set and is redeployed to complete a specific task that does not include firefighting (**190** bar minimum and no longer than **15** minutes duration).

3.15 Safe air – an environment where the air is breathable and will not be harmful without the use of respiratory protection.

3.16 Time of warning –time at which low pressure warning actuates.

3.17 Time to warning – remaining working duration until actuation of low pressure warning.

3.18 Turn-around pressure (TAP) – the pre-determined cylinder pressure at which the BA team should commence withdrawal from the risk area so that the ECP is reached before the low pressure warning actuates. This TAP should be reviewed by the wearers, although the ECO must be informed of any change (for example where wearers reach their TAP but are working very close to their known exit).

3.19 Turn-around point – the pre-determined point at which the BA team will turn-around and withdraw from the risk area. This will be a location or landmark i.e. work and don't go beyond the top of the stairs.

3.20 Turn-around time (TAT) – the pre-determined time the BA team will begin to retrace their steps to withdraw from the risk area, timed and communicated by the ECO/ECPS i.e. to reduce BA team exposure to known extreme conditions.

3.21 Working duration – is the time between taking the first breath, and the actuation of the low pressure warning (electronic or pneumatic).

4 Wearing of BA

4.1 At any incident, the IC is responsible for ensuring that RPE is worn whenever there is a risk of personnel suffering respiratory discomfort or injury. Where **any** doubt exists as to the presence of a respiratory risk, the IC will give instructions for RPE to be used. BA is the default level of RPE for fires and other incidents presenting an acute respiratory hazard. Personnel are reminded that the products of combustion at car fires are particularly hazardous and BA must always be worn.

4.2 BA is normally worn on the authority of the IC; however, personnel can request to wear it for respiratory protection and such requests should be considered as part of the normal risk management process. There may be exceptional circumstances (safety reasons) where personnel may need to wear a BA set without obtaining the IC's permission first; justifiable examples include a sudden change of wind direction affecting a pump operator, where safety would be compromised if they were to leave the pump unattended). In such instances personnel should don BA and inform the IC and ECO of that decision as soon as possible.

4.3 Personnel are only to be committed to the risk area wearing BA on the instructions of the IC once the required level of BA entry control is in place.

4.4 BA teams must consist of a minimum of two BA wearers. The nominated BA team leader must have radio communications. BA teams should be kept as small as practicable.

4.5 Whilst larger BA teams can reduce workloads this may lead to difficulties in communications between BA team members. Good practice would be to use multiple BA teams of two who can, if required, work together.

4.6 Exceptionally, there may be operational circumstances where one BA wearer for firefighting would suffice. In these circumstances a minimum of BA stage I entry control will be applied. Examples of these circumstances include car fires, rubbish fires, hot cutting and working a monitor at the head of an aerial appliance.

This procedure can only be applied in the following circumstances:

- Operations are not within a building or structure. A single BA wearer is not to enter a building, structure or any other significant risk area alone.
- The BA wearer is always in view of the IC or other nominated officer or crew member and can be quickly removed from the risk area.

4.7 Where a fire or risk of fire is still present BA teams must be committed with extinguishing media. The IC should ensure sufficient personnel are deployed to ensure BA teams do not have to separate for hose management whilst inside structures.

4.8 No search and rescue team 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 fire extinguishing media (either carried by them or by another BA team).

5 Hazards

5.1 The hazards listed below can reasonably be expected to be encountered at incidents where breathing apparatus is worn.

5.2 This list is not exhaustive and the IC should be aware there maybe additional hazards arising from the incident which are not specific to the use of breathing apparatus:

- Atmosphere – the atmosphere can be oxygen deficient, toxic or flammable or contain dust or particulates, heat and steam, bio-hazards, cryogenics, aerosols and/or radiation.
- Temperature – heat (conducted, convected, radiated, steam contact and reactive chemicals) cold (cryogenic, decompressing gases, ice, cold water, wind chill and very cold metal objects).
- Reduced visibility – smoke and any physical barrier screening another hazard.
- Electricity – electrocution or electric shock.
- Cables and structural failure – entrapment and or entanglement.
- Environmental – weather, terrain, height, unsafe structures, confined spaces and topographical.
- Hazardous materials – any materials covered by PN 796 – HAZMATS – fires and incidents involving hazardous substances.
- Manual handling – SDBA weighs approximately 15.5kg and EDBA weighs approximately 22kg. Together with full firefighting personal protective equipment (PPE) this amounts to a significant additional load for the wearer.

Breathing apparatus wearer

6 Nominated BA wearer station duties

6.1 Ensure that personal competence and BPAs are kept up to date, if lapsed inform OiC.

6.2 When nominated as a BA wearer personnel shall:

- Carry out an 'A' test of the BA set and ancillary equipment (see Babcock BA 012 'A' test Core Skills and policy number 476 - Respiratory protective equipment – breathing apparatus – Dräger PSS 7000 – technical information). An 'A' test is carried out, when taking over a BA set, following a cylinder change and when nominated to test any 'spare' BA set.
- In exceptional circumstances (where personnel are unable to record the completed test results), verbally confirm with their watch officer that the BA set has been checked and is working satisfactorily. If committed to a risk area personnel will ensure that 'A' test not recorded' is entered onto the ECB by the ECO.
- Report to the watch officer any defects and or missing equipment immediately.
- Ensure a BA set that fails testing is not worn until the reason for the failure is rectified.
- Inform the watch officer if the BA log book shows that a BA set has not been worn under controlled conditions (e.g. for any drill that does not involve real fire training) within the last 28 days and carry out a 28 day test as detailed in policy number 476.

7 Nominated BA wearer incident duties SDBA

Rigging

7.1 Nominated BA wearers must **not** get rigged in BA en-route to incidents.

Radio communications

7.2 Dedicated BA radio interface equipment (BARIE) provides BA wearers with effective communication and should be used whenever available. If dedicated BARIE sets are not available a minimum of one hand held radio per BA team must be carried.

7.3 The IC will undertake a risk assessment (RA) to determine the possibility of an explosive atmosphere being present (see policy number 458 – Entel HX 480 1 Hand held incident ground radio).

7.4 In all instances where initial BA teams are deployed into compartments where a potentially explosive atmosphere may be present only BARIE sets can be worn, as they are the only radios that are intrinsically safe (hand held radios should be removed when replaced by BARIE sets in these circumstances).

7.5 Radio communications equipment must be worn by BA team leaders and **must** be tested prior to entering the risk area.

7.6 Information regarding the BA team's progress and any hazards identified should be regularly transmitted to the ECO or Comms-Op and recorded. Wearers should be aware that other BA teams will be using the same radio channel and therefore keep such messages concise.

7.7 If a BA team has an unexpected or sustained loss of communications with the ECO or Comms-Op, the team leader will decide whether to withdraw. If both telemetry and radio signal is lost the BA team **must** withdraw to a point where communications can be restored. This position should be landmarked for deployment of telemetry repeaters.

7.8 If there is unexpected or sustained failure of communications with any BA team, an assessment of risk should be undertaken by the person responsible for the ECP and they must decide whether a BA emergency team should be committed to investigate. If there is any doubt, the person responsible for the ECP must be immediately informed and a BA emergency team **must** be committed.

7.9 Standard communications discipline as used with main scheme radio should be maintained and, in any emergency, the message should be prefixed as 'priority'. If a BA team is unable to communicate on the BA channel (channel 6), they should use the general incident command channel (channel 1).

7.10 Where a radio leaky feeder is in use BA teams will be told to transmit on channel 5.

7.11 For further information see policy number 593 – Entel ht981 intrinsically safe fireground radio.

Briefing from IC or sector commander (SC)

7.12 The whole BA team shall receive and confirm understanding of a briefing prior to deployment and, as a minimum, this should include:

- Where and how they are to enter the risk area.
- Team objectives and their part in the ICs plan.
- Any identified hazards.
- Any limitations on wear duration (on instructions from the person responsible for the ECP).

Don and start

7.13 BA wearers must:

- Don and start in safe air (see Babcock BA 010 Donning, Starting and Closing down Core Skills and appendix 2 of this policy).

- Carry out buddy checks to ensure RPE and PPE are correctly fitted and that no skin is exposed.

Entry control point (booking in)

7.14 BA wearers reporting to an ECP shall:

- Ensure at least **240** bar pressure reading when reporting to the ECO. Calculate and select the required turn-around pressure (TAP) in agreement with the person responsible for the BA ECP and the BA team leader (see green TAP column on the ECB duration table).
- If detailed to use firefighting media ensure branch and water supply are checked by opening them for several seconds and testing the branch flow and jet pattern settings before entering the risk area.
- Confirm nominated radio channel and test communications equipment with ECO or Comms-Op. Establish and confirm a call sign with ECO or Comms-Op.
- Don BA set and hand BA tally to the ECO before entering the risk area ensuring the tally is placed in the ECB with the 'time in' completed.
- Ensure a BA telemetry signal is established prior to entering the risk area (unless informed that manual calculations are being used).
- Inform the ECO if they have already worn BA at the incident and ensure ECO records 'A/B test not recorded' on the ECB prior to entry.

Low battery warning (Bodyguard)

7.15 If the Bodyguard 'reduced battery level' icon and alarm actuates prior to booking in at the ECP, the wearer must:

- Withdraw from the ECP.
- Take BA set out of service and replace onto the appliance to recharge.

7.16 If the Bodyguard 'reduced battery level' icon and alarm actuates when the BA set is being worn in the risk area:

- Inform the ECO or Comms-Op immediately.
- The BA wearer can continue with deployment within the risk area.
- Following withdrawal from the risk area the BA set shall be taken out of service and replaced onto the appliance to recharge.

Deployment within the risk area and close personal contact

7.17 Immediately inform ECO or IC if circumstances mean the team have to change their objectives, briefed tasks or part in the ICs plan whilst deployed in the risk area.

7.18 Carry out safe movement at all times, utilising safe and effective search and rescue techniques (see Babcock BA 005 Safe Movement, BA 006 Search and Rescue Procedures Core Skills and policy number 803 – Search and rescue procedures within structures).

7.19 Promote and maintain regular communication with BA team leader and other BA team members and update them regarding any relevant information.

7.20 When visibility is impaired, BA team members must maintain close personal contact. Close personal contact is necessary to ensure the safety of personnel, and to facilitate the exchange of information within the BA team.

7.21 The BA team must risk assess the conditions and select the appropriate level of close personal contact used unless otherwise directed by the briefing officer. For example a higher risk may be found in large complex premises, or when there are significant indicators of fire and or extremely low visibility. A lower risk may be found in domestic premises, or during post-fire ventilation, damping down and cutting away operations, when the fire risk has been controlled and visibility has improved.

7.22 Depending on visibility and the perceived level of risk, a hierarchical approach to deciding which method to adopt should be taken, as per below:

- Attachment by short BA personal line.
- Actual physical contact between each BA team member.
- Within physical touching distance.

7.23 The effects of heat and physical exhaustion may impair wearer's decision making as time within the risk area increases. BA team members must therefore review the level of close personal contact used at regular intervals and consider the use of BA personal lines.

7.24 When BA teams encounter hazards such as stairs or vertical ladders they can briefly separate, although only to the minimum extent necessary and no more than the distance created by the hazard.

7.25 Regularly check pressure readings and monitor air consumption (and prompt other BA team members to do so) to allow sufficient duration to withdraw to the ECP before low pressure warning actuates. Pressure checks should be carried out more frequently when working hard, as this can have significant effect on air consumption rates and consequently duration times.

7.26 Regularly check for telemetry signal (flashing blue LEDs on front of Bodyguard and radio icon ticked on Bodyguard display). When out of signal contact ECP via radio communication to update on safety and wellbeing of the team.

7.27 Assist the BA team leader with brief and task, memorising route in and out of the risk area (take regular landmarks throughout movement), and pass radio messages to ECP if required to do so by BA team leader.

7.28 Constantly monitor conditions and re-evaluate risk, be especially observant with regards to signs of potential backdraught and flashover (paying particular attention to the colour, volume and pressure of smoke) and the integrity of the structure/compartments for signs of potential collapse.

7.29 Monitor conditions using thermal imaging camera (TIC) remember above, below and concealed (ABC).

7.30 Be aware of the signs and symptoms of heat stress and monitor the physiological effects for self and team. See section 25 and 26 of this policy and policy number 284 - Metabolic heat stress.

Air management

7.31 Each wearer will consume air at a different rate and in relation to factors such as body mass, individual levels of fitness, work rate, environmental conditions and the wearer's reaction to the situation. Therefore, each wearer must:

- Carry out regular pressure checks to monitor their consumption (update ECP with readings when out of telemetry signal).
- Inform BA team leader of their pressure 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 (see team and task rotation in section 8).

- Carry out own 'turn around' calculations (see Babcock BA 023 Cylinder and Consumption rate Calculations Core Skills), and take responsibility for informing the BA team leader of the pressure at which the team will need to start exiting the risk area.
- Return to the ECP before their low pressure warning begins to sound.

7.32 In assessing working duration, team leaders and wearers should take into account all aspects of the incident. These include:

- The air consumed to reach the scene of operations.
- The potential for physiological and psychological stress and or distress as a result of environmental conditions or workload (e.g. high temperatures, humidity, casualty rescue etc.).
- The physical conditions and/or depth of penetration into the risk area, such as any confined space. The likelihood that conditions on the exit route may have deteriorated.
- Information received from the ECO or Comms-Op and other BA teams.
- That consumption rates on the way out may be higher due to the natural effects of physical exertion or increased workloads (casualty rescue etc.).
- Any relocation of ECP.

Team and task rotation

7.33 This is a technique used to ensure that all members of a BA team that are committed to a risk area consume approximately the same amount of air (especially important when wearing EDBA).

7.34 This is a simple method and involves all BA team members sharing tasks, roles and functions. Examples include:

- Rotating the BA team members through different positions when carrying equipment or a casualty on a stretcher.
- All BA team members 'taking turns' at undertaking a specific task.
- All BA team members rotating through the number one position and leading the BA team (the designated BA team leader will, however, always remain in command of the BA team).

7.35 BA team leaders must ensure that team and task rotation is applied although it is equally important that all BA wearers consider it's application and prompt the BA team leader if necessary.

Entry control point (booking out)

7.36 BA wearers exiting the risk area shall:

- Immediately report to the ECP, close down BA set and collect BA tally from the ECO.
- Assist BA team leader with debrief (as required) ensuring that any information that may assist other BA teams entering the risk area, or the IC, is made known to the person responsible for the ECP. It may assist to draw a basic plan (or use plans available) to identify the route, any hazards, location of casualty(s), landmarks and clearly mark areas that have been searched to assist any further BA teams.

BA set testing (incident ground 'A' and 'B' test)

7.37 A BA wearer can only carry out one incident ground 'A' test on their BA set. The BA set is not to be used after the second wear unless a 'B' test has been carried out. If a BA set that has already been worn and is then allocated to another BA wearer a 'B' test must be completed. The operational support unit (OSU) with BA maintenance resource pack must be in attendance to enable a 'B' test to be carried out.

7.38 BA sets that have become heavily contaminated must be 'B' tested before being worn again.

7.39 Carry out all incident ground testing away from the risk area so that any DSU sound will not be heard by wearers in the risk area or interpreted as coming from inside the risk area.

Damping down and cutting away

7.40 During damping down and cutting away operations where fire compartments **remain hot/warm** the minimum RPE level is breathing apparatus. Unseen fire gases will still be present so therefore particulate filters will not provide the correct level of protection.

8 Nominated BA wearer incident duties EDBA

8.1 This section provides further guidance for EDBA, however wearers must be aware that standard BA procedures still apply.

8.2 EDBA is provided to give an enhanced duration where long travel distances or the conditions likely to be encountered make SDBA less effective, such as incidents below ground or when searching large buildings. It is **not** provided in order to increase the amount of work BA wearers can undertake within the risk area.

8.3 Due to the demands that wearing EDBA will place on wearers it is important that BA team leaders, IC or SC and wearers pay particular attention to their mental and physical well-being. Anyone who has doubts about their own or another's ability to withstand the demands placed upon them as EDBA wearers are to bring these to the attention of their watch officer and or IC.

8.4 EDBA wearers are only to be used for 're-entry' or 'second wear' in exceptional circumstances.

8.5 EDBA wearers and their watch officers have a responsibility to ensure they are fit to wear EDBA given the potential additional physiological demands that may be involved.

8.6 For specific technical information regarding EDBA see policy number 476 – Respiratory protective equipment – breathing apparatus – Dräger PSS 7000 – technical information.

9 Nominated BA wearer post wear duties

9.1 On completion of a BA wear, ensure self and other team members are not suffering the effects of heat stress and on the instructions of a relevant officer relax PPE, allow to cool down, hydrate as soon as possible, rest and recuperate.

9.2 BA wearers must report any injury, safety or near-miss events to the IC.

9.3 As soon as possible after wearing BA clean and wash hands to reduce the risk of cross contamination from the risk area (see policy number 707 – The control of infection and infectious diseases policy).

9.4 On return to station ensure that the appropriate testing and cleaning is carried out on BA set and ancillary BA equipment and appropriate log book and records are completed.

10 Nominated BA team leader incident duties

10.1 A member of the BA team will be nominated as team leader by the IC or SC. This must not be a firefighter on development.

10.2 The BA team leader should not perform all team tasks personally and tasks should be shared between team members i.e. use of TIC and operation of firefighting media.

10.3 The BA team leader is responsible for the BA team whilst in the risk area and when making decisions should consider:

- The IC or SCs risk assessment and briefing.
- Their knowledge and experience.
- Any information received from outside the risk area.
- Visual and other 'cues' inside the risk area (noise, temperature).
- Evidence gathered from situation, task and event using the decision making model (DMM).
- Information from equipment, such as Bodyguard and TIC.
- Information from other BA team members.

10.4 The duties of BA team leaders are to:

- Ensure the whole BA team is fully briefed by the briefing officer before deployment into the risk area and is debriefed on exit from the risk area and that any relevant information is passed to the ECO, IC, SC or other BA teams.
- Lead the team to complete allocated tasks and return to ECP.
- Promote and maintain regular communications within the BA team.
- Co-ordinate pressure and telemetry signal checks ensuring that the BA team return to the ECP before any BA set low pressure warning operates and having regard to limits previously agreed with the IC or SC to prevent undue exposure to known harsh conditions.
- Monitor working conditions to identify any adverse and changing conditions, such as temperature change/rise or change in smoke colour/pressure and assess their impact on BA team members and their working duration.
- Exchange information on pressure readings with the ECO if loss of telemetry signal occurs
- Regularly pass information on conditions, premises layout, hazards and BA team status to the ECO or Comms-Op.
- Ensure that BA wearers committed as a BA team remain together and exit at the same time and place. BA teams must **never** be split.
- Decide whether to continue to carry out operations if radio communications with the ECP fail, recognising that a BA emergency team may be committed to investigate.
- Prompt BA team members to undertake task rotation and air management. Objectives defined in pre-entry briefings should be re-assessed in the light of the prevailing conditions if necessary.
- Ensure that if it is felt necessary to deviate from the teams brief that this is communicated to the IC or SC prior to any change in tactics.
- Ensure all BA team members operate the withdrawal button (right button) on the Bodyguard when deciding to return to the ECP, this will be acknowledged by the ECO. It is good practice to contact the ECO by radio to confirm this operation.
- Ensure that any unintended actuation of the withdrawal button is communicated to the ECO. In this circumstance, the BA team may continue to complete their task.
- Provide feedback to person responsible for the ECP on exit from the risk area.

10.5 The BA team leader **must** withdraw the BA team and inform the ECO or Comms-Op if any of the following occur:

- Any BA team member has an uncontrolled loss of air.
- A BA set low pressure warning actuates.
- Any BA team member seems unwell or confused.
- Any BA team member's Bodyguard display becomes faulty or unreadable.
- A BA set DSU actuates within the team (ECO should also be alerted to this by the ECB).
- Any BA team member indicates they may have been exposed to an irrespirable atmosphere due to a dislodged or defective face mask.

- A sustained and/or unexplained breakdown of both radio and telemetry communications (withdraw the BA team to a point where communications can be restored).
- Any BA team member reaches a pre-determined pressure reading set by the person responsible for the ECP, following an assessment of physiological risk and other relevant information. For example, in the case of chemical protective clothing (CPC), by determining sufficient time for decontamination procedures to be carried out within the 20 minute recommended wear time.
- An emergency evacuation signal sounds and receipt is confirmed with ECO or Comms-Op (ACME thunder whistle, radio comms or telemetry).
- Loss of firefighting media.
- Conditions in the risk area have deteriorated to the extent that BA team members are exposed to an unacceptable level of risk.

10.6 In any of the above circumstances the team must withdraw together and the team leader must consider operating their DSU (if none are already actuating) to summon assistance from other BA teams and to alert the ECO via telemetry communication.

10.7 If the BA team are unable to withdraw they must immediately go into entrapped procedure and inform ECO or Comms-Op if possible.

10.8 If the decision is made to withdraw the BA team prematurely from the risk area inform the ECO or Comms-Op if possible.

11 BA emergency team

11.1 The IC must nominate a BA emergency team as soon as resources allow.

11.2 The BA emergency team shall be nominated and maintained throughout BA operations. This is a dedicated role and this team should only be used for other tasks in exceptional circumstances i.e. to save a saveable life.

11.3 The BA emergency team must be:

- Led by a minimum rank of leading firefighter (LFF).
- At least as large as the largest BA team or teams working together on the same task.
- Rigged to at least the same level of PPE/RPE as BA teams already committed.
- Switched to the same radio channel as BA teams already committed to enable the emergency team leader to monitor and communicate with committed BA teams. The BA emergency team(s) will adopt call signs linked to the ECP 'alpha emergency team one', 'alpha emergency team two' and so on. A BA emergency team should consist of BA wearers who have not previously been committed to the risk area, unless the knowledge of those wearers is required to allow the team to be effective (e.g. their previous wear means that they know the route/layout in a complex building).

11.4 The IC should take into account the demands likely to be made on these BA wearers and should consider using them to only undertake specific functions, such as searching for missing BA wearers in a known area. If the BA emergency team is committed to locate a BA team, they should be briefed to locate the BA team and immediately report back (either by radio or physically) the condition and circumstances of the BA team.

Note: Resuscitators must **not** be taken into the risk area, consider 'second set' procedure.

12 Nominated BA emergency team incident duties

12.1 A nominated BA emergency team shall provide the following equipment to their nominated ECP:

- An additional ECB set up and annotated 'BA emergency team' for use by the BA emergency team if committed.
- One 'second set' (select ECO's BA set and include second set bag where available) carried by every two BA wearers in the BA emergency team (split tally from Bodyguard key and write 'second set' on the BA tally of the 'second set' and insert it into the ECB, bracketed together with the BA emergency team).
- A charged 45 mm second jet (if not already in place). Where resources allow this should be from an alternative pump and water supply.

12.2 Once established the BA emergency team should :

- Monitor briefing/debriefings for all other BA teams committed and exiting from that ECP.
- Monitor radio messages sent and received to and from that ECP.
- Familiarise themselves with building layout/construction and plan alternative emergency egress points.
- Plot the locations of BA teams already committed from that ECP.
- Provide a full brief to any relief BA emergency team sent to that ECP.

BA emergency team actions on locating distressed BA wearer(s)

12.3 Following the search and location of distressed BA wearer(s) the BA emergency team shall:

- Silence the distressed BA wearer(s) DSU to improve communications. Use 'second set' Bodyguard key to silence actuating DSU and then return key to the 'second set' so that BA wearer(s) Bodyguard remains active following silencing.
- If possible, get the distressed BA wearer(s) to confirm the nature of the emergency.
- Inform ECP that distressed BA wearer(s) have been located and request any further assistance that is required.
- Take pressure readings of both distressed BA wearers and the BA emergency team to assess if sufficient duration remains to withdraw and any requirement to supplement air.
- Render any on scene emergency assistance as required.
- Following assessment of risk, determine and implement a safe action plan to remove distressed BA wearer(s) from the risk area.

13 Cable entanglement

13.1 BA teams must use safe movement procedures at all times, as this will help to identify any fallen cables and enable BA team members to avoid entanglement.

13.2 Any BA wearer encountering fallen cables must immediately inform all BA team members, other BA teams and the ECO or Comms-Op of the location of cables encountered. The ECO must also ensure that the presence of this hazard is communicated to the IC or SC.

13.3 BA teams should risk assess the need to travel through areas where fallen cables are encountered, using alternative routes if available.

13.4 Where a BA team member becomes entangled and is unable to free themselves they must immediately:

- Inform all other BA team member(s) and remain as still as possible to prevent further entanglement.
- Carry out cable entanglement procedure (see Babcock BA 017 Emergency Procedures Core Skills and Cable entanglement training BPA appendix 5 of this policy).

13.5 If any BA team member is in distress as a result of cable entanglement their DSU **must** be actuated immediately.

13.6 On the release of an entangled team member, the BA team leader in consultation with BA team members must establish if they can continue with operations. They must inform the ECO of their decision and the ECO should convey this information to the IC or SC.

Note: If any DSU has been operated, the BA team **must** withdraw.

13.7 ECOs being informed of BA team entanglement must:

- Inform the person responsible for the ECP.
- Commit BA emergency team.

13.8 ICs or SCs being informed of BA team entanglement must:

- Consider declaring a "firefighter emergency" (see policy number 496 - Firefighter emergency, emergency evacuation and tactical withdrawal).
- Consider isolation of electrical supplies.
- Commence accident investigation (all instances of cable entanglement are to be recorded).

14 Distress signals

14.1 A DSU must be operated **immediately** by a BA team member if they:

- Become lost or confused or are injured and in difficulty.
- Have problems with their BA set.
- Become distressed, trapped or disorientated.

Note: **Do not wait** – inform ECO or Comms-Op and then operate the DSU to summon assistance.

14.2 BA team(s) hearing a distress signal must advise the ECO or Comms-Op and must keep them informed of their actions.

14.3 On hearing a distress signal the team leaders of all BA teams are to direct their BA teams to investigate the source of the sound. Rendering assistance to a BA wearer in distress takes precedence over other tasks, subject to:

- Having sufficient reserves of air to enable effective assistance to be given.
- Whether the BA team is already undertaking a rescue or maintaining egress routes for other BA teams within the risk area.

14.4 The team leader of the BA team sounding the DSU should consider whether the team should withdraw or remain stationary until they are located by a responding BA team/emergency team.

14.5 The use of radio communications will assist the ECPS/ECO or IC/SC to determine the nature of the distress and assist in providing an appropriate response.

14.6 When making the decision to withdraw after actuation of a DSU, BA team leaders should consider:

- How close they are to the exit.
- How close they are to the fire or other hazard.
- Whether staying where they are puts them in further/greater difficulties/increased risk.
- Whether attempting to withdraw puts them in further/greater difficulties/increased risk.
- Proximity of and how other BA teams may be able to assist (communicate assistance required if appropriate).
- Impact of the fitness or condition of BA team members on their ability to withdraw.

14.7 It should be noted that some devices sound like a DSU. All such sounds should be investigated and, if it is not a DSU, inform the IC or SC (and other BA teams) via the ECO or Comms-Op.

14.8 If any member of a BA team has an accidental actuation of their DSU the BA team must take the following actions:

- Inform the ECO or Comms-Op by radio to confirm accidental actuation, so that a BA emergency team is not committed unnecessarily.
- Withdraw from the risk area and report to ECP.

The ECO must take the following actions:

- Inform other BA teams committed of accidental actuation.
- Instruct the BA team to stay under air when they report to the ECP.
- Cancel the DSU with the affected wearer's Bodyguard key taken from the ECB.
- Manually log off that BA wearer and then reinsert the BA tally into the same BA tally position on the ECB and release the BA team back into the risk area if appropriate (see section 31.9).

15 Entrapped procedure

15.1 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.

15.2 The low pressure warning operates when sufficient air remains for 12 minutes duration at a consumption rate of 50 litres per minute for SDBA and 18 minutes duration at a consumption rate of 58 litres per minute for EDBA. These times can be greatly extended by reducing demand.

15.3 No provision exists to conserve the air supply for compressed air BA other than by the wearer moderating demand by reducing their breathing rate.

15.4 When the BA wearer becomes aware that it is not possible to exit the risk area the following actions should be taken:

- Contact ECO or Comms-Op by radio (if possible).
- Operate one team members DSU (normally the member in distress/lowest pressure).
- Relax as much as possible in the circumstances by assuming a reclined or seated posture.
- Breathe calmly to minimise demand, stay in physical contact with other team members and conserve air by keeping verbal communication to a minimum.

15.5 Do not operate the additional flow button on the lung demand valve (LDV). Do not adjust the cylinder valve other than to ensure it is fully open.

15.6 Once the safety margin has been reached the low pressure warning will actuate. The electronic warning consumes no air and the pneumatic warning consumes a minimal amount. Consider exchange of air procedure.

16 Emergency exchange of air

16.1 The BA set is fitted with a 'second person connection' which allows exchange of air to be completed.

16.2 Where a BA team member becomes aware that they are low on air they must immediately:

- Inform all other BA team members.
- Carry out exchange of air procedure (see Babcock BA 017 Emergency Procedures Core Skills) and appendix 2 of this policy.

16.3 Following exchange of air the donor must contact the ECO or Comms-Op with following information:

- BA team location.
- Whether or not they are adopting entrapped procedure.
- Whether or not they are exiting the risk area.
- That exchange of air has taken place and the BA wearers affected.

16.4 The recipient then activates their DSU.

16.5 The BA team will either exit the risk area or adopt entrapped procedure.

Exchange of air and gas tight suit (GTS)

16.6 In order to supplement the air supply to a GTS wearer without compromising the GTS it is necessary to use a second set. The second set must be packaged so that the second person connection is placed outside of the bag with the 1m rescue hose and back to back adaptor fitted. This can then be connected to the GTS external coupling at the wearer's left hip.

16.7 **If this is not immediately possible, use any method to get into the suit and connect to the BA wearer's second person connection.**

Exchange of air during GTS decontamination

16.8 GTS wearer's reporting for decontamination with a Bodyguard pressure reading of 100 bar or below must have their air supply supplemented by use of a 'second set' as per 16.6 above, this is supplied and connected by decontamination operative one (Decon Op 1-dirty).

16.9 When the wearer's GTS has been removed to waist level a Bodyguard reading must be taken. If the Bodyguard reading is 90 bar or below, Decon Op 2 (clean) provides another second set packaged as per 16.6 above and presents the wearer with the back to back adaptor. The wearer connects the BA set inline connection to the back to back adaptor and proceeds to ECP. Decon Op 2 (clean) will carry the second set for the wearer.

The ECO will monitor the cylinder pressure for the second set(s) in use. During the decontamination procedure remove tally from Bodyguard key and write 'second set' on the BA tally of the second set and insert it into the ECB prior to use.

17 Guidelines

Use of guidelines

17.1 Guidelines are only to be used on the instructions of the IC. It is recommended that guidelines are laid by EDBA teams.

17.2 They are used to provide a means by which a BA team entering and searching a risk area can retrace its steps. Guidelines also enable subsequent BA teams to make their way to, and return from the scene of operations with the minimum of difficulty.

- Stage II entry control procedure must be implemented when guidelines are used.
- Only one main guideline is to be laid along any single route from an ECP.

17.3 Main guidelines must be used:

- Where no other suitable means exist for tracing the way out of a risk area, such as when hose lines are submerged or tangled or premises layout is complex.
- To enter high expansion foam.

17.4 Branch guidelines are used:

- When there is a need to search off the main guideline a distance greater than can be achieved with the full length of a personal line (i.e. 6m).
- Branch guidelines must not be extended.

17.5 No more than two main guidelines and four branch guidelines can be in use from any single ECP.

17.6 Where practicable guidelines should not be laid closer than 6m to one another as this may lead to confusion when BA teams are traversing them.

Note. During the initial laying along a corridor from an EP this may be unavoidable until the guidelines split (if this is unavoidable, two guidelines must not be laid along the same wall).

17.7 When searching rooms that are known or discovered to be small the guideline should be gathered up and taken out of the room to shorten the route and use the guideline more efficiently. Update the ECO with this information via radio communications and on exit with the debriefing officer. It must be made clear to subsequent BA teams that this area has been searched.

17.8 The use of guidelines is covered in Babcock training note GL 001 Guideline Procedures and see appendix 3 of this policy for best practice assessment (BPA).

18 Bridgehead or forward BA entry control point

18.1 This may be implemented by an IC or SC when there is a requirement to provide an ECP at some distance from the initial point of access into a building or risk area, whilst still remaining in safe air, at incidents such as those involving high rise buildings or large, complex structures like shopping malls.

18.2 This allows the deployment of BA teams from safe air within a structure whilst being as close as practical to the scene of operations.

18.3 The location of the ECP in these circumstances will be determined by the IC or SC based on any site specific plan, the operational plan and the level of risk faced by BA teams.

18.4 A bridgehead or forward BA entry control point must be sited in safe air and with regard to the following factors:

- The potential for the incident to escalate.
- Availability of access and egress points to the risk area.
- BA team safety and welfare.
- Availability of water supplies.
- Effective communications with BA teams, IC and/or SC.
- The level of supervision and support necessary for the ECO.
- The distance from the initial point of access to the ECP.

18.5 See also policy number 467 - Breathing apparatus sub surface procedure and policy number 633 - High rise firefighting.

19 Working in high expansion foam (Hi-Ex foam)

19.1 Guidelines must be used whenever BA teams are committed into Hi-Ex foam.

19.2 Stage II entry control must be established and the ECO must ensure that the BA wearer's LDV outer rubber casing is pulled away from the LDV body (see policy number 476 - Respiratory protective equipment – breathing apparatus – Dräger PSS 7000 – technical information, appendix 1 for details).

20 Chemical protective clothing

20.1 When GTS is being worn the ECO and the wearer should be aware that the recommended maximum period for wearing GTS is 20 minutes. Agreement for an extension to the wearing time must be agreed with each wearer, not with the team leader alone.

20.2 Working duration may be extended where the work rate is low or the weather conditions are cool or shortened where work rate is high or the weather conditions are hot. When a work time has been agreed between the IC and each wearer this information must be conveyed to the ECO and noted in the 'remarks' column of the ECB.

20.3 Working duration will always be subject to the over-riding consideration that the BA team **must be withdrawn immediately if any wearer shows symptoms of heat stress**. For this reason all personnel should be made aware of the symptoms of heat stress, (see policy number 284 - Metabolic heat stress) and of the appropriate treatment for it, this is particularly relevant for EDBA wearers.

20.4 When Stage I BA entry control is operating, wearers must remain in sight of the ECO and Stage II entry control must be introduced if the wearers need to operate out of sight of ECO.

Low battery warning automatic distress signal unit (DSU)

20.5 If the Dräger Bodyguard 1000 DSU low battery warning signal actuates prior to booking in at entry control the CPC wearer must:

- Withdraw from the ECP.
- Remove the Dräger Bodyguard 1000 DSU and resources permitting, have the unit replaced and continue with operations.

20.6 If the Dräger Bodyguard 1000 DSU low battery warning signal actuates while CPC is being worn in the risk area the wearer must:

- Inform the ECO or Comms-Op immediately.
- The CPC wearer can continue with deployment within the risk area.
- Following withdrawal from the risk area the DSU should be taken out of service until battery replacement has been completed.

21 Aerial appliances and ladders

21.1 Aerial appliances should not normally be sited and pitched in a position which makes it necessary for personnel to wear BA in the cage or at the head of the ladder.

21.2 When the IC deems it necessary for BA wearers to work from the head of aerial appliances they must be controlled through the appropriate stage of BA entry control. The ECO shall make an entry on the ECB of the location of the wearer and that they are working alone.

21.3 Where it is necessary for a BA team to enter a building or structure at or above ground level by use of turntable ladder or pitched ladder, an ECP should be established at ground level in a safe area adjacent to the ladder.

21.4 Personnel working at the head of an aerial appliance must only wear BA on the order of the IC or SC.

21.5 A BA wearer working at the head of an aerial appliance must:

- Use communications to remain in contact with the aerial operator and the ECO.
- Stay on the ladder or cage.
- Wear a safety harness and lanyard attached to an anchor point.

21.6 On all occasions where BA is being used on aerial appliances the base operator must ensure a clear view of the cage/head whenever possible. Should the cage/head be enveloped in smoke or be otherwise out of view, the base operator should confirm with the BA wearer that it is safe to continue operations, and should inform the IC or SC of the changed situation.

21.7 Aerial appliance cages must not be used as ECPs.

21.8 Where an aerial appliance is used to provide means of access for BA wearers, or where the cage is occupied by BA wearers whether or not they are aerial operators, the operation of the appliance will only be by means of the base console. This must be sited in safe air. The operator at the base console must not wear or need to wear any RPE as vision may be restricted by the face mask.

21.9 When an aerial appliance or ladder is used for access by BA teams it **must not** be repositioned under any circumstances until the BA teams have returned and been brought down to ground level.

22 Distress to wearer (DTW) procedure

22.1 If a DTW incident occurs the IC must inform Brigade Control, request the attendance of an senior accident investigator (SAI) and implement the procedure detailed on BA aide memoire No. 5 – Distress to wearer procedure (see appendix 1) and (see Babcock BA 007 BA Entry Control Procedures Core Skills).

Definition of DTW

22.2 Any malfunction of a BA set, which is likely to or has the potential to deprive the wearer of air or expose them to a contaminated atmosphere (this includes cosmetic smoke), and that is discovered or occurs during:

- Actual use (operational or training).
- Any checks before use in a contaminated atmosphere (don and start or incident ground 'A' test).
- When BA is being worn after leaving a contaminated atmosphere.
- Where, due to restriction in the wearer's ability to operate the controls or remove the face mask, there is an actual or potential deprivation of air to the wearer.
- Where a defective BA set harness prevents the set continuing to be worn by pulling on the face mask causing potential deprivation of air.

22.3 Malfunctions found during routine testing or maintenance is **not** reportable under Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR 1995).

22.4 If any malfunction or fault occurs that does not fall under the definition of a DTW although an examination of the BA set is required (due to a safety event or investigation) this will fall under the 'special examination' procedure.

22.5 BA sets that require 'special examination' should be forwarded to Operations Support Group (OSG) using the equipment impounding box to preserve evidence. It should be clearly stated on the transport form that the BA set requires special investigation.

22.6 The term malfunction does not include leakage into a face mask due to poor face fit or a failure arising from an external source, such as falling debris or entanglement.

22.7 For advice contact the respiratory protective equipment logistics officer (RPELO), who is available 24/7 and can be contacted via Resource Management Centre (RMC) or Brigade Control.

23 Working with other brigades

23.1 Other fire and rescue services (FRS) may use different operational procedures and types of BA equipment and it is therefore important that an LFB officer attends to liaise, communicate, and resolve operational differences.

23.2 BA wearers from different FRS may be committed at the same incident if:

- They only use the equipment from their own FRS.
- They are under the control of an ECO/ECPS with ECBs from their own FRS.

23.3 BA teams must only consist of BA wearers from the same FRS. Where BA teams from more than one FRS have been committed to the same incident, each FRS will have its own ECB. Each ECP BA emergency team must support BA wearers from the same FRS and be equipped with the appropriate 'second set' as rescue equipment. This BA set must be the same BA set as that being worn by the BA team they are covering.

24 Working with other agencies

24.1 There are a number of other agencies using BA equipment (such as scientific advisor, police and ambulance services) that may be required to attend the same incident and memoranda of understanding (MOU) have been agreed to detail the arrangements in place for working with them.

24.2 The LFB via its training partner provides these agencies with initial and continuation training.

24.3 At incidents requiring other agencies to wear BA, where the LFB is in attendance, BA entry control procedures will be managed by LFB personnel.

24.4 Due to different consumption rates in use by other agencies, only London Ambulance Service Hazardous Area Response Team (LAS HART) EDBA teams may be committed through LFB ECBs. Where they do, LAS must provide a Comms-Op who is in constant contact with their deployed BA teams. All other agencies must provide their own ECB.

25 Welfare of BA wearers

25.1 The welfare of BA wearers must be considered and monitored whenever BA is deployed.

25.2 Firefighting PPE is essential for personal protection. However, while providing a thermal barrier to protect the wearer from high temperatures, it also prevents the dissipation of body heat as the wearer starts to work and will contribute to a rise in core body temperature. This will increase the likelihood and onset of heat stress.

25.3 The selection of PPE for BA wearers must be appropriate for the environment into which they are to be deployed and tasks to be undertaken (e.g. CPC may not require firefighting PPE to be worn underneath).

25.4 It is imperative for all personnel to remain properly hydrated whilst on duty.

25.5 It is recommended that a BA wearer consumes 500ml of water within the 30 minutes prior to working in BA.

26 Dealing with physiological effects of working in hot and humid conditions

26.1 The IC or SC must take account of the effects that working in hot and humid conditions can have on the body. All personnel must be aware that physiological stress may occur at any time and not just when wearing BA.

26.2 BA wearers may be subjected to heat in three different ways:

- Environmental conditions – heat generated by the environment in which a BA wearer is working. This is absorbed by the BA wearer increasing core body temperature.
- Metabolic heat generation – this is the heat created by the BA wearer through normal functions. This increases substantially when the BA wearer starts to work harder.
- Psychological stress – may also increase the rate of metabolic heat generation.

26.3 Wherever possible personnel intended to be used as BA wearers should not be used for other tasks requiring high levels of physical effort (such as transporting equipment upstairs during high-rise incidents) as this will raise their core body temperature potentially leading to the early onset of heat stress and a loss in effectiveness whilst wearing BA.

26.4 ICs, SCs, BA wearers and ECOs must take all possible steps during an incident to mitigate the build-up of BA wearers' core body temperature before committal. Research has identified that there are various methods to limit heat build-up, and to ensure that these effects are minimised. Where possible:

- IC or SC to establish a shaded holding and recovery area, away from the immediate risk area, where BA wearers can muster and rest.
- BA wearers within the holding and recovery area should relax their firefighting PPE to allow their body to cool as normal (Where emergency teams are standing by at the incident, they are to remain fully rigged).
- Drinking water must be available at the holding and recovery area to allow personnel to re-hydrate, use of personal water bottles should be encouraged (At hazardous materials incidents drinking water is only to be allowed under the direction of the HMEPO or SA).
- Recognise the stresses of the tasks that BA wearers are required to complete. Ensure that BA teams are relieved at appropriate intervals.

26.5 To optimise recovery between BA wears and maximise performance and safety before being redeployed, BA wearers should be given a period of time to rest and rehydrate. Paragraph 26.6 below details guidance on rest and rehydration periods; however, the time given should be based on the task undertaken, duration and conditions encountered by wearers. If wearers are not going to be redeployed in BA they can undertake other work subject to the IC's or SC's risk assessment.

26.6 Following BA wears within the risk area the minimum rest and recovery periods are:

- Following ambient BA wear 30 minutes rest and consume 500ml of cool water.
- Following hot and humid BA wear 60 minutes rest and consume 1000ml of cool water.

These rest and recovery periods will only be shortened in exceptional circumstances i.e. to save a saveable life when no fresh BA wearers are available.

26.7 Once the recovery period has elapsed or clearance has been given to leave the rest area, personnel will report to the IC or SC for redeployment.

26.8 See policy number 284 - Metabolic heat stress.

BA entry control

27 BA entry control procedures

27.1 The purpose of BA entry control procedures is to provide a consistent method for the safe and effective command, control and management of BA operations.

- BA control procedures must be used whenever BA is worn.
- There are two stages of BA entry control, Stage I and Stage II.
- The highest stage of BA entry control in use at any one ECP will be adopted by all other ECPs in use at the same incident.

28 Stage I BA entry control

28.1 This is the minimum level of BA entry control necessary whenever BA is used:

- Incident requires a limited number of BA wearers over a limited period of time.
- Incident and any structures involved are small and not complex.
- Limited to **six** wearers deployed into the risk area at any one time.
- Limited to one ECP.
- The IC must nominate a BA emergency team as soon as resources are available.
- When resources permit the IC will nominate a Comms-Op.

29 Entry control operative (ECO)

29.1 An ECOs responsibility is for the control and management of the ECP as described in the remainder of this policy. An ECO is not responsible for supervising the tasks allocated to BA teams. This responsibility rests with the IC or SC.

29.2 The ECO must not be involved or allocated any other tasks.

30 Nominated ECO station duties

30.1 Ensure personal competence and BPAs are kept up to date, if lapsed inform OiC.

30.2 When nominated by a watch officer an ECO (or nominated person for CU only equipment) is responsible for the examination and testing of the following:

- Ensure the ECB and its telemetry functionality is fully tested (see policy number 760 - Respiratory protective equipment - Dräger PSS Merlin telemetry equipment – technical information.
- ECO surcoat.
- Chinagraph pencils (black for SDBA or respirator tally and white for EDBA tally).
- Evacuation whistle.
- Main guide line tallies A+B and branch guide line tallies 1-4 (FRU only).
- BA aides memoire set of twelve.
- BA guidelines.
- IEC pack (resuscitator).
- ECB tripod and bracket.
- Thermal imaging camera
- Telemetry repeaters (FRU and CU only).
- Telemetry leaky feeder (FRU only).
- Ensure that the 'second set' carrying bags are available (FRU, CU, OSU only).

30.3 ECO (or nominated person in the case of the CU) must report to the watch officer any defects and or missing equipment immediately.

31 Nominated ECO incident duties

31.1 BA aide memoire No. 1 is provided for incident ground use (see appendix 1).

31.2 The ECO is responsible for one ECB only, and a maximum of **six** BA wearers.

Setting up ECP

31.3 The ECP is the position for the command and control, deployment and monitoring of BA wearers committed to a risk area and should be sited under the direction of the IC or SC.

31.4 The ECO will:

- Set up ECB on tripod, complete ECB information panel and ensure correct time is displayed (ECP can consist of more than one ECB, only one alphabetical call sign will apply to an ECP).
- Don 'ECO' surcoat.
- Provide IEC pack (resuscitator).
- Switch incident ground radio to BA channel (if BA Comms-Op is nominated switch to command channel).
- Prompt IC to provide BA emergency team when resources permit.

Briefing and debriefing

31.5 The ECO is not responsible for the briefing and debriefing of BA teams and this should be undertaken by the IC or SC.

31.6 The ECO should confirm their own understanding of the briefing and debriefing given to BA teams with the briefing officer and update the ECB with key information.

First wear (new entry)

31.7 BA wearers reporting to the ECO must have at least **240** bar cylinder pressure (minimum entry pressure) and the ECO enters new entry records onto the ECB.

31.8 The ECO will:

- Check BA team are correctly rigged in RPE/PPE with no exposed skin.
- Receive BA tallies, check wearer and cylinder pressure information are correctly entered (pressures must be at least **240** bar) and enter 'time in' using the ECB clock.
- Enter BA tallies into ECB ensuring telemetry signal is achieved (if manual calculations are required see aide memoire No. 11) and bracket BA team together.
- Enter BA team location in 'location' column of ECB.
- Enter task, extinguishing media (including weight of attack), turn around pressure (TAP), turn around time (TAT) when appropriate and any appropriate resources in the 'remarks' column of the ECB.
- Inform BA team(s) of ECP call sign.
- Confirm BA team(s) call sign and record in 'remarks' column of ECB.
- Carry out radio communications check with BA team(s).
- Check wearer's electronic personal dosimeter (EPD) as they enter suspected/confirmed radiation incidents and record the reading in the 'IN' section on the back of the BA tally.
- When committing BA wearers to Hi-Ex foam the ECO must ensure that the BA wearers LDV outer rubber casing has been unclipped from the lug and lifted clear of the LDV housing. This

is to prevent the build-up of foam behind the rubber casing causing the LDV to go into free flow.

31.9 Where a BA team temporarily withdraws but does not remove their face masks (for example to collect equipment) they can immediately return to the risk area without fresh records or amendments being made. The Bodyguard withdraw button would not be pressed in this case.

Communications to IC, BA teams and other ECP

31.10 In the absence of a BA Comms-Op the ECO must:

- Maintain communications with BA teams operating inside the risk area.
- Inform the person responsible for the ECP of any prolonged breakdown in communications with BA teams (prompt IC or SC to consider use of telemetry repeaters).
- Inform other ECPs if any BA teams report to the ECP that are not under your control.
- Forward on information to the person responsible for the ECP of any relevant update from BA teams and record this time of update in the 'remarks' column of the ECB.
- Inform BA teams if there is any relocation of the ECP.

31.11 Advise BA teams of the location and tasks of adjacent BA teams during operations and record the information so that it is available for briefing or debriefing of BA teams.

Monitor ECB

31.12 The ECO must monitor the telemetry signal displayed on the ECB (solid green radio icon against each BA tally position). The ECO must make immediate radio contact with any BA team(s) when loss of telemetry signal is identified to confirm the safety and wellbeing of the team and, if radio contact fails, inform the person responsible for the ECP and commit a BA emergency team to investigate. The IC or SC must consider if circumstances require a 'Firefighter Emergency' to be declared.

31.13 If telemetry signal loss is prolonged and cannot be re-established (BA team welfare has been confirmed by radio contact), the ECO must inform the IC or SC who shall consider deploying telemetry repeaters or leaky feeder. This decision will be dependent upon the nature and type of incident, i.e. complexity of task, numbers of BA teams committed and whether the incident is sub-surface or likely to be protracted.

31.14 For more detailed information on the use, deployment and methods of boosting the signal strength of telemetry equipment through the use of telemetry repeaters or leaky feeder, see policy number 760 - Respiratory Protective Equipment - Dräger PSS Merlin telemetry equipment – technical information.

Withdrawal of and close down of BA teams

31.15 The ECO will:

- Inform IC or SC if BA teams are being withdrawn prematurely.
- Ensure all BA wearers have closed down and purged their BA set prior to removal of BA tally from ECB (BA wearers will not be logged off from ECB unless this sequence is carried out).
- Return BA wearers' tallies as they pass back through ECP and direct them to report to the IC or SC for debriefing.
- Check wearer's EPD as they withdraw from suspected/confirmed radiation incidents and record the reading in the 'OUT' section on the back of the BA tally. Note and inform the IC or SC of any change in the reading.

31.16 When a BA wearer requires decontamination after exiting from the risk area, the decontamination director may request the BA wearer's DSU key to deactivate the unit when removed from the wearer (see policy number 584 – Firefighter decontamination).

31.17 If a BA tally fails to log off from the ECB, the ECO can perform a 'manual log-off' (see BA aide memoire No. 10).

Re-entry

31.18 This occurs following withdrawal and closing down, if the BA team is required to re-enter the risk area to perform a specific task, such as equipment collection or a simple ventilation task like opening a window.

31.19 If after withdrawing and closing down, a BA team can re-enter the risk area to perform a specific task (other than firefighting) provided that:

- The BA team have remained under the control and supervision of the ECP.
- There are no doubts about the fitness and wellbeing of any BA wearer for the task to be undertaken.
- All BA team members have a cylinder content of at least **190** bar. Pressures in excess of **190** bar will be recorded on the BA tally as **190** bar for the purposes of the task and for control of the BA team.
- The task will be of short duration and the IC or SC considers the BA wearers have sufficient air to complete it and return to ECP before the low pressure warning actuates. The 'time in' will be recorded on the BA tally and a time of warning (TOW) for **15** minutes later entered into the 'location' column. The words 're-entry' and the task being performed must be entered in the 'remarks' column (the BA team **will be** recommitted using manual calculations).

31.20 Other than in exceptional circumstances EDBA wearers should not be used for 're-entry' tasks.

Second wear (new entry)

31.21 In exceptional circumstances i.e. to save a saveable life the IC or SC can recommit BA wearers for a second wear at the same incident if no fresh BA wearers are available.

31.22 The IC or SC must carry out an assessment in consultation with the BA wearers in order to be satisfied that the BA team are rested, re-hydrated and fit for a subsequent entry. Fresh ECB records are required. See section 26 Dealing with physiological effects of working in hot and humid conditions for the minimum rest and recovery periods between BA wears.

31.23 Except in exceptional circumstances EDBA wearers should not be used for a 'second wear' in either SDBA or EDBA.

31.24 In addition to 31.8 above the ECO will:

- Record 'second wear' in the 'remarks' column of the ECB.
- Record 'A/B test not recorded' in the 'remarks' column of the ECB.

Committing BA emergency teams

31.25 It is essential that the ECO notifies the person responsible for the ECP that a BA emergency exists prior to committing BA emergency team(s).

31.26 BA emergency teams must be committed using an additional ECB set up and annotated 'BA emergency team'. An additional ECO must be nominated to operate the emergency team ECB as soon as resouces allow.

31.27 The ECO must commit a BA emergency team when:

- A BA team or wearer has not returned to the ECP by their time of low pressure warning and cannot be contacted to confirm their safety and wellbeing.
- A DSU is heard to have been actuated or is indicated to have been actuated on the ECB.
- Where audible or visual indications suggest a BA team or wearer appear to be in distress or imminent danger.
- A prolonged and unexplained breakdown in communications has occurred.
- A BA team or wearer has requested assistance.

Distress to wearer (DTW)

31.28 If a DTW is reported (see section 22 above), notify the IC or SC who will nominate an officer to impound the BA set. Give the nominated officer BA aide memoire No. 5.

Manual calculations of duration

31.29 Manual calculations are <u>not</u> intended as a replacement for the loss of telemetry signal once BA operations have started, the deployment of telemetry repeaters and leaky feeder equipment is provided to restore signal loss.

31.30 The equipment providing the telemetry function is extremely robust and provided with back-up battery power supplies. This means that telemetry system failure is very rare and any loss of signal is most likely due to intentional blocking i.e. counter-terrorism measures.

31.31 Manual calculations will only be used on authority of the IC or SC. They will be used when:

- <u>All</u> BA wearers are unable to log onto the ECB and achieve a BA telemetry signal when starting BA operations.
- An ECB display fails (clock must still operate) and no replacement ECB is available.

31.32 Guidance on how to use manual calculations can be found in BA aide memoire No. 11 – Using manual calculations of duration (from ECB pouch) and Babcock BA 023 Cylinder and Consumption rate Calculations Core Skills.

Committing BA teams using manual calculations of duration

31.33 If on starting BA operations all BA wearers are unable to achieve telemetry signal, the ECO on the authority of IC or SC will commit BA teams using manual calculations.

31.34 The ECO will:

- Check BA team are correctly rigged in RPE/PPE with no exposed skin.
- Receive BA tallies, check wearer and cylinder pressure information are correctly entered (pressures must be at least **240** bar) and enter 'time in' using the ECB clock.
- Enter BA tallies into ECB, calculate TOW (see BA aide memoire No. 11) and bracket BA team together and write lowest TOW outside the brackets in the 'location' column of the ECB.
- Enter BA team location in the 'remarks' column of the ECB.
- Carry on as per section 31.8 fifth bullet above.

Manual calculations of duration for BA teams already committed

31.35 If during operations an ECB display fails (clock must still operate) and no replacement ECB is available the ECO will:

- Use radio communications to contact and verify BA team safety and wellbeing, request status and pressure readings.

- Inform IC or SC that ECB failure has occurred and that BA team welfare has been established, then prompt the IC or SC that BA teams should be withdrawn from the risk area unless risk assessment allows the BA team to carry on with task.
- Using original 'time-in' from BA tallies entered into ECB, calculate TOW (see BA aide memoire No. 11) and write lowest TOW outside the brackets in the 'location' column of the ECB.
- Use radio communications to inform BA team of TOW and request regular pressure reading updates from BA team leader.

31.36 BA entry control operations will either be telemetry or manual (calculations) and will not be mixed on any one ECB (other than the use of re-entry as per 31.19 above).

32 Stage II BA entry control

32.1 Stage II BA entry control should be used to meet the demands of larger and or more complex incidents.

32.2 The entry control point supervisor (ECPS) must be appointed when Stage II BA entry control procedures are used, this rank must be a minimum of LFF.

32.3 Stage II procedures are to be used when **any** of the following apply:

- More than one ECP is required.
- More than **six** wearers are deployed into 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.
- Guidelines are required.
- The risks presented to BA teams demand a higher level of BA emergency provision, involving the need for BA emergency teams.
- EDBA is required.
- BA telemetry repeater(s) or leaky feeder is deployed.
- Confirmed basement fire (where size and layout indicate Stage II is appropriate).
- BA emergency team(s) have been committed.
- When chemical protective clothing wearers are out of the line of sight of ECP.
- When committing BA wearers to Hi-Ex foam.
- When other agencies are being committed in BA.

Note: Both emergency and relief BA teams must be established at Stage II.

Note: SDBA and EDBA teams can be entered onto the same ECB however all BA team members must be equipped with the same type of BA (either SDBA or EDBA) and emergency teams rigged to the highest level of RPE in use e.g. EDBA.

33 Entry control point supervisor (ECPS)

33.1 An ECPS responsibility is for the control and management of the ECP and the personnel designated to the support tasks under Stage II entry control procedures.

33.2 The nominated ECPS is to supervise BA procedures at their allocated ECP. The ECPS should not normally record details of BA wearers onto an ECB and should use an ECO for that purpose.

33.3 A Stage I ECO who has handed over to a Stage II ECPS will remain at the ECP to carry out the ECO role.

34 Nominated ECPS incident duties

34.1 BA aide memoire No. 2 is provided for incident ground use (see appendix 1).

34.2 When nominated the ECPS will:

- Don 'ECPS' surcoat (insert available from CU).
- Ensure each ECB has a dedicated ECO.
- Ensure ECPS's name is recorded on the ECB below that of the ECO.
- Nominate Comms-Op for the ECP and hand them BA aide memoire No. 4.
- Switch your incident ground radio to the incident command channel.
- Ensure that the clock on any additional ECBs are synchronised with the initial ECB before they are brought into use.
- Nominate BA emergency team and have them standing by at the ECP (see section 11 and 12).
- A BA emergency team must be at least the size of the largest BA team committed from the ECP, and rigged to at least the same level of PPE and RPE. The BA emergency team must have one 'second set' per two wearers
- Ensure an additional ECB has been supplied by the initial BA emergency team.
- A BA emergency team that is committed must be replaced immediately.
- Nominate an EDBA emergency team and have them standing by at the ECP before committing an EDBA team.
- Inform IC or SC of the number of BA wearers committed and when additional BA wearers are required.
- Ensure that briefing of BA teams takes place at least five minutes before they are due to be committed.
- If a BA team(s) exit the risk area and report to an ECP different from the ECP that they were committed through, the committing ECP must be informed and the BA team(s) sent back to their original ECP to collect their BA tallies.

BA sector

- Inform BA sector of the number of BA wearers committed and when additional BA wearers are required.
- Ensure that briefing of BA teams takes place at least five minutes before they are due to be committed. Record the time of the request on the ECB.
- Ensure exiting BA teams return to BA sector for further instruction following de-brief.

34.3 If BA guidelines are used the ECO under the supervision of the ECPS will:

- Attach main guideline tallies to main guideline(s) and, if used, branch guideline tallies to branch guideline(s) and ensure that the tabs indicate the correct egress direction.
- Ensure main guideline(s) is secured at the ECP and that details are entered on the appropriate ECB.
- Confirm that all BA teams are made aware when a main or branch guideline is in use or is to be laid.

35 ECO post incident duties

35.1 On return to station the ECO must ensure that:

- The appropriate testing is carried out on ECB and ancillary equipment as per section 30.
- Any defective equipment is removed from service and that defects and or missing equipment is reported to the watch officer.

36 BA communications operative (Comms–Op)

36.1 BA aide memoire No. 4 is provided for incident ground use (see appendix 1).

36.2 An ECO will initially also perform the role of the BA Comms-Op. When resources permit, the role of the ECO and the BA Comms-Op should be separated and this must be considered by the IC or SC if the incident escalates or the level of risk increases.

36.3 The BA Comms-Op will report to and take instruction from the person responsible for the ECP and work alongside the ECO.

36.4 The function of the BA Comms-Op will be to send and receive messages between BA teams and the ECP. Communications will be undertaken in liaison with the ECO and the person responsible for the ECP. The ECO/ECPS will be responsible for communications between the ECP and the IC, SC and other ECPs dependant on the stage of BA entry control.

36.5 The duties of a BA Comms-Op are to:

- Don the 'BA Comms-Op' surcoat (insert available from CU).
- Switch incident ground radio to the channel being used by BA teams.
- Stay next to and liaise with the ECO(s) and ECPS for their respective ECP.
- Verify call signs and test communications with BA team(s) prior to entry into the risk area.
- Monitor BA team progress within the risk area.
- Inform and update the person responsible for the ECP of any relevant information received relating to the progress of BA operations or hazards encountered.
- Pass messages relating to status changes of BA teams to the ECO, for recording onto the ECB. Consider use of BA communications board at four pump incidents and above (carried on OSU).
- Only communicate with BA teams committed from their ECP.
- Respond immediately to priority messages.
- Prompt BA teams to take regular pressure readings if required (e.g. if BA team have gone out of telemetry signal range or have been committed using manual calculations).
- Inform BA teams if there is any relocation of the ECP.

36.6 In an emergency or where a distress signal is heard or indicated on the ECB, the BA Comms-Op must inform the ECO and ECPS (under Stage II) of the emergency and attempt to:

- Identify and locate the BA team in distress.
- Assist the ECO or ECPS and IC or SC to co-ordinate rescue operations using BA emergency teams and BA teams already committed.

36.7 The BA Comms-Op will not be allocated or undertake any other BA entry control duties.

Officer in charge, incident or sector commander

37 Officer in charge (OIC) station duties

37.1 Ensure personal competence and BPAs are kept up to date for self and watch personnel.

37.2 Maintain an understanding of the duties of a BA wearer, BA team leader, ECO, ECPS and BA Comms-Op.

37.3 At the start of each duty period the OIC is responsible for the following:

- Nominate suitably qualified and competent personnel to wear BA for each appliance and update with any changes required during shift.

- Nominate suitably qualified and competent personnel to assume the duties of ECO and update with any changes required during shift (this nomination should take into account any other specific duties any personnel may have at an operational incident).
- Allocate BA radio communications sets. This should be to nominated team leader where possible.
- Ensure that unallocated BA sets are tested and the cylinder pressure recorded on the BA tally. In the name section, the word 'spare' is to be inserted. The BA log book is to be completed by the tester.
- Ensure that the appropriate tests of BA and associated equipment are carried out, and that the test records are accurately maintained. The name of the ECO(s) and the nominated wearers of BA sets and communications equipment are recorded on StARS along with the nominated CPC wearers.
- Ensure that BA sets and associated equipment are maintained in a clean, safe and serviceable condition and are available for operational use.
- Ensure equipment reported as being defective has been removed from service, defects are reported and POMS orders raised for replacements.
- Ensure equipment reported as missing is investigated and POMS orders raised for replacements.

37.4 Every effort should be made to ensure that the full complement of BA sets for every appliance is maintained at all times. The servicing and replacement of BA sets is a priority to be carried out at the earliest opportunity. Appliance commanders must inform Brigade Control their appliance is not available for mobilising whenever less than two BA sets are available. Contact logistics manager at RMC on extension 88321 for 'urgent' replacement of BA set(s).

37.5 During visits carried out under section 7(2) d of the Fire and Rescue Services Act 2004 consider premises that may require the use of telemetry repeaters and or telemetry leaky feeder to maintain telemetry signal with BA teams, this should where possible also indicate suitable locations for repeaters or leaky feeder to be placed during use.

38 Incident and sector commander incident duties

38.1 The generic role of the IC with regard to command and control is described in policy number 431 – Incident commander and monitoring officer. This section of the policy deals with the specific responsibility of the IC with regard to BA when in use at an incident.

38.2 The IC on the basis of a suitable and sufficient risk assessment shall decide whether BA is required to deal with the incident. The IC may delegate the deployment of BA wearers to SCs.

38.3 The circumstances of the incident, such as the number and urgency of any rescues, will determine what resources are committed and when. However sufficient resources to achieve an objective should be available prior to resources being committed. If necessary, objectives should be limited to fit the available resources. Sufficient resources should be requested as soon as possible.

38.4 The outcome of the risk assessment will be used to determine appropriate procedures and the level of BA command and control to be used for all ECPs in operation.

38.5 All personnel should be made aware of what stage BA control is in operation.

38.6 The IC or SC will be responsible for the number of ECPs and will identify a suitable ECP location which must be in safe air and sited:

- To minimise background noise.
- As near to the scene of operations as possible.

- To take into consideration weather conditions (wind direction).
- In such a position that it should not be necessary to reposition the ECP if the incident escalates.

38.7 The IC or SC will:

- Concentrate effort and resources into maintaining a high degree of command and control during BA operations.
- Consider what resources are available prior to committing BA teams.
- Nominate a person to be responsible for each ECP, confirming the role and responsibility of the ECO, who shall manage and monitor the implementation of BA entry control procedures.
- Ensure arrangements are in place for communicating with the persons responsible for the ECPs.
- Nominate BA team members. Where possible the team leader should lead team members drawn from their own station.
- Determine and communicate the appropriate structural search procedures (see policy number 803 – Search and rescue procedures within structures).
- Consider the provision of BA emergency teams during the initial stages of operations and nominate a BA emergency team as soon as resources allow.
- Be aware that securing a separate water supply as specified in 12.1 should be seen as best practice but this may not always be possible e.g. at some high rise incidents.
- Consider and make arrangements for BA wearer welfare requirements (where BA sector commander has not been appointed).
- Ensure appropriate provision of 'relief' BA teams at ECPs in a timely fashion.
- Assess the need for the use of BA guidelines.

38.8 The IC will assess the need to appoint a BA sector commander.

38.9 Where the IC or SC has determined the need to deploy EDBA above that already in attendance, the following message should be sent: "From..... at.....; EDBA required; tactical mode....." in accordance with appendix 1 of policy number 518 – Messages from incidents. This will result in Brigade Control mobilising three FRUs for EDBA along with three EDBA support pumps.

38.10 If telemetry signals are lost and telemetry repeaters are required they are available from any attending CU. If telemetry leaky feeder is required at an incident where an FRU is not already in attendance they should be requested as an 'assistance' message through Brigade Control (e.g. "One FRU required for telemetry leaky feeder").

Briefing and debriefing of BA teams

38.11 A BA team must be fully briefed by the IC or SC (not the ECO) and confirm their understanding before they are deployed into the risk area.

38.12 The IC is to ensure that the ECO is made fully aware of the BA team's brief/plan/objective and outcome following debrief.

38.13 The IC or SC will make arrangements to record and store all briefing and debriefings for use at performance review of operations (PROs), performance review of the command function (PRCs), safety events and inquiries. The forward information board (FIB) carried on all pumping appliances will perform this function during incidents (see policy number 820 – Forward information board).

38.14 The IC or SC should consider and include the following points when briefing and debriefing.

Briefing

- Brief the whole BA team not just the team leader (include BA emergency teams if established).
- Brief them before starting up.
- Confirm radio communication availability and call signs.
- Define allocated tasks, such as firefighting equipment and tactics, search and rescue, identifying hazards and ventilation.
- Define any restrictions on what they can do, such as duration limits to prevent over exposure of BA teams during known severe conditions see 38.15).
- Define the location of where:
  - They will be working and the route they should take, where possible making reference to a site or building plan to help the team to visualise their route and area of responsibility.
  - Any persons that may be involved were last known to be.
  - The fire is known or suspected to be.
  - Other BA teams are working and what they are doing.
- The nature and frequency of progress reports required.
- Location and nature of any known hazards.

38.15 Under certain circumstances, the person responsible for ECP may stipulate that BA teams must return to ECP at an earlier pre-determined time. 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.

Debriefing

- Debrief immediately after BA teams close down (include BA emergency teams if established).
- Obtain an update on all of the elements in the original briefing so that a developing picture can be obtained.
- Obtain information about the heat, smoke and fire conditions. Some of the danger signs are heat damaged and or steaming PPE on exiting, signs of exhaustion and air consumption significantly above the normal consumption taking into account the tasks undertaken.

38.16 It is essential that all information obtained from the debriefing is brought to the attention of the IC or SC and used to inform and update the overall plan.

39 OIC post incident duties

39.1 Ensure the BA wearers' welfare with regards to rehydration and recovery.

39.2 On return to station ensure personnel carry out the appropriate testing and inventory checks of BA sets and ancillary equipment and complete appropriate records.

39.3 Ensure personnel remove from use any equipment reported as defective.

39.4 Ensure POMs orders are raised to replace any defective and or missing equipment.

40 BA sector

40.1 This is not a separate stage of control although it is set up in addition to Stage II, in order to co-ordinate and support BA resourcing, logistics and operations at incidents where a large number or additional BA resources are required.

40.2 The BA sector will be commanded by a BA sector commander and is appointed by the IC (minimum rank of station commander – SC). Responsibility for BA sector may, on the instruction of the IC, be passed to a more senior officer as the incident develops. The officers must ensure

that a comprehensive brief takes place when responsibility is transferred. The officer handing over must remain with the senior officer to assist as this is a command support function of the BA sector. The BA sector assistant will wear the 'BA sector assistant' surcoat.

40.3 The BA sector commander is responsible to the IC for establishing additional control to co-ordinate all BA requirements.

40.4 The BA sector function should be supported by the crew of a pumping appliance and command unit.

41 BA sector commander incident duties

41.1 BA aide memoire No.3 is provided for incident ground use (see appendix 1).

41.2 The duties of a BA sector commander are to:

- Don 'BA sector' commander surcoat (available from the CU).
- Set up a BA communications network with each ECPS and the IC. Ensure incident ground radio is switched to the incident command channel. Do not use the BA channel.
- Ensure the BA sector board clock is synchronised with the initial ECB clock.
- Identify the location of each ECP, record the name of each ECPS on the BA sector board/CSS.
- Ensure Stage II control is applied to all ECPs and that all ECPs are correctly resourced.
- Regularly update the IC with an accurate assessment of BA resources, requirements and operational activities.
- Establish and record the requirements for relief BA teams required by ECPS.
- Record and update the information on the BA sector board. Maintain suitable and sufficient resilient records.
- Have available sufficient BA wearers to provide relief teams required by each ECPS and dispatch them to arrive at the ECP in sufficient time before they are required.
- Provide BA emergency team to stand by at each Stage II ECP. In addition, a reserve BA emergency team should standby at BA sector when resources permit.
- Establish and monitor a BA equipment pool.
- Be responsible for BA wearer welfare and establish an appropriate area for hydration, rest and recuperation.
- Recommit SDBA (for second wear only) wearers if no fresh BA wearers are available, ensure they have had the minimum rest and recovery period specified in paragraph 26.5 and there is no reason to doubt the wearer's fitness. **EDBA wearers must only be used for a 're-entry' or 'second wear' in exceptional circumstances.**
- Set up a BA maintenance area away from the scene of operations (ensure BA maintenance resource pack is available – RPE resource pack number 11 on OSU).
- Ensure any 'DTW' procedures and notifications are followed.
- Use an additional BA sector board to record other Brigade's/agencies' BA commitment/ availability at the incident.

42 Respiratory protective equipment logistics officer (RPELO)

42.1 The duty RPELO is drawn from personnel of the Operations Support Group (OSG) and provides on call assistance, advice and incident support on a 24/7 hour basis.

42.2 The RPELO can be contacted via the logistics manager in RMC or Brigade Control.

42.3 The main roles of the RPELO are to:

- Co-ordinate the operations of OSG and manage its resources in the event of a major or catastrophic incident.

- Provide support and resources to the incident ground such as bulk supplies of air and/or hot cutting oxygen cylinders.
- Provide guidance in matters relating to RPE.
- Manage and deploy the OSG personnel recall system.
- Assist accident investigators with RPE related safety events.
- Resolve issues relating to correctly fitting RPE (face-fit testing).

42.4 The RPELO can be identified on the incident ground by a yellow surcoat with the word 'RPELO' on the back and front.

42.5 An RPE support unit crewed by OSG personnel, carrying bulk supplies of cylinders and related equipment can be mobilised by the duty RPELO or on request from an incident. When attending incidents these personnel are identified by a yellow surcoat with the words 'RPE Support' on the back and front.

42.6 The RPE support unit provides an emergency response and has an approximate maximum attendance time of 60 minutes during normal working hours and 90 minutes at night and at weekends.

43 Additional reading – other documents national and policy

- National Operational Guidance Programme – Foundation for Breathing Apparatus.
- https://www.ukfrs.com/foundation-knowledge/foundation-breathing-apparatus?utm_medium=email&utm_campaign=Foundation%20for%20Breathing%20Apparatus&utm_content=Foundation%20for%20Breathing%20Apparatus+CID_de8773a38b0b9e774abecf0dbdb8add2&utm_source=NOG%20Newsletter&utm_term=Foundation%20for%20Breathing%20Apparatus
- National Operational Guidance Programme – Breathing Apparatus Training Specification. https://www.ukfrs.com/training-specification/breathing-apparatus?bundle=section&id=19447
- Control of Substances Hazardous to Health Regulations: 2002.
- Ionising Radiations Regulations: 1999.
- Control of Lead at Work Regulations: 2002.
- Control of Asbestos Regulations: 2012.
- Dangerous Substances and Explosive Atmospheres Regulations: 2002.
- Confined Spaces Regulations:1997.
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations: 2013.

44 Training notes

- BA 001 Introduction to Respiratory Protective Equipment.
- BA 002 PSS 7000 BA Set.
- BA 003 Cylinder and Ancillary Equipment.
- BA 004 Wearer's Guidance.
- BA 005 Safe Movement: Doors, Stairs and Land Marking.
- BA 006 Search and Rescue Procedures.
- BA 007 BA Entry Control.
- BA 008 BA Entry Control – Telemetry.
- BA 009 'B' Test.
- BA 010 Donning, Starting and Closing Down.
- BA 012 'A' Test.
- BA 017 Emergency Procedures.
- BA 018 BA Communications Equipment.
- BA 022 Emergency Procedures – Second Set.
- BA 023 Cylinder and Consumption rate Calculations.
- BA 027 Respirator Face mask.
- GL 001 Guideline Procedure.
- HAZ 002 Gas Tight Suits.

Glossary RPE generic

- ADSU - Automatic distress signal unit.
- BA - Breathing apparatus.
- Comms - Communications.
- Comms-Op - Communication operative.
- CPC - Chemical protective clothing.
- CU - Command unit.
- DSU - Distress signal unit (automatic or manually operated).
- DPFM - Dual purpose face mask.
- EDBA - Extended duration breathing apparatus.
- ECB - Entry control board.
- ECO - Entry control operative.
- ECP - Entry control point.
- ECPS - Entry control point supervisor.
- EMU - Electronic monitoring unit.
- ESA - Einheit stecken anschlussfilter (meaning standard plug-in connection).
- FC - Filter cartridge.
- FPS - Face protection system.
- FRU - Fire rescue unit.
- GTS - Gas tight suit.
- HMEPO - Hazardous materials and environmental protection officer.
- HSE - Health and Safety Executive.
- IC - Incident commander.
- IS - Intrinsically safe.
- LCD - Liquid crystal display.
- LED - Light emitting diode.
- LPW - Low pressure warning (can be electronic or pneumatic in operation).
- LPM - Litres per minute.
- LTS - Liquid tight suit.
- OiC - Officer in charge.
- OSU - Operational support unit.
- POMS - Purchase and ordering management system.
- PSS - Personal safety system.
- RA - Risk assessment.
- RPE - Respiratory protective equipment.
- RPELO - Respiratory protective equipment logistics officer.
- SA - Scientific advisor.
- SAI - Senior accident investigator.
- SDBA - Standard duration breathing apparatus.
- TAP - Turn-around point.
- TAT - Turn-around time.
- TM - Telemetry module.
- TOW - Time of warning (audible and visual warnings to indicate end of working duration).
- TTW - Time to warning (end of working duration and the start of safety margin).
- USAR - Urban search and rescue.

Appendix 1 – BA board aides memoire 1, 2, 3, 4, 5, 10, 11, 12 and 13

(Note: aide memoire number 6 can be found in policy number 376 - Cylinder procedure, aide memoire 7 is no longer in use, aide memoire numbers 8 and 9 can be found in policy number 759 - Dräger FPS 7000 respirator face mask).

LONDON FIRE BRIGADE

Aide Memoire No.1

BA – Stage I: Entry Control Operative Duties

The Entry Control Operative (ECO) is responsible for one Entry Control Board (ECB) only and a maximum of six BA wearers.

Setting up Entry Control Point (ECP)

1. Establish ECP under direction of IC or SC. Set up ECB, complete information panel, ensure correct time is displayed. Don 'ECO' surcoat.
2. Provide IEC pack (resuscitator).
3. Switch radio to BA channel (if BA Comms-Op is nominated switch to command channel). For Comms-Op duties, see aide memoire No.4.
4. Prompt IC to provide BA emergency team when resources permit.
5. Record the key information from BA team briefing/debriefing onto ECB.

First wear (new entry)

6. Check BA team RPE/PPE no exposed skin. Receive BA tallies, check wearer and cylinder pressure (min **240** bar) and enter 'time in' using the ECB clock.
7. Enter BA tallies into ECB ensuring telemetry signal is achieved (if manual calculations are required see BA aide memoire No.11) bracket BA teams.
8. Enter BA team location in 'location' column of ECB. Enter task, extinguishing media/resources in 'remarks' column of ECB.
9. Inform BA team(s) of ECP call sign. Confirm BA team(s) call sign and record in 'remarks' column of ECB. Carry out radio comms check with BA team(s).
10. At suspected/confirmed radiation incidents record EPD reading in the 'IN' section on the back of the BA tally.
11. For Hi-Ex foam the ECO must ensure that the BA wearers LDV outer rubber casing has been unclipped from the lug and lifted clear of the LDV housing.

Withdrawal of and close down of BA teams

12. Inform IC or SC if BA teams are being withdrawn prematurely.
13. Ensure BA wearers have closed down/purged BA set prior to return of BA wearers' tallies and direct them to report to the IC or SC for debriefing.

Aide Memoire No.1 continued

14. At suspected/confirmed radiation incidents record EPD reading in the 'OUT' section on the back of the BA tally. Inform IC or SC of any change.
15. BA wearer requires decon, decon director may request wearer's DSU key.

Re-entry

16. After withdrawing and closing down, a BA team can re-enter to perform a specific task (other than firefighting) provided that:
    - BA team members have at least **190** bar. Pressures in excess of **190** bar will be recorded on the BA tally as **190** bar.
    - Record 'time in' on BA tally and 'Time of Warning' (TOW) for **15** minutes later entered in 'location' column. Words 're-entry' and task performed entered in 'remarks' column (the BA team **will be** recommitted using manual calculations).

Second wear (new entry)

17. In exceptional circumstances BA wearers can be used for a second wear if no fresh BA wearers are available.
18. In addition to 'first wear (new entry)' procedure above, the ECO will:
    - Record 'second wear' in the 'remarks' column of the ECB.
    - Record 'A/B test not recorded' in the 'remarks' column of the ECB.

Committing BA emergency teams

19. It is essential that the ECO notifies the person responsible for the ECP or IC that a BA emergency exists prior to committing BA emergency team(s).
20. BA emergency teams must be committed using an additional ECB annotated 'BA emergency team' and operated by an additional ECO.
21. ECO must commit a BA emergency team if:
    - BA team/wearer has not returned to ECP by TOW and cannot be contacted.
    - DSU is heard or is indicated to have been actuated on the ECB.
    - Where indications suggest, BA team or wearer are in distress or danger.
    - Prolonged and unexplained breakdown in communications has occurred.
    - BA team or wearer has requested assistance.

DTW/BA defects

22. If a BA wearer reports a BA set defect or a DTW occurs, inform IC/SC and give nominated officer BA aide memoire No.5.

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LONDON FIRE BRIGADE

Aide Memoire No.2

BA – Stage II: Entry Control Point Supervisor Duties

(minimum role: Crew Manager)

Stage II procedures are to be used when any of the following apply:

- More than one ECP is required.
- More than six wearers deployed into the risk area at any one time.
- BA operations are likely to be complicated or protracted.
- Guidelines are required.
- Risks presented demand a higher level of BA emergency provision, involving the need for BA emergency teams.
- EDBA is required.
- BA telemetry repeater(s) or leaky feeder is deployed.
- Confirmed basement fire (size/layout indicate Stage II is appropriate).
- BA emergency team(s) have been committed.
- CPC wearers are out of the line of sight of ECP.
- When committing BA wearers to Hi-Ex foam.
- When other agencies are being committed in BA.

Entry Control Point Supervisor (ECPS) duties

1. Stage I ECO handing over to ECPS will remain to carry out ECO role.
2. When nominated the ECPS will:
   - Don 'ECPS' surcoat (insert available from CU).
   - Ensure each ECB has a dedicated ECO.
   - Ensure ECPS's name is recorded on the ECB below that of the ECO.
   - Nominate Comms-Op and hand them BA aide memiore No 4.
   - Switch your incident ground radio to the incident command channel.
   - Ensure that the clock on any additional ECBs are synchronised with the initial ECB before they are brought into use.

Aide Memoire No.2 continued

- Nominate a BA emergency team and have them standing by at ECP.
- Ensure that a BA emergency team is at least the size of the largest BA team committed and rigged to at least the same level of PPE and RPE. The BA emergency team must have one 'second set' per two wearers
- Ensure that an additional ECB is supplied by the BA emergency team.
- Ensure that the BA emergency team committed is replaced immediately.
- Nominate EDBA emergency team and have standing by before committing an EDBA team.
- Inform IC or SC of the number of BA wearers committed and when additional BA wearers are required.
- Ensure that briefing of BA teams takes place at least five minutes before they are due to be committed.
- Ensure that if a BA team(s) exit the risk area and report to an ECP different from the ECP that they were committed through, that the committing ECP must be informed, and the BA team(s) sent back to their original ECP.

BA sector

- Inform BA sector of the number of BA wearers committed and when additional BA wearers are required.
- Ensure that briefing of BA teams takes place at least five minutes before they are due to be committed. Record the time of the request on the ECB.
- Ensure exiting BA teams return to BA sector for further instruction following de-brief.

BA guidelines

If BA guidelines are used, the ECO under the supervision of the ECPS will:

- Attach main guideline tallies to main guideline(s) and, if used, branch guideline tallies to branch guideline(s).
- Ensure main guideline(s) is secured at the ECP and that details are entered on the appropriate ECB.
- Confirm that all BA teams are made aware when a main or branch guideline is in use or is to be laid.

F5995B August 2017

LONDON FIRE BRIGADE

Aide Memoire No.3

BA – BA sector officer duties

(minimum role: Station Manager)

1. Responsibility for BA sector may, on the instruction of the IC, be passed to a more senior officer as the incident develops. In these circumstances the initial BA sector commander will remain with the senior officer to assist.
2. The BA sector function should be supported by the crew of a pumping appliance and command unit.
3. The duties of a BA sector commander are to:
   - Don 'BA sector commander' surcoat (available from CU).
   - Set up a BA communications network with each ECPS and the IC. Ensure fire ground radio is switched to the incident command channel. Do not use the BA channel.
   - Ensure the BA sector board clock is synchronised with the initial ECB clock.
   - Identify the location of each ECP, record the name of each ECPS on the BA sector board/CSS.
   - Ensure Stage II control is applied to all ECPs and that all ECPs are correctly resourced.
   - Regularly update the IC with an accurate assessment of BA resources, requirements and operational activities.
   - Establish and record the requirements for relief BA teams required by ECPS.
   - Record and update the information on the BA sector board. Maintain suitable and sufficient resilient records.
   - Have available sufficient BA wearers to provide relief teams required by each ECPS and dispatch them to arrive at the ECP in sufficient time before they are required.
   - Provide BA emergency team to stand by at each Stage II ECP. In addition, a reserve BA emergency team should standby at BA sector when resources permit.

Aide Memoire No.3 continued

- Establish and monitor a BA equipment pool.
- Be responsible for BA wearer welfare and establish an appropriate area for hydration, rest and recuperation.
- Re-deploy or rest and recommit BA wearers who have already been committed to the incident.
- Recommit SDBA (for second wear only) wearers if no fresh BA wearers are available, they have had the minimum rest and recovery period (following ambient BA wear 30 minutes rest and consume 500ml of cool water; following hot and humid BA wear 60 minutes rest and consume 1000ml of cool water) and there is no reason to doubt the wearer's fitness. **EDBA wearers must only be used for a 're-entry' or 'second wear' in exceptional circumstances.**
- Set up a BA maintenance area away from the scene of operations (ensure BA maintenance resource pack is available – RPE resource pack number 11 on OSU).
- Ensure any 'DTW' procedures and notifications are followed.
- Use an additional BA sector board to record other brigade's/agencies' BA commitment/availability at the incident.

LONDON FIRE BRIGADE

Aide Memoire No.4

BA Communications Operative

1. The duties of a BA Comms-Op are to:
   - Don the BA Comms-Op surcoat (insert available from CU).
   - Switch incident ground radio to the channel being used by BA teams.
   - Stay next to and liaise with the ECO(s) and ECPS for their respective ECP.
   - Verify call signs and test communications with BA team(s) prior to entry into the risk area.
   - Monitor BA team progress within the risk area.
   - Inform and update the person responsible for the ECP of any relevant information received relating to the progress of BA operations or hazards encountered.
   - Pass messages relating to status changes of BA teams to the ECO for recording onto the ECB. Consider use of BA communcations board at four pump incidents and above (carried on OSU).
   - Only communicate with BA teams committed from their ECP.
   - Respond immediately to priority messages.
   - Prompt BA teams to take regular pressure readings if required (e.g. if BA team have gone out of telemetry signal range or have been committed using manual calculations).
   - Inform BA teams if there is any relocation of the ECP.
2. In an emergency or where a distress signal is heard or indicated on the ECB, the BA Comms-Op must inform the ECO and ECPS (under Stage II) of the emergency and attempt to:
   - Identify and locate the BA team in distress.
   - Assist the ECO or ECPS and IC or SC to coordinate rescue operations using BA emergency teams and BA teams already committed.
3. The BA Comms-Op will not be allocated or undertake any other BA entry control duties.

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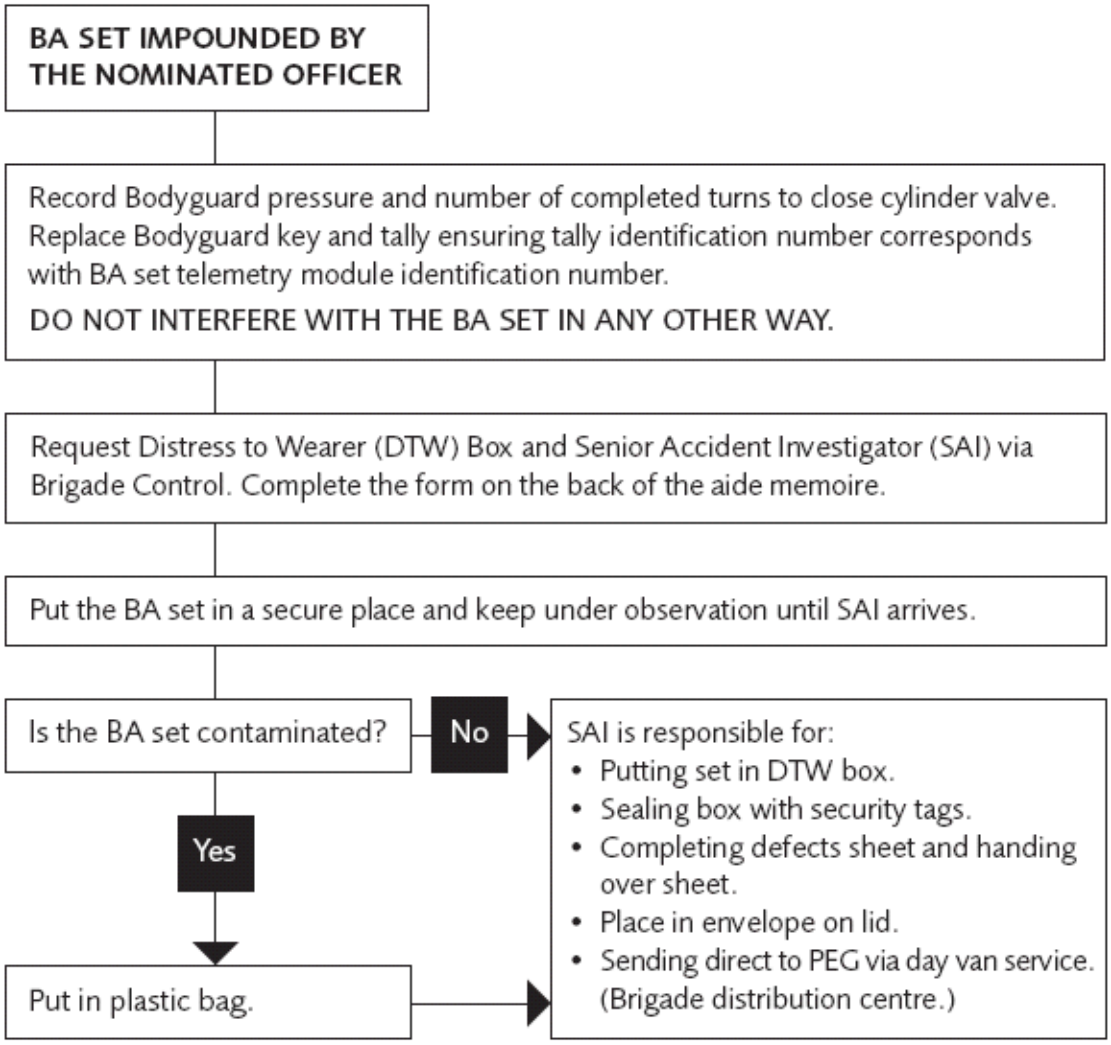
LONDON FIRE BRIGADE

Aide Memoire No.5

BA – Distress to Wearer Procedure

To be applied when a BA wearer suffers distress



Aide Memoire No.5 continued

Details of officer completing form:

Role _____

Name _____

Signature _____

BA Set No: _____

Wearer details:

Role _____

Name _____

Defect discovered:

Date _____ Time _____

Brief details of defect and how discovered _____

_____

_____

_____

_____

_____

_____

_____

Incident address/training venue: _____

_____

_____

No. of complete turns required to close cylinder valve: _____

Record cylinder pressure displayed on Bodyguard: _____

FORM 5995 18 January 2012

LONDON FIRE BRIGADE

Aide Memoire No.10
BA Entry Control Manual Log On and Off

Manual log on (suspected BA tally transponder fault)

An unsuccessful log on is identified by an initial momentary display of fault code 'Et' followed by the display changing to 'E:00' (time elapsed count). A single audible beep alarm is emitted until the manual log on is started.

The ECO shall carry out the following manual 'log on' procedure:

1. To acknowledge the 'Et' fault code, press the BA tally channel Evacuation/ Acknowledgement button. The red LED above the button will begin flashing.

2. Enter the BA tally number, using the keypad.

3. Press the Enter key.

The BA tally channel screen momentarily displays the BA tally number and then changes to Time of Warning/Whistle (TOW).

The ECB green telemetry signal radio icon illuminates continuously, confirming a successful telemetry signal with the BA set.

NOTE: If the above is not achieved this indicates that either the BA set or the BA tally is defective and should be taken off the run.

Manual log off

The ECO shall carry out the following manual 'log off' procedure:

1. Press and then release the Enter key on the keypad. The status display changes to show **QUIT**.

2. Press the No.2 or No.8 key on the keypad to display **LOGOFF** and then press the Enter key.

3. Press the Evacuation/Acknowledgement button for the BA tally channel to be logged off. The BA tally channel number will be entered automatically on the display.
4. Press the Enter key. The display changes to the selected BA tally channel with the **N** (No) symbol flashing. Use the No.2 or No.8 key to scroll **Y** (Yes).

5. Press the Enter key.

NOTE: If the BA tally has not been removed, the display will not scroll between **N** and **Y**.

NOTE: If the BA set Bodyguard does not switch off following manual log off procedure, press both buttons simultaneously to override and switch off the Bodyguard (this will prevent the telemetry module searching for an ECB).

LONDON FIRE BRIGADE

Aide Memoire No.11

BA – Using Manual Calculations of Duration

Committing BA teams using manual calculation of duration

1. If, on starting BA operations, all BA wearers are unable to achieve telemetry signal, the ECO on the authority of IC or SC will commit BA teams using manual calculations:
   - Check BA team are correctly rigged in RPE/PPE with no exposed skin.
   - Receive BA tallies, check wearer and cylinder pressure information are correctly entered and enter 'time in' using the ECB clock.
   - Enter BA tallies into ECB, calculate 'Time of Warning' (TOW) and bracket BA team together, and write lowest TOW outside the brackets in the 'location' column of the ECB.
   - Enter BA team location in the 'remarks' column of the ECB.
   - Carry on as per BA aide memoire No.1.

Manual calculations of duration for BA teams already committed

2. If during operations an ECB display fails (clock must still operate) and no replacement ECB is available the ECO will:
   - Use radio communications to contact and verify BA team safety and wellbeing, request status and pressure readings.
   - Inform IC or SC that ECB failure has occurred and that BA team welfare has been established, then prompt the IC or SC that BA teams should be withdrawn from the risk area unless risk assessment allows the BA team to carry on with task.
   - Using original 'time-in' from BA tallies entered into ECB, calculate TOW and bracket BA team together and write lowest TOW outside the brackets.
3. Use radio communications to inform BA team of TOW and request regular pressure reading updates from BA team leader.

Aide Memoire No.11 continued

4. BA entry control operations will be telemetry or manual (calculations) and will not be mixed on any one ECB.

How to use manual calculations

1. Use pressure reading entered on BA tally and cross reference with the duration table (below). Take note of the 'MINS' against that pressure shown under 'BAR' column.
2. Add the 'MINS' noted to the time displayed on the ECB clock and write this TOW against wearers BA tally in the 'Location' column of the ECB, bracket BA team together and write lowest TOW outside the bracket. For example SDBA pressure reading 300 bar and ECB time 1200hrs = 1200hrs + 31 minutes. TOW = 1231hrs.

	SDBA		EDBA	
	SINGLE – 2160 LITRES		TWIN – 3672 LITRES	
	BAR	MINS	BAR	MINS
	300	31	300	45
	290	29	290	43
	280	28	280	41
	270	26	270	39
	260	25	260	37
	250	24	250	35
MIN ENTRY	240	22	240	32
RE-ENTRY	190	15		

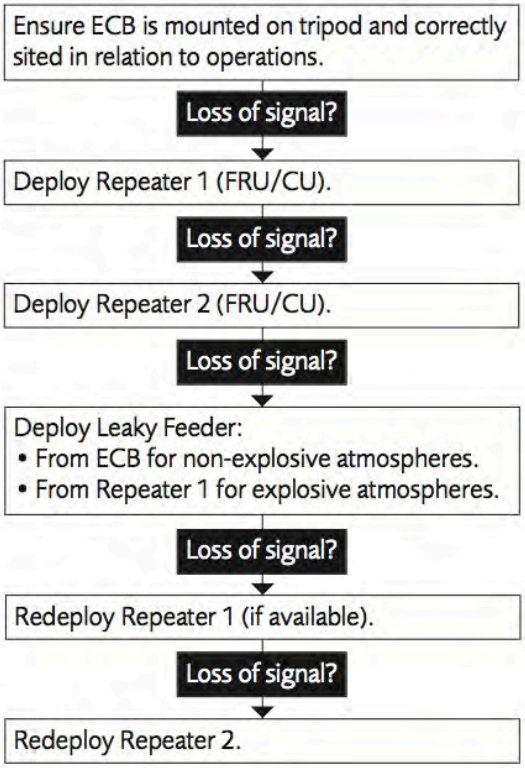
F5995 August 2017

LONDON FIRE BRIGADE

Aide Memoire No.12

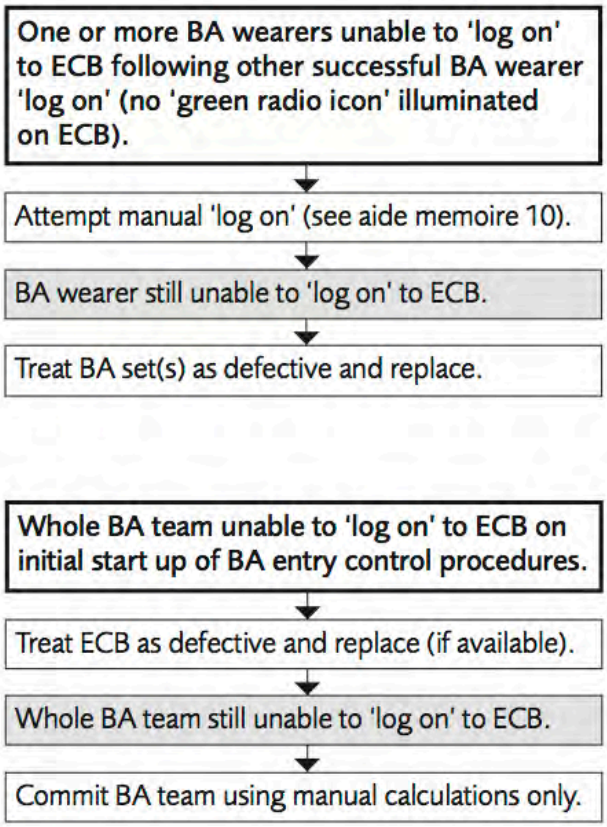
BA – Maintaining Telemetry Signal – Deployment Options

Loss of signal following successful 'log on' to Entry Control Board (ECB)



Aide Memoire No.12 continued

How to resolve initial BA set telemetry 'log on' failure(s)



NOTE:

- ECO must contact BA teams via radio when telemetry signal is lost and BA teams should withdraw if both radio and telemetry signals are lost.
- Basements and sub-surface structures have the potential to severely reduce the telemetry signal propagation.
- Stone construction structures have the potential to severely reduce the telemetry signal propagation.
- Premises found to have telemetry signal propagation issues during incidents/visits should have this information entered on Operational Risk Database for future use.
- Respiratory Protective Equipment Logistics Officer (RPELO) is available via RMC for telemetry signal related advice during large or protracted incidents.

FORM 5995 1 July 2012

LFB
LONDON FIRE BRIGADE

Aide Memoire No.13

Emergency Firefighter Decontamination

Personnel in firefighting PPE

TASK	OPERATIVE
Nominate roles: • **Decontamination director – minimum crew manager.** • **Two decontamination operatives.** • **One support officer – as a minimum.**	**Incident Commander/ Decontamination Director**
1. Don FPS 7000 facemask with P3 filter and Neoprene gloves (minimum level of PPE) – if time permits, don LTS.	Decontamination Operatives
2. Lay out a salvage sheet beside the wearer to provide a 'clean path' onto which to stand. Also provide a charged hose reel set on flush.	Support staff
3. If the wearer is donned in BA, maintain the facemask seal and remove the BA set from the wearers shoulders – one operative should continue to support the weight of the BA set whilst the second operative continues the disrobe process.	Decontamination Operatives
4. Remove wearers helmet and gloves and place clear of wearer – instruct wearer not to touch contaminated firefighting PPE with unprotected hands, even in an attempt to assist the disrobe.	Decontamination Operatives
5. Unfasten Velcro on fire tunic and then unfasten zip. Remove tunic from shoulders – ensuring tunic is turned inside out as removed.	Decontamination Operatives
6. Grasp the cuff of the tunic and instruct the wearer to withdraw their arm – remind them of the need to work their thumb out of the thumb loop and then place their arm across their chest without coming into contact with contaminated clothing. Repeat with other arm.	Decontamination Operatives

FORM 5995 1 July 2015

Aide Memoire No.13 continued

TASK	OPERATIVE
7. Keep tunic inside out and place clear of the wearer.	Decontamination Operatives
8. Pull firehood over the head (back to front) being careful not to dislodge BA facemask. Allow firehood to remain looped around the supply hose of the BA set.	Decontamination Operatives
9. Provide disrobe pack and wearers footwear if available.	Support staff
10. Remove overtrouser braces from shoulder and allow to fall to waist.	Decontamination Operatives
11. Roll down leggings – inside out – to boot level. Grasp each boot, in turn, and instruct wearer to step from boot onto salvage sheet.	Decontamination Operatives
12. Remove wearers facemask and reset first breath button.	Decontamination Operatives
13. Move away from decontamination zone for assessment by Incident Commander (or HMEPO).	Wearer
If wearer reports any discomfort, such as irritation or burning sensation to the skin then continue to disrobe and shower using hose reel.	**Incident Commander/ Decontamination Director**
14. Dry and re-robe – use the re-robe pack provided (if available).	Decontamination Operatives
Consider medical attention for wearer dependent on level and type of contaminant and any reported signs or symptoms.	**Incident Commander**
15. All firefighting PPE should be double bagged and labelled 'for examination by SA' when resources permit. BA to be double bagged.	Decontamination Operatives
16. If any cross contamination is suspected from wearer to decontamination operative(s) then disrobe decontamination operative(s) as above.	Decontamination Operatives

Appendix 2 - Don, start, exchange of air and close down BPA

Best Practice Assessment Review Sheet(s)	Dräger PSS 7000
Name: _____ Pay No: _____ Base: _____ Date:	

	Dräger PSS 7000 Breathing Apparatus – DON and START UP		
EV	**CHECK IN ORDER**	**P**	**NYP**
1	**REMOVE** fire helmet.		
2	**PLACE** face mask loop over head. **DON** BA set		
3	**PLACE** face mask on retaining stud.		
4	**ADJUST** shoulder straps and secure waist belt buckle. **REPLACE** fire helmet.		
5	**OPERATE** first breath button.		
6	**FULLY** open cylinder valve, check for minimum pressure of **240** bar.		
7	**PLACE** gloves into left leg pocket.		
	START UP		
EV	**CHECK IN ORDER**	**P**	**NYP**
8	**REPORT** to the committing officer for briefing.		
9	**REMOVE** fire helmet.		
10	**DISCONNECT** neck loop retaining stud and **DON** face mask, adjust straps (lower two first, then middle two and top one if required). **BREATHE** normally.		
11	**TEST** the constant flow of air to face mask by briefly operating the additional flow button on the front of the LDV once only.		
12	**TAKE** a deep breath and hold, listen for any leakage from face mask (approximately 8 seconds) and adjust face mask if required.		
13	**ENSURE** all PPE is worn and face mask neck loop is placed inside fire hood.		
14	**CHECK** that your partner/team are ready (PPE and RPE buddy check)		
15	**REPORT** to ECO and hand in BA tally, ensure you have telemetry signal before entering risk area. Note: If <u>all</u> BA team members are unable to achieve initial telemetry signal then use ECB manual duration tables.		

Dräger PSS 7000 Breathing Apparatus – EXCHANGE OF AIR PROCEDURE			
EV	**CHECK IN ORDER**	**P**	**NYP**
16	**Recipient** holds up Bodyguard towards the Donor stating: **'I NEED AIR'.**		
17	**Donor** checks own Bodyguard to ensure they have sufficient air to assist.		
18	**Donor** informs Recipient: **'I CAN GIVE YOU AIR'.**		
19	**Donor** removes protective blank cap from own second person connection.		
20	**Recipient** takes deep breath and disconnects their own in-line connection.		
21	**Recipient** connects to Donors second person connection and breathes normally.		
22	**Recipient** removes the second person connection hose from the clips of the donors BA set. The donor can assist if required.		
23	**Recipient** operates DSU.		
24	**Recipient** links arms with Donor.		
REVERSE ROLES OF BA TEAM MEMBERS AND CONTINUE			
25	**Recipient** holds up Bodyguard towards the Donor stating: **'I NEED AIR'.**		
26	**Donor** checks own Bodyguard to ensure they have sufficient air to assist.		
27	**Donor** informs Recipient: **'I CAN GIVE YOU AIR'.**		
28	**Donor** removes protective blank cap from own second person connection.		
29	**Recipient** takes deep breath and disconnects their own in-line connection.		
30	**Recipient** connects to Donors second person connection and breathes normally.		
31	**Recipient** removes the second person connection hose from the clips of the donors BA set. The donor can assist if required.		
32	**Recipient** operates DSU.		
33	**Recipient** links arms with Donor		
RECONNECT WEARER TO THEIR OWN SET - ENSURE THAT PROTECTIVE BLANK CAP IS REPLACED			

EV	CONFIRM VERBALLY WITH INDIVIDUALS	P	NYP
34	If sufficient air is **available**, team will leave incident and report to the ECO.		
35	If sufficient air is **unavailable**, team to adopt the entrapped procedure.		

	CLOSE DOWN		
EV	CHECK IN ORDER	P	NYP
36	**REPORT** to ECO and when instructed to close down remove fire helmet then gloves and pull down fire hood.		
37	**HOLD** breath, operate first breath button, release sliding buckles, remove face mask by pulling head harness over top of head.		
38	**REPLACE** fire helmet.		
39	**EXTEND** all straps, attach face mask to retaining stud.		
40	**CLOSE** cylinder valve, operate additional flow button. The BA set must be closed down with all pressure removed to ensure BA set is logged off the ECB correctly.		
41	**COLLECT** BA tally from ECO. Replace key into Bodyguard		
42	**REPORT** to the committing officer for debrief.		
43	**RETURN** the BA set to the appliance, **PLACE ON CHARGE**, **REMOVE** face mask from retaining stud and **RESTOW** face mask in bag.		

Assessors Notes (Don, Start and Close Down)
EV 3, 6, 8, 12, 13, 15, 36, 39, 40, 41 and 42 (shaded NYP) are risk critical evolutions.
Candidate failure to address these areas correctly must initiate urgent training and reassessment.

EV 1, 2, 4, 5, 7, 9, 10, 11, 14, 37, 38, and 43 (un-shaded NYP) are non-risk critical evolutions.
Candidate can be prompted by the assessor.

Assessors Notes (Exchange of Air)
EV 17, 20, 21, 23, 26, 29, 30 and 32 (shaded NYP) are risk critical evolutions.
Candidates failure to address these areas correctly must initiate urgent training and reassessment.

EV 16, 18, 19, 22, 24, 25, 27, 28, 31, 33, 34 and 35 (un-shaded NYP) are non-risk critical evolutions.
Candidates can be prompted by the assessor.

Note: When a BA set has been used for the sole purpose of demonstrating this don, start, exchange of air and close down the wearer will not have to complete a' B' test. If pressure has dropped below **270** bar, carry out a cylinder change followed by an 'A' test.

Appendix 3 - Guideline team leader BPA

Best Practice Assessment Review Sheet(s)

Name: _____ Pay No: _____ Base: _____ Date: _____

	LAYING THE GUIDELINE		
EV	**CHECK IN ORDER**	**P**	**NYP**
1	**CHECK** that the guideline bag is located on the correct side for laying.		
2	**CHECK** that additional guideline bag is located on team members 'D' ring.		
3	**IDENTIFY** suitable tie off points and demonstrate appropriate knots.		
4	**COMMUNICATE** effectively with team members.		
5	**DEMONSTRATE** the correct method when extending the guideline **BKO.**		
6	**DEMONSTRATE** the correct method when leaving a guideline bag **OKB.**		
	NAVIGATION ALONG THE GUIDELINE		
EV	**CHECK IN ORDER**	**P**	**NYP**
1	**IDENTIFY** key features in order to retrace a route in limited visibility.		
3	**COMMUNICATE** clear & concise instructions on landmarks/direction changes.		
4	**DEMONSTRATE** the correct procedure when passing teams on the guideline.		
5	**IDENTIFY** guideline tabs and branch tallies.		
	SEARCHING OFF A GUIDELINE		
1	**DEMONSTRATE** correct search patterns and techniques.		
2	**REMAIN** within six metres of the guideline.		
3	**IDENTIFY** hazards through correct safe movement.		
4	**LOCATE** casualties through the correct search procedure.		
5	**DEMONSTRATE** correct actions in accordance with safe casualty handling and removal.		
6	**IDENTIFY** guideline tabs and branch tallies to enable safe egress.		

Note: For additional information see Babcock training note GL 001 Guideline Procedures.

Appendix 4 - Entry control operative BPA

Best Practice Assessment Review Sheet(s)

Name: _____ Pay No: _____ Base: _____ Date: _____

ENTRY CONTROL OPERATIVE – BEST PRACTICE ASSESSMENT			
PC	**CHECK IN ORDER**	**P**	**NYP**
1	Test function of entry control board (ECB) using ECB test aide memoire (if required). Q: State the testing frequency. A: On receipt, daily, after use and monthly.		
2	Demonstrate setting ECB time or date using ECB test aide memoire (if required).		
3	"Set up Stage I entry control and book the following BA wearers in, the pressure entered on to the BA tallies agree with that displayed on the Bodyguard for the purpose of this assessment". Notes: Location is fire station name. Prepare BA tallies, enter details on simulator and activate BA wearers. Hand BA tallies to ECO. BA tallies must be inserted into the ECB in the same order as displayed on simulator. Team 1 "Call sign XXX PL3": LFF Smith 300 Bar – Breathing rate 50 l/m. FF Jones 300 Bar – Breathing rate 50 l/m. Brief, "Ground floor, fire fight, search and rescue LHW with 45mm jet". Increase LFF Smith's breathing rate to 120 l/min. **Do not inform ECO**.		
4	Demonstrate filling out BA wearer details on ECB correctly (Bracket BA team members together and enter location in the 'Location' column, other details in 'Remarks' column).		
5	Prepare BA tallies, enter details on simulator and activate BA wearers. Hand BA tallies to ECO. One of which should be the DEFECTIVE TALLY for FF Ball, enter details on simulator, hand both BA tallies to ECO. Confirm to ECO that pressure is as on the BA tally. Team 2 "Call sign XXX P3": LFF Krinsky 260 Bar – breathing rate 50 l/m. FF Ball 270 Bar – Breathing rate 50 l/m. Brief, "First floor, fire-fight search & rescue RHW with 45mm jet".		
PC	**CHECK IN ORDER**	**P**	**NYP**

6	Demonstrate 'Manual Log On' using BA aide memoire No. 10 (if required).		
7	Ask ECO to scroll through the ECB and identify each BA team's time of warning (TOW), time to warning (TTW) and cylinder pressure.		
8	ECO should identify that LFF Smith's TOW has reduced and explain the likely reasons for the increased breathing rate *(BA wearer is working hard)*. Q: What would ECO actions be? A: Contact the BA team and ask if they are ok and why their breathing rate has increased, consider task rotation.		
9	Take BA team 2 (LFF Krinsky & FF Ball) 'Out of Range'. Confirm that the ECO recognises this and is able to tell how long the BA team has been out of range for. Q. What actions would ECO take when BA teams go out of range? A. Contact the BA team by radio, if appropriate consider the use of telemetry repeaters/leaky feeder. Place BA team 2 (LFF Krinsky & FF Ball) back 'In Range'.		
10	Press the voluntary withdraw button for LFF Krinsky & FF Ball. Q: Confirm with ECO what icon means and actions they would take? A: Voluntary withdrawal icon, ECO acknowledges transmission and will contact BA team. Q: Confirm with ECO what action BA wearers take to send the voluntary withdrawal message? A: Each BA team member must press and hold the right button on Bodyguard.		
11	At this point the below 10 minutes to TOW warning for LFF Smith should start. Q: Confirm that ECO identifies this and states what their actions would be: A: Contact BA team to advice of proximity to TOW. Q: Confirm with ECO what occurs if the BA wearer reaches their TOW. A: The ECB will give an audible warning.		
12	Operate either the manual DSU or ADSU of LFF Krinsky. Q: Confirm that the ECO identifies what actuating icon means, what are the differences between DSU and ADSU icons and what their actions should be? A: Try to contact BA team by radio, inform IC and commit BA emergency team.		

PC	CHECK IN ORDER	P	NYP
13	Instruct ECO to carry out an emergency evacuation of BA team 1 (LFF Smith & FF Jones). The ECO should press the emergency evacuation buttons of both BA team members. Acknowledge the emergency evacuation for BA team 1 (LFF Smith & FF Jones). Q: Describe what is seen and heard on the Bodyguard to signal an emergency evacuation? A: 'Running person' icon is displayed and audible alert is sounded. Q: How does a BA wearer acknowledge this and how does the ECO identify that BA wearer has acknowledged evacuation instruction? A: BA wearer presses right hand button on Bodyguard; red LED for wearer on the ECB will stop flashing and remain illuminated.		
14	Instruct ECO to: "Carryout an emergency evacuation of all BA teams". Q: What actions should the ECO make? A: Press the 'emergency evacuate all' button (top left of the ECB) and ensure each BA wearer acknowledges the withdrawal by pressing right hand button of the Bodyguard.		
15	Inform ECO that, "All BA teams are now confirmed out of the incident". De-activate all BA wearers except FF Ball, ask ECO to return BA tallies for each BA team. FF Ball details will remain on ECB.		
16	Demonstrate 'manual log off' using BA aide memoire No. 10 (if required).		
17	Q: How to do you identify the battery charge level on the ECB? A: Using the number of dashes.		
18	Q: What is the length of operational battery life on a fully charged ECB? A: 8 hours.		
19	Q: What are the minimum requirements for a 'Re-Entry'. A: **190** bar and **15** minutes duration entered on ECB, enter 'TOW' in 'Location' column and 'Re-Entry' in 'Remarks' column and write the specific task being carried out.		

PC	CHECK IN ORDER	P	NYP
20	Q: Why do BA wearers need to close down the cylinder valve and 'purge' the air from their BA sets before returning to the ECO to retrieve their BA tally? A: To ensure that the Bodyguard will turn off once the Bodyguard key is inserted and that the BA set logs off the ECB.		
21	Q: What must be done to the BA set and ECB when they are returned to the appliance? A: Both must be placed on charge.		
22	Demonstrate 'manual entry control' using BA aide memoire No. 11 (if required).		
23	Q: What is the criteria for committing BA teams using manual calculations? A: All BA wearers are unable to log onto the ECB and achieve a BA telemetry signal when starting BA operations and on the instructions of the IC or SC.		
24	Q: Can the ECO commit BA teams using telemetry and manual entry on the same ECB? A: No BA entry control operations will either be telemetry or manual (calculations) and will not be mixed on any one ECB.		

Notes: Blue type indicates telemetry simulator actions, red type indicate instructions to ECO.

Personnel may consider wearing hearing protection for comfort purposes when carrying out ECB testing during this BPA.

Appendix 5 - Cable entanglement – training BPA

EV	CHECK IN ORDER
1	**Entangled** clearly states: **'I AM ENTANGLED IN CABLES'.**
2	**Rescuer** clearly states: **'STAY STILL AND CROSS YOUR ARMS AT CHEST HEIGHT'**.
3	**Entangled** crosses arms at chest height to protect BA set hoses.
4	**Rescuer** to approach with caution using safe movement procedures to identify any cables and prevent becoming entangled.
5	**Rescuer** to locate cables by completing a head to toe sweep using the backs of hands.
6	**Rescuer** use their own cable cutters to cut cables if unable to remove cables by hand. **Note: Caution must be taken to avoid cutting BA set hoses.**
7	**Rescuer** repeat above process until all cables are removed.
8	**Rescuer** restow cutters.
9	**On release** the BA team leader in consultation with BA team members, must establish if they can continue with operations. They must inform ECO of decision. ECO should convey this information to the Incident Commander. **Note: If DSU has been operated, the BA team must withdraw.**
10	**If wearer cannot be released** by their BA team member the ECO must be informed (information should be provided to assist the emergency team i.e. location, conditions, Bodyguard pressure reading) and the entangled wearer's DSU must be operated.

Note: Ensure as part of this procedure that BA wearers are aware of ECO's actions as per section 13 above.

ECO's being informed of BA team cable entanglement must:

- Inform person responsible for the entry control point.
- Commit emergency team.

Document history

Assessments

An equality or sustainability impact assessment and/or a risk assessment was last completed on:

EIA	04/07/2016	SDIA	04/07/2016	HSWIA	07/07/2016	RA	08/07/2016

Audit trail

Listed below is a brief audit trail, detailing amendments made to this policy/procedure.

Page/para nos.	Brief description of change	Date
Throughout	Full rewrite to align policy with National Operational Guidance	14/02/2018
Page 29 para no 34.3	Wording added for ECO to 'ensure that the tabs indicate the correct egress direction.	08/03/2018
Page 54 appendix 2	Don and start up section updated to include placing personal line karabiner and gloves into leg pockets.	03/04/2018
Page 24 para no 31.8	Updated to include turn around pressure (TAP)	05/04/2018
Page 26 para no 31.26	Wording updated for emergency team ECO	20/04/2018
Page 62 appendix 5	Cable entanglement training BPA added	23/04/2018
Page 32 para no 30.2	'Check date and time' wording against thermal image camera deleted.	25/04/2018
Page 24 para no 31.8	Updated to include turn around time (TAT)	30/04/2018
Throughout Page 4, para 3.2 and 3.18 Page 13 para 12.1 Page 19 para 21.3 Page 32 para 38.7 and 38.9 Page 33 para 40.2 Page 56 appendix 2	This policy has been reviewed as current with the changes made. BA sector reword and turn around pressure (TAP) additional wording. Second jet reword. Aerial appliance changed to read turntable ladder. Water supply additional bullet added and EDBA reword. BA sector additional wording. Close personal contact note added to BPA. Please re-read the content to familiarise yourself.	22/05/2018

Page/para nos.	Brief description of change	Date
Page 22, para 26.5	New paragraph inserted to provide more clarification on optimising recovery for BA wearers.	21/06/2018
Throughout Page 7 para 7.2 Page 8, 9 and 57 Para 7.20 – 7.23 and note Page 21 para 23.2	Minor amendments made throughout. Placing radio on centre loop of tunic wording deleted. Close personal contact additional information added. Separate sector requirement removed.	05/02/2019
Page 21, para 24.1	Examples of other agencies added.	29/08/2019
Throughout	Links and references to PN431 – Incident commander and monitoring officer now updated due to policy amendment.	31/10/2019
Page 8, para 7.14 Page 55, appendix 2 Throughout	TAP on ECB information added. Requiremet to place karabiner in pocket removed due to the new retractable lines being issued. Note re EV 7 also removed. Role to rank updates (note: aides memoires 2 and 3 will be updated on next hard copy change).	12/12/2019

Subject list

You can find this policy under the following subjects.

Level 1	Level 2
Incident Management	Incident Type
Assets	Equipment

Freedom of Information Act exemptions

This policy/procedure has been protectively marked due to:

Considered by: (responsible work team)	FOIA exemption	Protective marking descriptor

LONDON FIRE BRIGADE

Respiratory protective equipment – breathing apparatus – Dräger PSS 7000 – technical information

New policy number:	**476**
Old instruction number:	**TEC:B010:b1**
Issue date:	**17 November 2006**
Reviewed as current:	**29 January 2020**
Owner:	**Assistant Commissioner, Operational Policy**
Responsible work team:	**RPE and Hazmat PPE**

Contents

1 Introduction

1.1 This policy provides technical information for the Dräger PSS 7000 breathing apparatus (BA) set. Information on breathing apparatus procedures is contained in Policy number 466 – Respiratory protective equipment - breathing apparatus – operational procedures.

1.2 The PSS 7000 standard duration breathing apparatus (SDBA) set will give a working duration of 31 minutes when applying a consumption rate of 50 litres per minute (LPM). The safety margin duration is 12 minutes with the electronic low pressure warning (LPW) actuating at 84 bar.

1.3 The PSS 7000 extended duration breathing apparatus (EDBA) set will give a working duration of 45 minutes when applying a consumption rate of 58 litres per minute (LPM). The safety margin duration is 18 minutes with the electronic low pressure warning (LPW) actuating at 84 bar.

1.4 For operational use the complete BA set is made up of a PSS 7000 BA set including cylinder with cover fitted, entry control tally, personal line, BA cable cutter in pouch and log book (which is held on station unless BA set is sent for service or repair).

1.5 Main features of the PSS 7000 set:

- Positive pressure, first breath activated.
- Ergonomic carrying system, adjustable to suit wearer.
- Electronic monitoring unit with telemetry.
- Second person connection hose and quick release coupling (QRC) coupling.
- Dual purpose face mask (DPFM) that allows for either the connection of a lung demand valve (LDV) positive pressure, or a filter cartridge (FC) negative pressure.

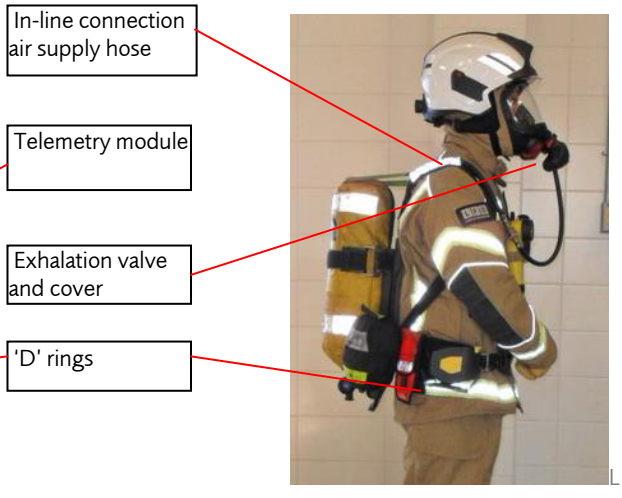
1.6 For further information regarding this policy, please email the RPE and Hazmat PPE mailbox

PSS 7000 SDBA set overview

LFB image id 1136791

LFB image id 1136779

LFB image id 1136793



FB image id 1136795

PSS 7000 EDBA set overview

LFB image id 1136771

LFB image id 1136768

LFB image id 1136773

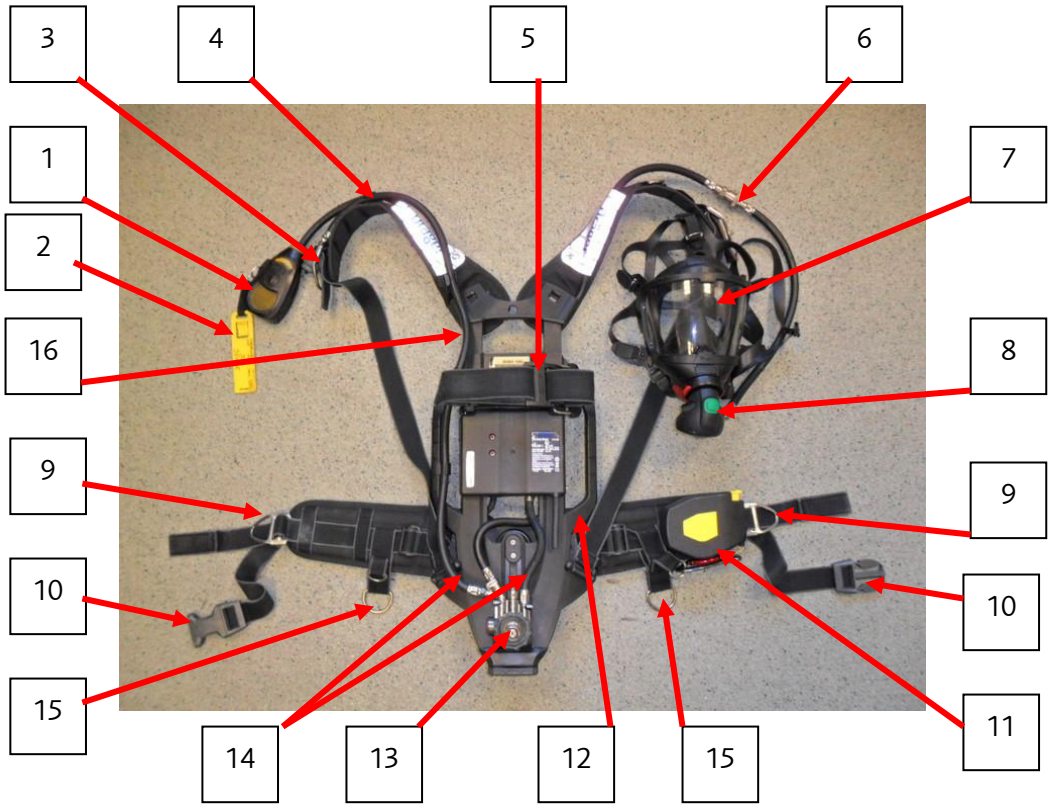
LFB image id 1136774

2 Component parts

2.1 The PSS 7000 – component parts

(a) Front view SDBA

1. Bodyguard 7000 user interface unit (display).
2. SDBA entry control tally (yellow).
3. Second person connection QRC.
4. Second person hose retaining clip.
5. Cylinder retaining strap and securing mechanism.
6. In-line connection QRC.
7. FPS 7000 dual purpose face mask.
8. Lung demand valve (LDV).
9. Waist belt adjustment buckles.
10. Waist belt buckle.
11. BA personal line housing, karabiner attached to small 'D' ring.
12. Backplate incorporating telemetry module.
13. First stage reducer incorporating cylinder connection.
14. Medium and high pressure hoses.
15. Waist belt 'D' ring for attachment of guide line bag and BA team personal lines.
16. Second person connection hose.



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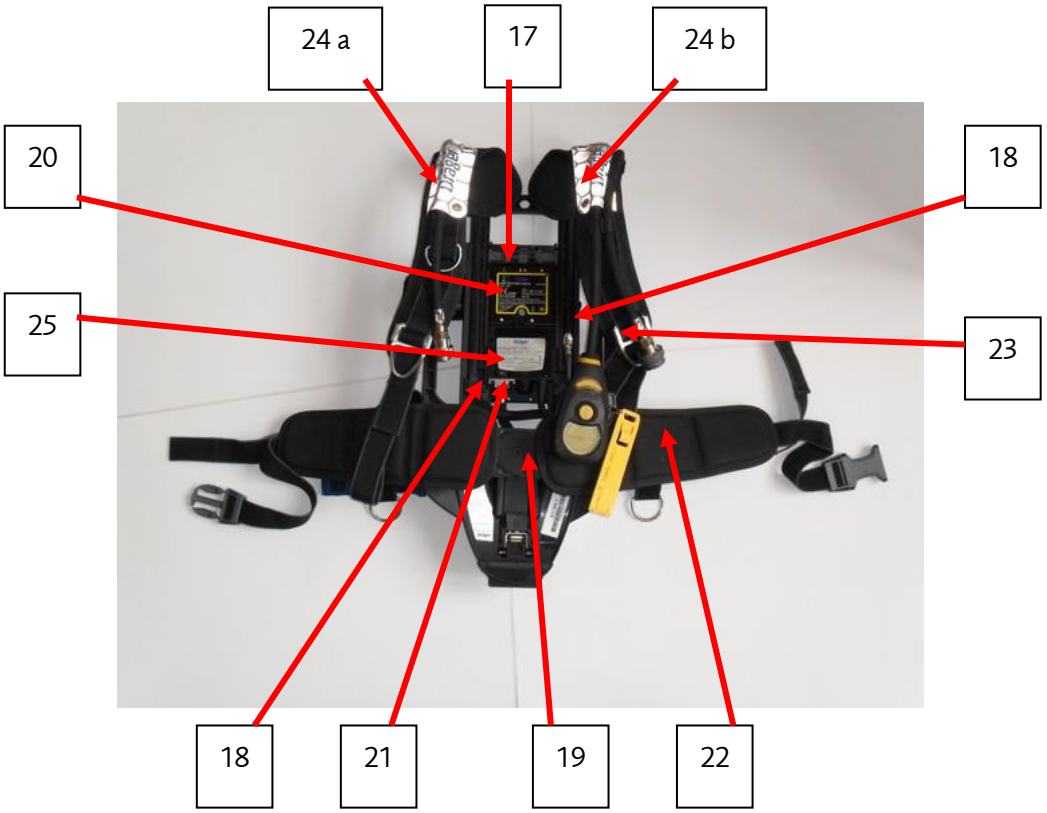
(b) Rear view (face mask removed for clarity)

17. 3-point height adjustable, lightweight, high strength, carbon composite backplate.
18. Integrated hose channels.
19. Sliding and swivelling waist belt.
20. Rechargeable battery pack.
21. Pressure sensor housing.
22. Padding material; high wear resistance and high grip properties.
23. Shoulder strap adjustment buckles.
24. Hose sleeves on shoulder harness to reduce snagging and are reflective:
    (a) Leading to FPS 7000 face mask.
    (b) Leading to Bodyguard 7000.

    Note: the second person connection hose **must not** be roved under the hose sleeve as this would disable its quick release.
25. Electronic monitoring unit (EMU).



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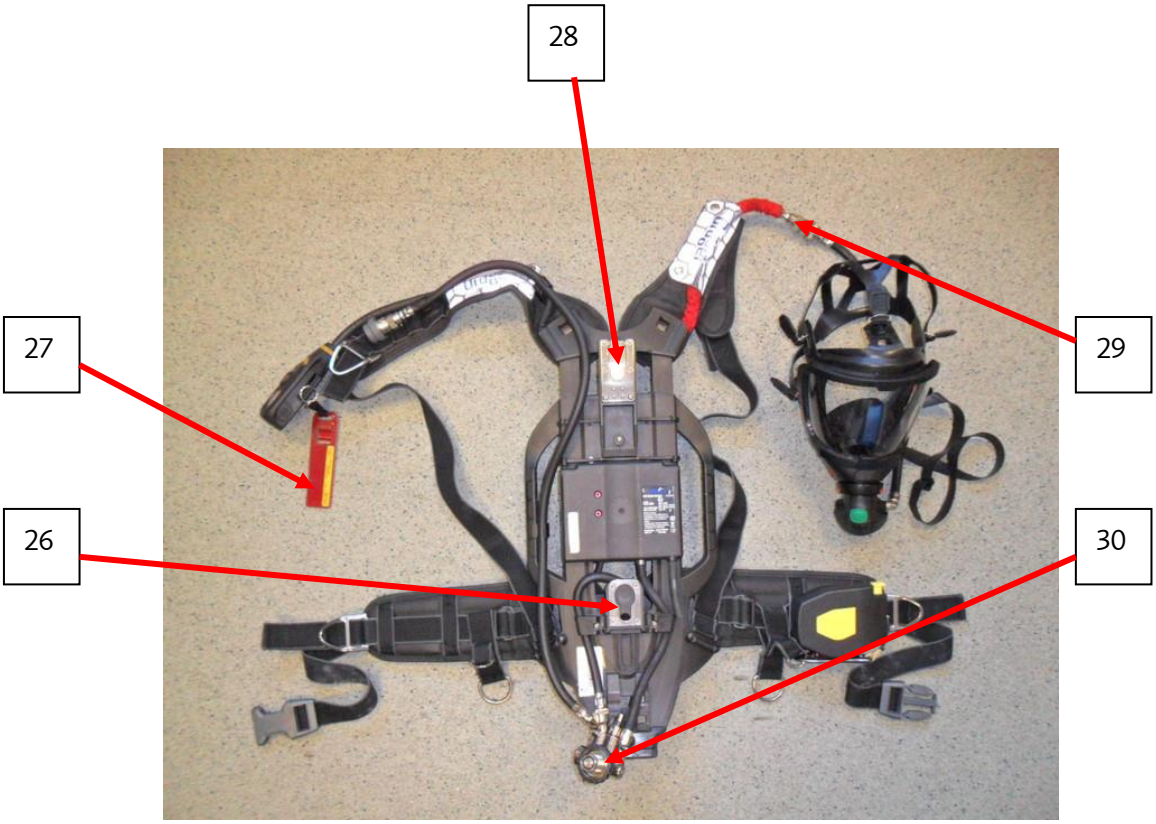
(c) Front view EDBA to indicate differences from SDBA

26. Lower cylinder connection guide.
27. EDBA entry control tally (red).
28. Upper cylinder retaining bracket incorporating spring clip.
29. Red sleeve to in-line connection hose.
30. Floating first stage reducer.



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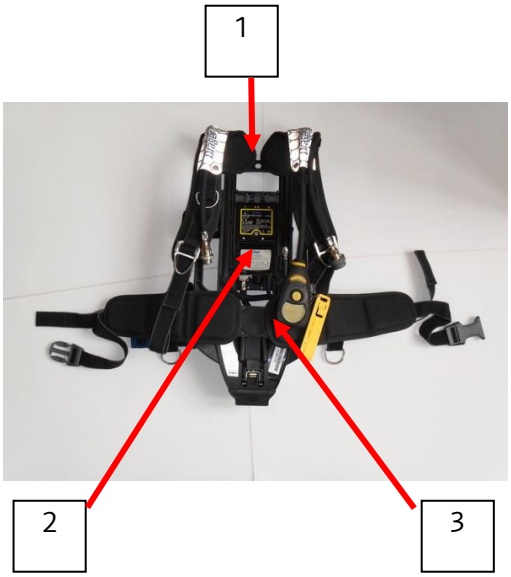
3 Backplate assembly

General

3.1 The height adjustable, and articulating backplate assembly, provides the wearer maximum comfort and ease of use, resulting in reduced wearer fatigue. The backplate assembly consists of three elements:

1. The adjustable shoulder yoke.
2. The backplate.
3. The waist belt pivot slide assembly.



3.2 Each of the elements is manufactured from a moulded carbon composite material, providing an anti-static, lightweight and durable system.

3.3 The adjustable shoulder yoke has two guide arms that locate, and slide, in the two channel slots in the rear of the backplate.

3.4 At the base of the backplate is the waist pivot slide assembly. This unit is assembled to a spring loaded vertical slide that is guided in a vertical slot in the backplate.

3.5 Two compression springs, in the slide assembly, act against the slide and pivot slide assembly to hold the unit at the top of the slide.

3.6 When wearing the BA set, the waist pivot slide assembly slides, and pivots, in response to the twisting and bending movements of the upper body of the wearer. This flexibility improves the weight distribution, and provides freedom of movement and increased manoeuvrability for the wearer.

3.7 For maximum comfort and improved weight distribution adjust the shoulder straps to allow the BA set waist belt to be positioned comfortably on the hips so that weight is taken through legs.

LFB image 245591

3.8 A twin hook arrangement, moulded at the base of the SDBA backplate, provides a positive mounting for the body of the pressure reducer.

3.9 Located in the recess behind the twin hook is a pre-loaded coiled return spring. The spring latches onto an extended portion (lug) on the body of the pressure reducer, securing the reducer assembly in its twin hook location.

3.10 A degree of pivotal movement of the reducer is possible to allow for the alignment of the hand wheel of the reducer to the cylinder valve.

LFB image 245570

3.11 The EDBA reducer is not mounted to the backplate.

3.12 A rubber shock buffer, at the base of the backplate, provides additional impact protection.

3.13 Side handles, incorporated into the backplate moulding, allow for the BA set to be easily carried (without cylinder attached).

Adjustment

3.14 Three pre-set height settings are available to suit the body length of the individual wearer ('S' - short, 'M' - medium, 'L' - long), and these associated letters are embossed along the guide arms of the shoulder yoke.

Short | Medium | Long

LFB image 245554 | LFB image 245552 | LFB image 245550

3.15 A locking mechanism for the shoulder yoke is located at the rear of the backplate and consists of two spring loaded buttons.

3.16 Body length adjustment is achieved by using the finger and thumb to open the locking mechanism buttons, and then sliding the shoulder yoke to align the buttons with the required 'letter'.

3.17 Releasing the buttons will allow them to retract and locate into the slots in the guide arms when an audible 'click' will be heard locking and securing the shoulder yoke to the required height setting.

3.18 This adjustment is carried out during 'A' and 'B' testing if required.

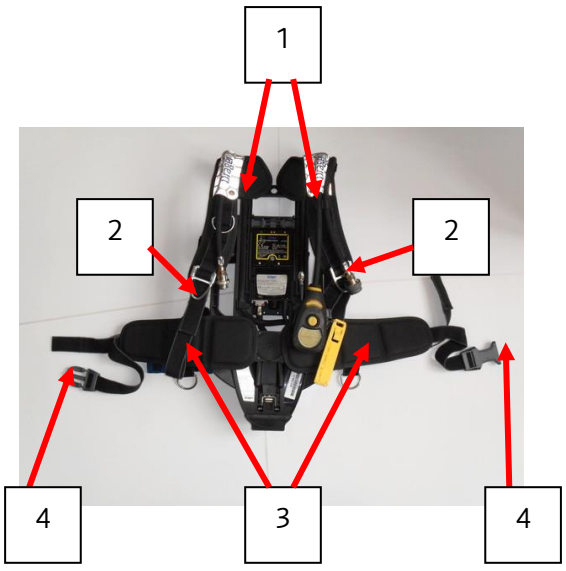
LFB image 245544

LFB image 245546

4 Harness and cylinder strap assembly

4.1 The harness arrangement consists of the following:

1. Left, and right shoulder padding with slide lock buckle, hose retaining flap – button locking.
2. A pair of adjustable (pull-down) shoulder straps connected to the slide locks buckles of the shoulder padding.
3. A pair of waist padding elements with a buckle arrangement fitted to the slide lock buckles strap.
4. A pair of adjustable (pull forward) waist belt straps with a push-in quick release buckle set.



4.2 The inner padding is produced from a flame retardant, closed cell, fully vulcanised Polyolefin foam. The inner liner is then covered with outer layers of woven polyester covered with Neoprene. The outer edges are covered with a stitched binding of the same material as the outer layer.

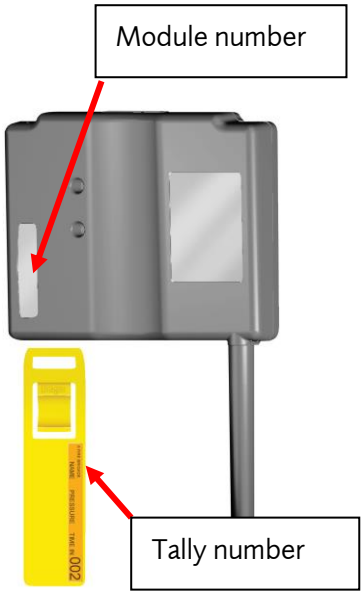
4.3 The material of the hose retaining flaps is a double coated Neoprene Polyester plus a 'Scotchlite' reflective outer printed with a photo luminescent pattern and a blue Dräger logo.

4.4 The cylinder strap is fitted to a unique 'Camlock' buckle that ensures that the cylinder is securely clamped to the backplate. A rubber cradle assists in alignment of the cylinder prior to clamping

4.5 All straps, adjusting straps, and the cylinder securing strap are manufactured from black Kevlar webbing that meets the flame test requirements of EN137: 2006.

5 Telemetry module

5.1 The PSS Merlin telemetry module is a battery-powered unit incorporating an integral digital radio transmitter/receiver with an external antenna. The integrated assembly is able to transmit and receive audible and visual alarm signal data to and from the PSS Merlin entry control board (ECB). The unit is programmed with an identification number (London Fire Brigade ID is 028) and an individual telemetry module identification number.



5.2 The module is permanently attached to the backplate of the BA set and is only interchangeable by Operations Support Group (OSG).

5.3 Power is supplied by a rechargeable battery pack located in the backplate of the breathing apparatus. An in-cab charger provides charging via a charging port incorporated into the telemetry module.

5.4 Supplied with each module is a matching BA entry control tally which is encoded with the same identification number as the module. A label on the tally shows the brigade name, the telemetry module identification number and three headings that allow the following information to be added using a 'Chinagraph' pencil:

- The rank and name of the wearer.
- The cylinder pressure.
- The actual entry time into the risk area (using the clock of the ECB).

5.5 Where a radiation risk may be present, a dosimeter reading can be recorded on the reverse side of the tally (prior to entry and after exit).

5.6 The BA tally must stay with the BA set when the set is sent in for repair/service as it is linked with the telemetry module (the tally and telemetry identification numbers must match to ensure that the telemetry module links with the ECB that the tally is placed into).

6 Charging BA set from appliance

6.1 BA sets must be connected to appliance charging points to maintain a fully charged battery pack. All BA stowage are fitted with charging points, the components can be identified as follows:

- Drager in-cab charger fitted to locker stowage in this example (see image 1136764).
- Charging lead located to the left side of the stowage (see image 248635).

LFB image 1136764

LFB image 248635

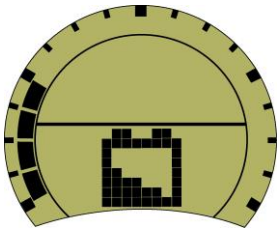
6.2 **The BA set must be shut down and the Bodyguard switched off when connected to the charging point**. This ensures that the BA set is not searching for the ECB which can overrun the charging supply.

6.3 The charging lead connector push-fits into the BA set charging port. The port is located to the left side of the telemetry module as you wear the BA set (see image 245584). To connect the lead, place the BA set in front of stowage position. Push-fit the connector with the charging lead uppermost (see image 1136763). The BA set can now be pushed back into the stowage and checked to ensure it is securely held. The connector will automatically disconnect when the BA set is removed from the BA set stowage bracket.

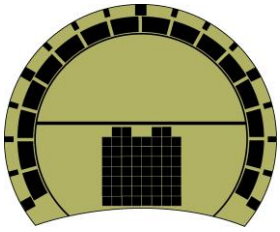
LFB image 245584

LFB image 1136763

6.4 Once connected the Bodyguard will carry out a short test sequence before displaying the 'charging' icon. The radial arc indicates the level of charge in the same way as it shows the level of pressure when the BA set is being worn (see image below).



Battery charging quarter charged



Battery charging fully charged

6.5 A guide to the applicable defect codes for BA set stowage and charging points can be found in appendix 7 of this policy.

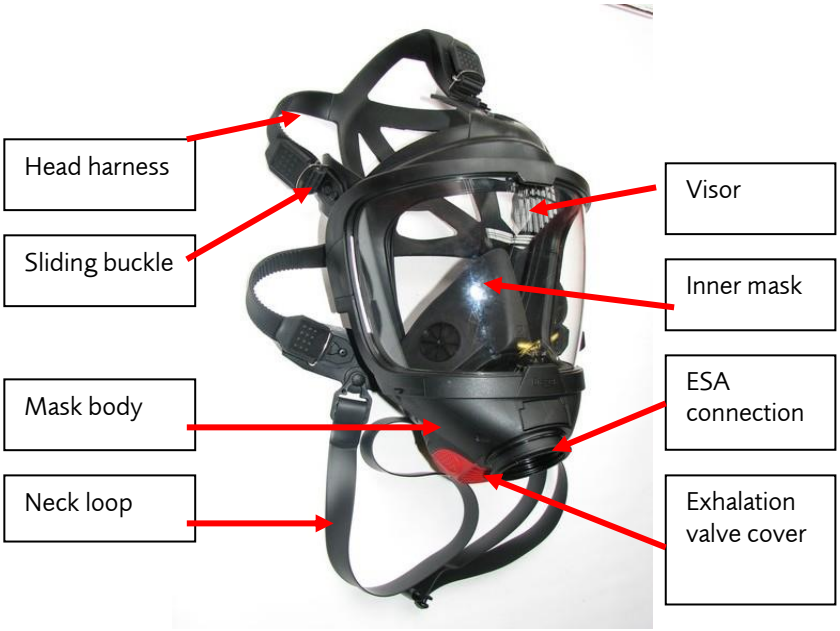
6.6 The battery pack also indicates charging state via a coloured LED located to the top right hand corner of the battery pack. The table below is a guide to LED status.

Battery pack LED status	Description	Action
Solid green	Fully charged (maintenance charge).	Leave on charge.
Single flash green	Charging (fast).	Leave on charge.
Double flash green	Fault, battery temperature too high or too low.	Remove from charge. Leave approximately 30 minutes for

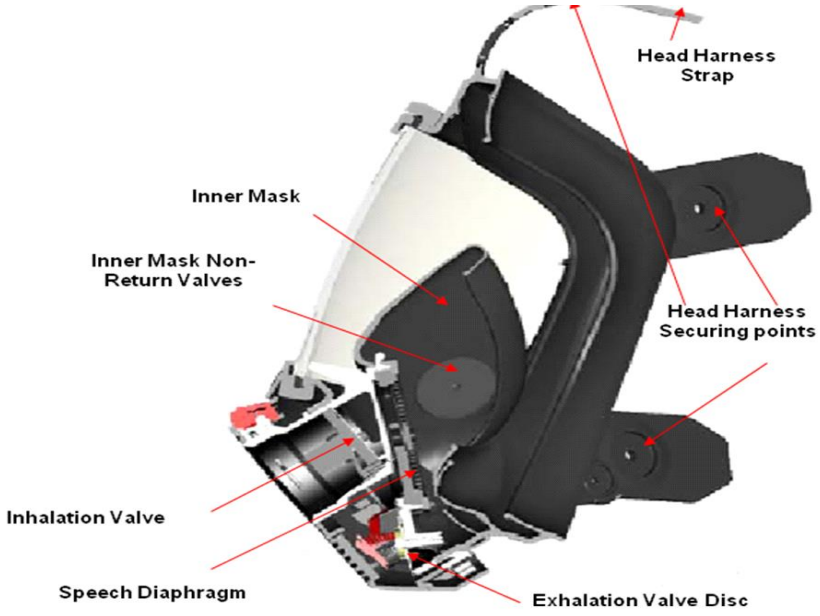
		temperature to stabilise and then charge.
Solid amber	Was fully charged but now battery drained.	Check BA set is shut down correctly and the air is purged. Remove charger and refit. If the problem persists contact OSG.
Single flash amber	Charging (fast) low capacity.	Leave on charge.
Double flash amber	Fault, Battery low capacity or battery temp may be too high or too low.	Remove from charge. Leave approximately 30 minutes for temperature to stabilise and then charge.

7 FPS 7000 dual purpose face mask

Face mask identifying features



LFB image 201850



7.1 The standard size combination of face mask and inner mask fitted to the PSS 7000 BA set is a medium mask 'M' with a size '2' inner mask – 'M 2'.

7.2 If a seal cannot be achieved using this combination of face mask and inner mask, the wearer (following a face fit arranged through OSG) will be given either the S (small), M (medium) or L (large) face mask and 1, 2 or 3 inner mask combination as appropriate. This will be issued on a personal basis and will be recalled on an annual basis for testing.

7.3 Personal issue face masks that become defective during weekend and or night duties are to be removed from service and a POMS order raised. Personnel affected are to remain on the run and allocated duties that do not involve the wearing of BA. This is however limited to the extent that a minimum of two BA wearers (excluding the appliance commander but not excluding the driver) are available on the appliance. Should BA wearer availability drop below two, an appliance will then be considered 'off the run' (OTR) for BA.

7.4 The log book 'remarks' section should be annotated with the personal issue face mask identification number when fitted as part of BA set testing when carrying out 'A' and 'B' tests. A 28 day test can be carried out with a personal issue face mask see section 18 for details.

7.5 The FPS 7000 DPFM can be fitted with a P3 particulate filter to protect personnel from the effects of exposure to airborne particulates.

7.6 The FPS 7000 face mask can be fitted with a hot cutting visor for cutting operations carried out by fire rescue unit (FRU) qualified personnel, see Policy number 799 – Broco exothermic cutting equipment – technical information.

BA face mask seal and the acceptable limits of facial hair.

7.7 The importance of obtaining an effective face mask seal should not be underestimated. Factors such as individual face shape and size together with the presence of facial hair can affect face fit. Poor face fit introduces the potential for inward leakage and exposure under extreme use, together with the potential for outward leakage with consequent reduced duration.

7.8 The face mask seal has been defined by the manufacturer as that area of the face mask in contact with the face. The inner mask is designed to manage the build-up of CO_2 in the face mask. The face mask seal is made up of a 'double reflex seal' that by design and function is considered **safety critical to the respiratory protection of the wearer**. The area within the yellow lines shows the defined limits of the double reflex seal (see image 389147 below).

LFB image 389147

7.9 For their own safety and in accordance with the manufacturer's and Health and Safety Executive (HSE) recommendations, all potential BA wearers are to maintain all areas of the face that **may**

come into contact with the face mask double reflex seal, in a clean shaven condition and free from beard, stubble and sideburn hair.

7.10 The HSE advise, and past fire brigade experience shows, that sweating can cause face masks to slip. This increases the chance that the mask will come into contact with facial hair etc. **Facial hair is an avoidable hazard**; all firefighters trained in BA must remain clean shaven. Hair, (facial or head) or any adornment in contact with the face mask seal has the potential to impair the efficiency of the seal and compromise the respiratory protection of the wearer, and **must be removed**.

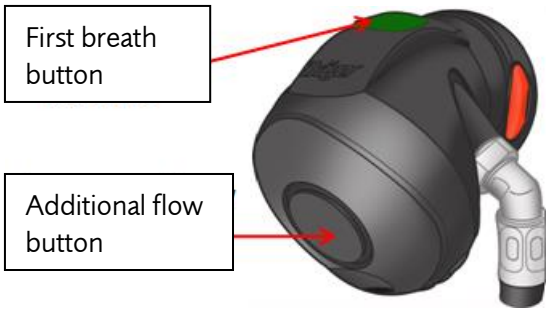
7.11 Cosmetics/sun tan creams must not come into contact with the face mask rubber seal as this degrades the rubber and may affect the quality of the seal. See Policy number 320 - wearing of uniform and personal appearance (section 8) for further details.

8 Lung demand valve (LDV)

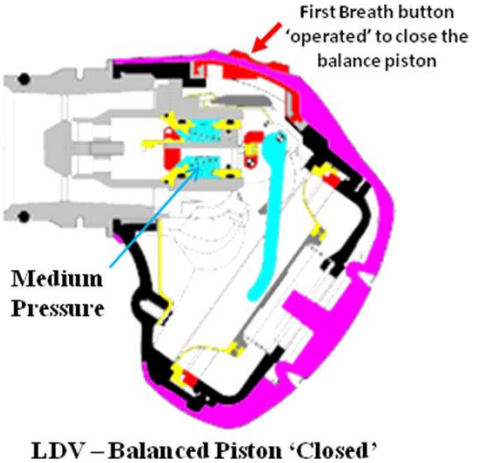
Operation of the LDV

8.1 Before opening the cylinder valve, the first breath mechanism must be operated. To do this press the green first breath button on the top of the LDV which will lift and lock the main pivot lever and diaphragm (see image right).

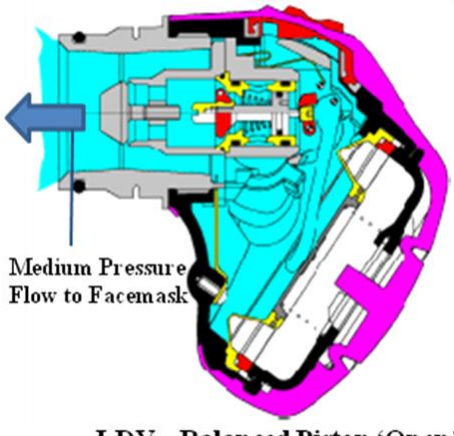
Warning: do not try to operate the first breath button (on top) and the 'additional flow' button (at the front) simultaneously. **This will result in damage to the LDV and may render it inoperative.**



8.2 The conical compression spring in the main chamber of the balanced piston unit, acts against the piston flange resulting in the piston cone being pressed against the sealing rim of the piston housing – sealing 'off' the outlet of the balanced piston unit.



LDV – Balanced Piston 'Closed'



LDV – Balanced Piston 'Open'

8.3 On opening the cylinder valve, medium pressure air flows from the reducer, through the medium pressure hose of the LDV, into the air transfer block then into the main chamber of the balanced piston unit.

8.4 When the wearer begins to inhale a negative pressure is created inside the mask and LDV. Due to the negative pressure, the ambient air pressure acts against the diaphragm.

8.5 As the diaphragm deflects, it then presses against the main hinged lever of the balanced piston unit resulting in the release of the positive pressure 'off' mechanism.

8.6 Increasing deflection of the diaphragm, during inhalation, pivots the cam of the main lever against the secondary lever.

8.7 The secondary lever then pivots and presses against the end cap of the piston – moving the piston axially against the conical spring – lifting the piston cone from its seating and releasing air from the LDV into the wearer's face mask.

8.8 A compression spring attached to the front cover of the LDV acts on the diaphragm, then the pivot levers and the conical compression spring, lifting the sealing cone and maintaining a positive pressure (above ambient) inside the face mask.

8.9 When the wearer stops inhaling and then begins to exhale, the diaphragm, the pivot levers and the sealing cone all retract.

8.10 This cycle repeats as the wearer begins to inhale again.

8.11 The LDV is designed to maintain positive pressure inside the mask.

Use in hi - expansion foam

8.12 For use in hi-expansion foam the outer rubber casing should be released from the body of the LDV prior to use, see appendix 1 for details.

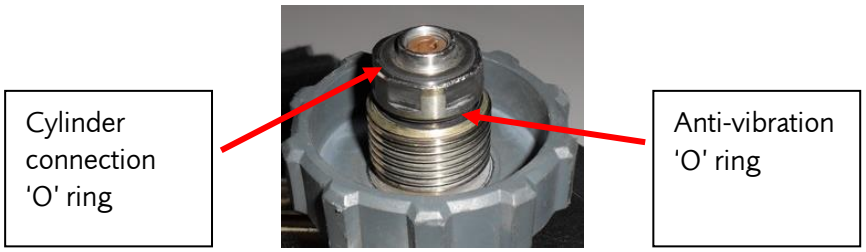
9 Pneumatic system

First stage pressure reducer

9.1 Leading from the first stage pressure reducer are the:

- High pressure hose to electronic monitoring unit (EMU).
- Low pressure warning whistle (LPWW).
- Medium pressure hose to in-line connection with LDV hose.
- Medium pressure hose to second person connection.
- Cylinder connection.

9.2 An additional compression 'O' ring located between the hand wheel and the flange of the high pressure (HP) connector, functions as an anti-vibration device.



LFB image 245568

9.3 This feature prevents the inadvertent loosening of the hand wheel from the port of the cylinder valve, during storage conditions involving vibration, when the system is not pressurised.

9.4 The reducer has two outlet ports, one providing high pressure air to the EMU, and the other providing medium pressure air only to a 'Y' piece which supplies both the LDV and second person connection. The LPWW is situated in the middle port of the reducer body.

9.5 Two of the hoses that connect to these ports are looped through the central hole in the backplate and located into the respective channel in the adjustable shoulder yoke, from which they are directed and secured to the shoulder pads.

9.6 The hose to the second person connection is run up the left hand side of the backplate.

9.7 The route of the hoses from the reducer, to the guide slots in the shoulder yoke are set to allow for full and free linear movement of the yoke during height adjustment.

LFB image 1136792

9.8 Fitted to the medium pressure port is a flexible and anti-kinking rubber hose assembly.

9.9 The inlet fitting of the hose incorporates a pressure relief valve feature.

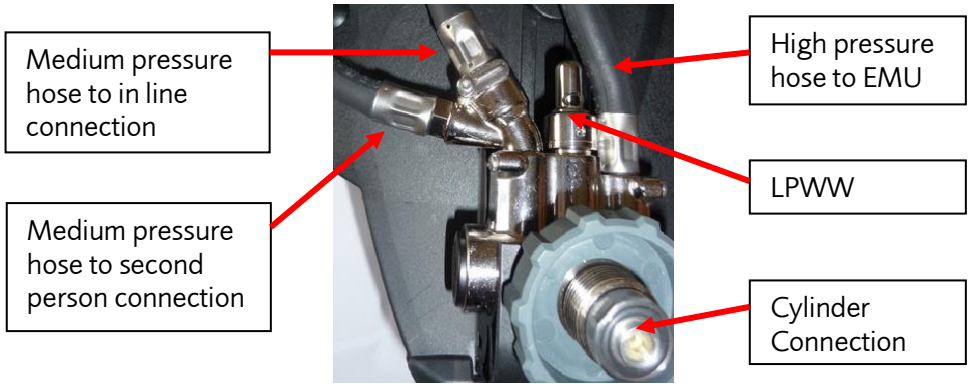
9.10 At the outlet end of the hose is a female QRC. This female QRC is used to attach to the male coupling of the LDV.

9.11 The hose is manufactured from Ethylene-Propylene-Diene-Monomer (EPDM) rubber.

9.12 Fitted to this port is the hose assembly that supplies the EMU for monitoring the air pressure in the compressed air cylinder.

9.13 The hose construction, although appearing similar to medium pressure hoses, differs in its internal construction. Inside the outer EPDM rubber hose assembly is a fine bore copper capillary tube that is coil wound around a multi-strand length of phosphor bronze wire. The capillary tube and wire are then brazed to each of the end fittings of the capillary tube assembly.

9.14 High pressure air flows through the bore of the capillary tube to the EMU which is protected by the rubber outer hose.



LFB image 202449

10 Second person connection

10.1 The second person connection is an additional feature fitted to the PSS 7000 BA set. The second person hose is connected at one end to a 'Y' piece on the reducer and terminates at the other end with a QRC and protective cap. The purpose of this hose is to provide the ability to either supplement the wearer's air supply with an airline or to provide another wearer with additional air during exchange of air procedure (see image 1136797).

LFB image 1136797

10.2 The hose to second person QRC is 900 mm long and when charged contains medium pressure air (between 6 and 9 bar) from the reducer to the QRC.

10.3 Once the second person connection has been made the second person hose can be released from its retaining clips. To release the hose the recipient takes hold of the QRC and pulls outwards to donor's left hand side, this action will release the hose without any undue pressure being applied to the hose retaining clips.

10.4 When fully unclipped, the 900 mm of hose and the additional 400 mm from the donor's face mask hose will enable the two attached BA wearers greater flexibility when withdrawing from an incident.

10.5 The second person hose is secured to the BA set at three points along its length by dedicated retaining clips.

- The second person hose passes up the left side of the BA set backplate. The first hose clip should be clipped to the side of the backplate carry handle, the open side of the clip points upwards towards the cylinder. The second person connection hose can then be pushed into the clip (see image 245574).
- The second person hose continues over the left shoulder padding, outside the hose sleeve and to the left of the Bodyguard supply hose. The second hose clip, is positioned on the top of the left shoulder padding. The clip should be attached to the underside of the Bodyguard supply hose so that you can still see the hose. The second person hose can then be pushed into the clip from the left hand side (see image 245578).
- The third hose clip is positioned by attaching the retaining clip to the harness webbing loop and then pushing the Bodyguard hose into the clip so that the hose can still be seen. The second person hose can then be pushed into the clip from the left hand side (see image 245576).

LFB image 245574

LFB image 245578

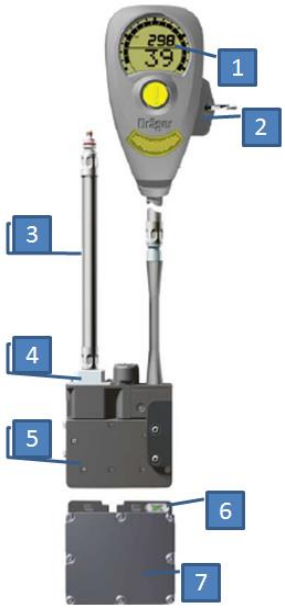
LFB image 245576

10.6 It is important that the second person connection hose clips are fitted correctly to ensure the hose is held securely until required.

10.7 The above section has provided an overview of the capability of the second person connection and wearers should remember that where possible they should stay in close personal contact and follow the correct exchange of air procedures as per Babcock training module BA 017 – Emergency Procedures found on Big Learning.

Note: when donor and recipient BA wearers revert back to their own BA set air supply, the donor's second person connection hose **must** be clipped back into place using the three clips on their BA set. Failure to do this may result in increased risk of entanglement and potential damage to the second person connection hose and QRC.

11 Bodyguard 7000 electronic monitoring unit (EMU)



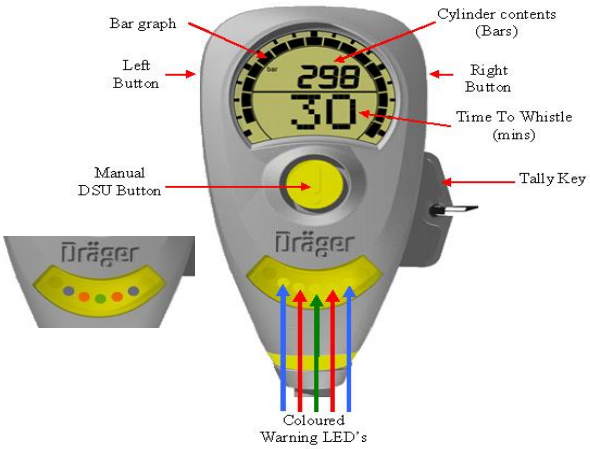
Components of the Bodyguard 7000 EMU

1. Bodyguard user interface unit (display).
2. Bodyguard/BA tally key.
3. High pressure hose to reducer.
4. Pressure sensor housing.
5. Electronic monitoring unit (EMU).
6. Battery contacts.
7. Rechargeable battery pack.

11.1 The Bodyguard 7000 EMU comprises of an electronic pressure transmitter module, a user interface unit (display) and a rechargeable battery pack. A short high pressure hose which is routed from the high pressure sensor housing of the electronic pressure transmitter module connects to the high pressure outlet of the pressure reducer of the BA set.

Component parts of Bodyguard user interface unit

Note: the Bodyguard key can be inserted into either side of Bodyguard user interface unit.



Description and use

11.2 The Bodyguard user interface unit (display) features a digital screen for viewing the cylinder pressure (in numeric and radial segments), scrolling of user details (BA identification), the time to warning (TTW) (numeric), and the display of various warning icons.

11.3 The electronic functionality of the unit is activated to operational mode by the system cylinder pressure of the BA set, via the pressure sensor incorporated in the pressure transmitter module located in the inside of the frame of the backplate.

11.4 This multi-function system provides continuous monitoring of the BA set and incorporates the following features:

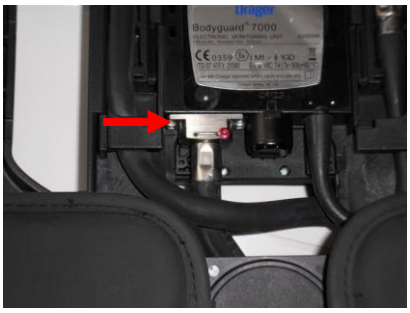
- Monitoring the available air pressure of the compressed air cylinder.
- Time to warning (TTW) – numeric display.
- Time of warning (TOW) – indicated by flashing LEDs and audible warning.
- Visual – LED indicators – (green – operational mode, key removed, red/blue – warning mode and blue – telemetry signal).
- Motion sensor and automatic distress signal unit (ADSU).

- Button activated manual distress signal unit (DSU).
- A 'backlight' – illuminating the display.

Pressure transmitter module

11.5 **Pressure connection** – pressure sensor (see paragraph 9.14) for connection to the high pressure outlet port of the first stage pressure reducer via a high pressure connection hose (see image 245556).

11.6 **Outlet connection** – hose/cable link to the Bodyguard unit.



LFB image 245556

Rechargeable battery pack

11.7 The rechargeable battery pack cannot be changed at station. If a 'reduced battery' icon is displayed investigate why i.e. is the charging lead connected or is the charging point defective on the appliance, try changing the set position to see if the charging icon is displayed on the Bodyguard display:

- Main power – 6.5 volts.
- The Bodyguard is powered by a 6.5 volt rechargeable battery pack.
- Actual operating time of the battery pack is dependent on how long the system has been operating, frequency of alarms, ambient temperature and frequency of use of the backlight.
- With the system switched 'off' a small amount of power is still consumed.
- Note: All electronic devices may suffer a temporary loss of function if subjected to high levels of radio frequency (RF) radiation.
- The Bodyguard will continue to operate with no loss of performance or loss of function, once the RF radiation has been removed.

12 Bodyguard in use functions

Display – operating mode

12.1 The Bodyguard user interface displays cylinder pressure and TTW. The upper numeric value and radial segments indicate cylinder pressure (see image right).

12.2 The lower numeric value indicates the TTW and the activation of the visual LEDs.

12.3 The display alternates between TTW and telemetry signal status at approximately five second intervals (see image right 'telemetry signal radio' icon ticked for 'in' telemetry signal).

12.4 The green LED on the front of the display unit flashes at one second intervals when in 'operational mode'.

12.5 The two blue LEDs on the front of the display unit flash at one second intervals when 'in' telemetry signal.

12.6 The EDBA set Bodyguard also features a first alert, this is indicated at **192** bar by two short 'bleeps' and is an indication that **50%** of the available working duration of the EDBA set has been reached.

Backlight

12.7 To illuminate the display – briefly press the **left** button. The display will illuminate for ten seconds.

Motion sensor

12.8 With the Bodyguard key removed, if no movement is detected for approximately 30 seconds, then a repeating audible 'pre-alarm' sound is emitted. If movement is then detected within a further 15 seconds of commencement of the 'pre-alarm' – the alarm is automatically cancelled.

12.9 The pre-alarm can only be switched 'off' by the movement of the Bodyguard display unit or Bodyguard key insertion. If the Bodyguard display unit is being tested this is accomplished by tapping the side of the unit when in the vertical position.

12.10 However, if no movement is detected for approximately 30 seconds, then the repeating audible 'pre-alarm' sound is emitted and at the end of a further 15 seconds a repeating audible alarm is emitted and the 'ADSU' icon is displayed (see image right).

12.11 To silence the alarm – refit the Bodyguard key.

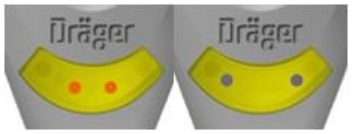
Distress signal unit (DSU) button

12.12 The DSU button is available to the wearer to signal an audible alarm for help and assistance manually.

12.13 Press the yellow button in the centre of display unit to start the DSU alarm (see image right).

12.14 A repeating audible alarm is emitted and the 'DSU' icon is displayed. Note display shows system pressurised (see image right).

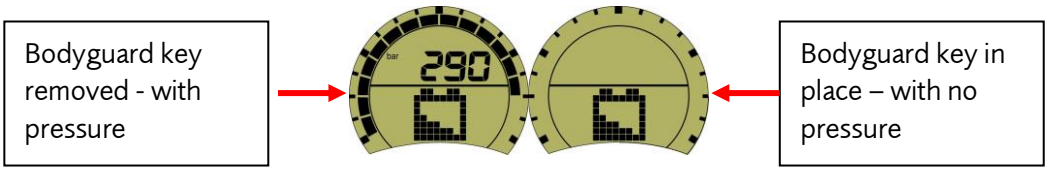
Note: The two blue and two red LEDs will illuminate alternately.



12.15 To silence the alarm – refit the Bodyguard key or remove and then refit the Bodyguard key.

Reduced battery level

12.16 A reduced battery level will be indicated by the 'low battery' icon. This will occur whether the Bodyguard key is in the unit or removed (see image below).



12.17 The unit emits a 'bleep' approximately every nine seconds to warn the wearer that the available power is reduced.

12.18 When this icon is first displayed the unit will continue to operate for up to two hours. The ADSU can still be activated during this time period and will maintain operation for up to two hours.

12.19 Any BA set found to have 'low battery' icon must be checked to ensure that it is connected to its charging lead and that it is being charged.

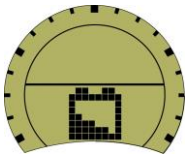
Low pressure warning

12.20 The electronic low pressure warning will sound at 84 bar. This indicates the start of the 12 minute safety margin for SDBA and 18 minute safety margin for EDBA.

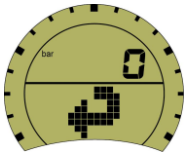
12.21 The pneumatic low pressure warning whistle will sound at 74 bar (+/- 5 bar). This indicates that 10 minutes of the safety margin remains for SDBA and 16 minutes remain for EDBA.

13 Bodyguard electronic monitoring unit self-check

13.1 The 'self-check' can be performed without the system pressurised.



Note: during 'self-check', a power on phase and battery check is simultaneously performed – if the battery voltage is below the programmed minimum power on value of 5.0 volts, then the 'low battery' icon will be displayed and then the system will switch 'off'. Investigate why the 'low battery' icon is being displayed i.e. not connected to charging lead. If BA set fails to charge remove the set from service and return to OSG (see image right).



13.2 Press and hold the **left** button of the Bodyguard unit and continue holding until the 'return arrow' icon appears. The unit will emit a single audible 'bleep', and then the 'self-check' sequence will start (see image right).

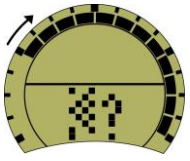
13.3 The initial short first display (see image right).

13.4 Quickly changes to the full 'LCD check' icon (see image right).

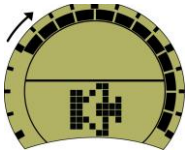
13.5 The display backlight will momentarily illuminate and the blue, red, and single green LEDs in the lower display cluster will also momentarily illuminate (see image right).

13.6 During each sequence the outer radial segments will initially illuminate and then switch off segment by segment from the left (clockwise).

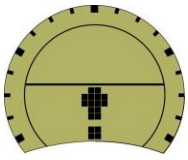
13.7 When all the segments have disappeared, the display will change to 'leak test' icon (see image right).



13.8 When all the segments have disappeared, the display will change to 'reduced volume' icon (see image right).



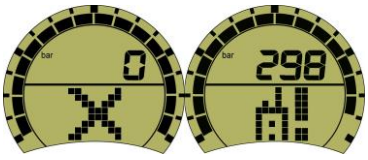
13.9 When all the segments have disappeared, the display will change momentarily to 'ADSU not active' icon (see image right).



13.10 The display will then quickly change to 'non-operational mode' icon (see image right).

13.11 The green LED continuously flashes at approximately one second intervals.

Note: the display of an 'X' or 'telemetry fault code' icon alerts the user that the Bodyguard 7000 has failed the 'self-check' or the telemetry module has failed. Return the BA set to OSG (see images right).



13.12 Press and hold the **left** button of the display unit. The 'return arrow' icon momentarily displays and then switches off. Release the button and the unit is off.

Note: if Bodyguard will not switch off (i.e. following manual log off) press and hold both buttons to override and shut down.

Do not use after date and BA set identification

13.13 To confirm the do not use after date and the BA set number, following completion of the 'self-check' as above press the **right** button and the do not use after date, followed by the four digit BA set number will scroll across the display screen from right to left (the example above is BA set 0029).

14 SDBA cylinder

General

14.1 Cylinder volume is eight litres (water capacity) and is charged to a working pressure of 300 bar.

14.2 Contains 2160 litres of compressed breathable air when charged to 300 bar.

14.3 Hydraulically tested every five years.

14.4 Design life is 30 years.

14.5 The cylinder must be used with a cylinder cover.

Construction

14.6 The basic construction of the fully-wrapped carbon composite cylinder consists of an aluminium liner over-wrapped with continuous filaments of carbon and glass fibres.

14.7 The liner is manufactured from AA6061 aluminium alloy that is deep drawn from plate to form an airtight enclosure.

14.8 The use of an aluminium alloy provides a lightweight liner having good resistance to corrosion in normal use.

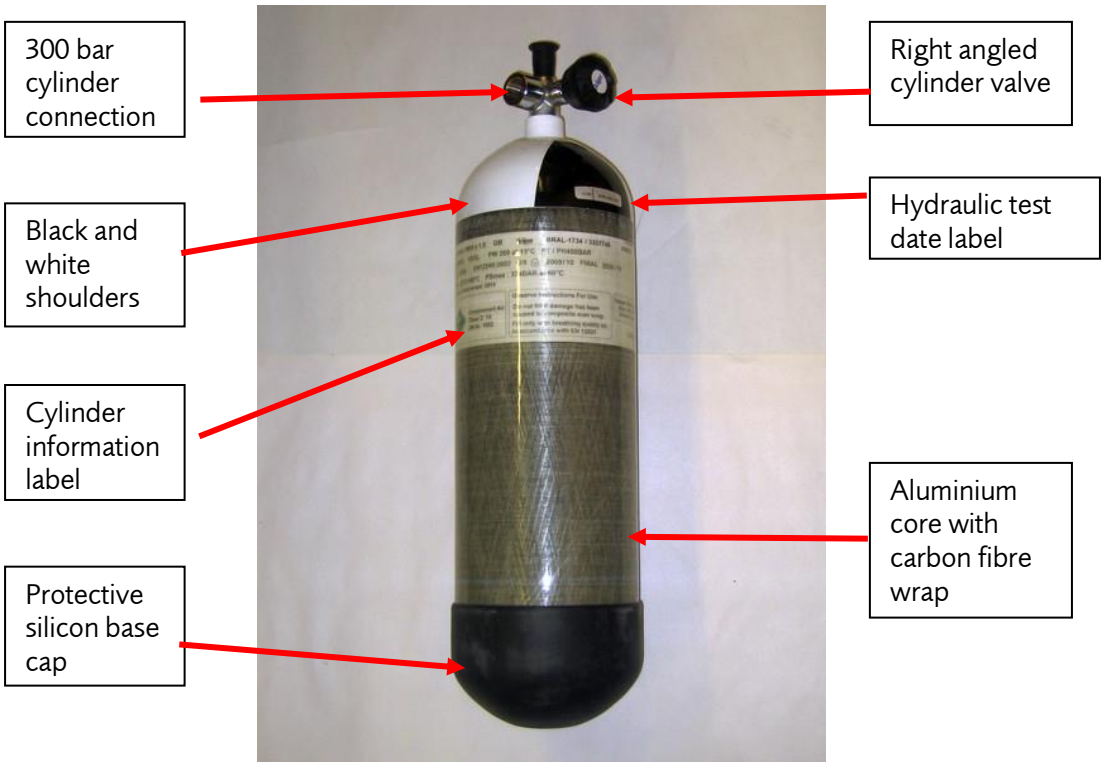
14.9 To give the cylinder the desired mechanical strength and light weight the liner is over-wrapped with carbon fibre and then a layer of glass fibre is applied over the carbon to enhance the resistance to abrasion and cut damage.

14.10 The carbon and glass fibre over-wrap are bonded together with an epoxy resin which has been pre-impregnated into the fibres prior to wrapping onto the aluminium liner.

14.11 A final outer layer of laminating resin is applied to the external surface of the cylinder to provide a smooth easily cleaned surface.

14.12 This outer resin layer is tough and wear resistant to further enhance the durability of the composite cylinder in everyday use.

Cylinder overview



LFB image 198288

- Weight when empty approximately 5.55 kg.
- Weight when full approximately 8.50 kg.

Right angle cylinder valve

LFB image 25873

14.13 The outlet connection of the valve, for connection to SDBA, is to DIN ISO 228/1 - G5/8.

14.14 The basic features of the standard valves are;

(a) Brass/chrome plated valve body.

(b) Flame retardant cylinder hand wheel - (incorporating ratchet mechanism).

(c) Sintered filter element.

Ratchet hand wheel

14.15 The valve is fitted with a spring loaded ratchet hand wheel mechanism and is opened anti clockwise; however during rotation of the hand wheel it will lift up (approximately 2mm) over the ratchet mechanism, away from the valve body, and then rapidly down due to the compression spring, riding over the ratchet mechanism.

14.16 A 'click' will be heard as the hand wheel moves down. This will occur six times per revolution, i.e. every 60°.

14.17 The ratchet mechanism is designed to prevent inadvertent closing of the valve when in use.

14.18 To close the valve it is necessary therefore to manually lift the hand wheel (against the spring force) away from the valve body and over the ratchet mechanism, at the same time rotate the hand wheel clockwise to close the valve. This action may have to be repeated to achieve final closure.

Ratchet valve

14.19 When the valve is in the 'closed' position, the sealing face of the lower spindle seals onto the sealing rim of the valve body, preventing high pressure air from being discharged from the cylinder.

14.20 Turning the hand wheel of the valve anti clockwise (looking at the top of the hand-wheel) rotates both the spindle and the threaded lower spindle opening the valve.

14.21 As the lower spindle rotates in the threaded bore it moves away from the sealing rim of the valve body and along the square drive of the spindle.

14.22 The released high pressure air from the cylinder discharges to the compressed air breathing apparatus attached to the valve outlet.

14.23 To ensure no restriction of air to the breathing apparatus, and to maximise the airflow from the cylinder, the valve should always be fully opened.

14.24 During opening, the hand wheel will be felt to lift up and down the ratchet mechanism.

14.25 Continue to turn anti-clockwise until a resistance is felt, indicating that the valve is fully open.

14.26 Do not force any further. When the resistance is felt, turn the hand wheel in the opposite direction (clockwise) to engage the first ratchet this will take much less than 60° of a rotation.

14.27 Engaging the first ratchet will ensure that no movement to 'close' the valve can occur without having to lift the hand wheel over the ratchet.

14.28 To close the valve pull the hand wheel away from the valve body to lift and override the ratchet mechanism, and rotate (clockwise).

14.29 Repeated pulling and clockwise rotation of the hand wheel rotates the spindle and threaded valve head.

14.30 As the lower spindle rotates it moves down the square drive of the spindle and towards the outlet sealing rim in the valve body.

14.31 When the sealing face of the lower spindle contacts the sealing rim this closes the valve preventing high pressure air discharging from the cylinder.

14.32 When closing the valve use finger and thumb pressure only. Do not use excessive force.

14.33 From the closed to the fully open position, the valve requires **more** than two full revolutions of the hand wheel.

Cylinder information

14.34 **Date of next hydraulic test** see printed label on shoulder of cylinder.

14.35 Black and white painted shoulders (denotes breathable air).

Cylinder label information

- **EN 144-1 M18 x 1.5 GB** (thread information).
- **GB** (country of manufacture).
- **BRAD-0871** (cylinder serial number).
- **/3357748** (manufactures part number).
- **5.55KG** (cylinder weight empty).
- **V8.0L** (water volume 8.0 litres).
- **PW 300 at 15°C** (working pressure [bars] at this constant temperature).
- **PT/PH450BAR** (test pressure for retest).
- **CE 0038** (CE mark and approval house number).
- **EN 12245:2002** (standard to which cylinder is manufactured to).
- **GB 2009/04** (year and month of manufacture).
- **FINAL 2039/04** (end of design life year/month).
- **TS-50°C/+60°C** (operating temperature range).
- **PS max: 374BAR at 60°C** (maximum service pressure at 60°C).
- **Year of 1st retest 2014** (date of manufacture + 5 years).

LFB image 198288

Safety precautions

14.36 BA set maintenance is to be carried out in the RPE maintenance room.

14.37 At operational incidents/training venues the BA set should be taken to the designated RPE maintenance area.

14.38 SDBA cylinders must have a cylinder cover fitted when connected to a BA set.

14.39 Cylinders are only to be transported in purpose built boxes/racks and fitted with red protective plastic blank cap.

14.40 Personnel must only carry one cylinder at a time. They should be carried vertically ensuring that a firm grip is taken around the cylinder neck (see image 1136782 below).

14.41 The cylinder valve opening must always be directed away from yourself and other personnel.

14.42 When removing a cylinder from a horizontal rack, slide it gently forward and support the underside with the free hand until the weight can be transferred fully to the carrying hand and a secure grip confirmed.

14.43 **Never fully empty a cylinder**, as this will allow contaminants and or moisture to enter the cylinder.

14.44 Do not remove stick-on labels.

14.45 Cylinders should be carried using the method shown below. **Do not lift the cylinder using the cylinder hand wheel** – 300 bar cylinder outlets have an increased jet reaction from inadvertent release of stored pressure which could lead to injury.

LFB image 1136781

LFB image 1136782

Cylinder acceptance test

14.46 Examine the cylinder, if steps a, b or c apply, the cylinder is to be treated as defective:

(a) The hydraulic test is out of date see ' yellow label - date of next test'. Do not use cylinder once month and year shown has been reached.

(b) The body of the cylinder is scored so as to reveal the carbon fibre matrix.

(c) After removing the protective blank cap the cylinder connection thread is damaged or contaminated with dirt or debris.

(d) Note the cylinder bar code number for entry into the BA log book.

Cylinder removal SDBA

14.47 Remove anti-entanglement straps from BA set shoulder straps.

14.48 Unlock the cylinder strap securing mechanism by pulling the strap away from the cylinder and unlocking the cam (see image 1136805 right).

Note: ensure all pressure is removed from the BA set prior to attempting to remove the cylinder. The Bodyguard display must read **0 bar.**

LFB image 1136805

14.49 Feed the strap back through the cam mechanism creating a loop (see image 1136806 right).

LFB image 1136806

14.50 Feed this loop back through the mechanism thereby loosening the strap around the cylinder cover to help facilitate the cylinder's removal (see image 1136785 right).

LFB image 1136785

LFB image 1136789

LFB image 1136786

LFB image 1136787

LFB image 1136788

14.51 Unscrew the cylinder connection (anti-clockwise) and carefully remove the cylinder from the BA set by drawing it away from the reducer.

14.52 Unfasten cylinder cover zip and remove cylinder cover, clean cylinder using Wypall x80 cloth and Safetywash solution and mark cylinder empty (M/T) on the black quarter shoulder.

Cylinder and cover replacement SDBA

14.53 The cylinder cover is provided with a full length zip incorporating a small 'Velcro' patch to cover the zip fastener when in the closed position and two anti-entanglement straps.

Fitting the cover to the cylinder

14.54 Release the Velcro flap and unzip the cover to its base.

14.55 Place the cover over the cylinder ensuring that the zip opening is in line with the cylinder connection as this will ensure that the anti-entanglement straps are properly aligned.

LFB image 684789

14.56 Zip the cover up to the neck of the cylinder and place the zip fastener flat and cover with the Velcro flap, ensuring Velcro is as flat as possible after fastening (see images 1136804 and 684773 right).

LFB image 684778

14.57 Ensure cylinder retaining strap is fully extended so there will be clear space around the cylinder cover for ease of movement.

14.58 Insert cylinder from opposite end to reducer/cylinder connection (this is to ensure that no fibres are deposited in the connection if the cover were to pass over it).

LFB image 684773

14.59 Line-up the two connections (see image 684786 right).

Note: the reducer/cylinder connection pivots forwards and backwards and therefore may not line-up vertically with the cylinder connection.

LFB image 684786

14.60 To assist with connection – lift the cylinder slightly at the opposite end to the connection, thereby lining-up both threads vertically (see image 1136794 right).

LFB image id 1136794

14.61 Screw the connections together clockwise (see image 1136790 right).

Note: finger and thumb pressure only.

LFB image 1136790

14.62 Adjust the (extended) strap circumference to fit the cylinder by pulling the strap through the securing mechanism (see image 684790 right).

LFB image 684790

14.63 Continue feeding the excess through the securing mechanism until the cylinder retaining strap just grips the cylinder cover (see image 684787 right).

LFB image 684787

14.64 Operate the securing mechanism by pulling the cam over the cylinder and using the 'Velcro' on the underside of the excess strap then secure it, ensuring it functions correctly (see image 684785 right).

LFB image 684785

Attaching the anti-entanglement straps

14.65 Extend the BA set shoulder straps fully to ease attachment of the anti-entanglement straps to the BA set.

14.66 The two anti-entanglement straps attach to the PSS 7000 BA sets left and right shoulder straps.

To connect the straps to the BA set

14.67 Release the BA set upper press stud for the corresponding shoulder strap. Release by lifting the press stud from the 'spot' side first (see image 684768 right).

LFB image 684768

14.68 Ensure there is slack in the anti-entanglement strap by 'lifting' the shoulder strap towards the press stud.

LFB image 684768

14.69 Place the 'D' ring over the male part of the press stud.

LFB image 684777

14.70 Place two fingers under the shoulder strap press stud and use your thumb on top to create a 'depression' or use work surface.

LFB image 684776

14.71 Offer-up the female part of the press-stud to the male part on the shoulder strap of the BA set ensuring that the connection starts from the opposite side of the 'spot' side (see image 684768 above right) identified on the surface of the female part of the press stud.

LFB image 684772

14.72 Complete the connection by moving thumb across the press stud.

LFB image 684775

14.73 After connections are complete – test the press-stud is secure by placing two fingers under the flap of the 'Dräger' motif and pull gently.

14.74 Repeat this process for the other anti-entanglement strap.

LFB image 684780

14.75 The cylinder cover with anti-entanglement fixture is now complete.

LFB image 1136780

14.76 Removal of the cylinder cover is a reversal of the above.

Cylinder cover cleaning

14.77 Cleaning the cylinder cover:

- Use warm soapy water and a cloth.
- Wipe off with clean warm water.
- Stubborn stains can be removed with the aid of a nylon hand brush and undiluted soap.
- Abrasive cleaners are **not to be used**.
- If in doubt contact OSG for further advice.

15 SDBA set – lifting and carrying instructions

15.1 If moving the SDBA set from one area to another don the set as per don and start so that the set harness and waist belt are secured, this will ensure that the weight is transferred through the hips and legs. The face mask can be left in the bag and carried in one hand.

16 EDBA cylinder

General

16.1 Cylinder volume is 6.8 litres (water capacity) x two and is charged to a working pressure of 300 bar.

16.2 Contains 3672 litres of compressed breathable air when charged to 300 bar.

16.3 Hydraulically tested every five years.

16.4 Design life is 15 years.

16.5 The cylinder must be used with a cylinder cover.

Description

16.6 The cylinders fitted to the EDBA cylinder pack are constructed in the same way as the SDBA cylinder (see 14.6 – 14.12). Two cylinders are permanently coupled together to form a 'cylinder pack' (see image 178633 right).

LFB image 178633

16.7 The two compressed air cylinders are aligned and secured in tandem onto a central support strut by a pair of stainless steel straps. The valve assembly is of the ratchet type and is positioned inboard (towards) the wearer.

16.8 From the valve assembly a high pressure tube bridges across and connects with the second cylinder. This arrangement is shrouded and protected by a split moulding that forms a carrying handle.

16.9 Two connector lugs attached to the central support strut locate the cylinder pack to the cylinder retaining brackets on the backplate of the BA set (see arrowed in image 178632 right).

LFB image 178632

16.10 The cylinder pack is attached to the BA set by a quick release spring plate fitted to the central cylinder retaining bracket on the backplate of the BA set.

- Weight when empty approximately 10.60 kg.
- Weight when full approximately 15.10 kg.

Safety precautions

16.11 BA set maintenance is to be carried out in the RPE maintenance room.

16.12 At operational incidents/training venues the BA set should be taken to the designated RPE maintenance area.

16.13 EDBA cylinders must have a cylinder cover fitted when on a BA set.

16.14 Cylinders are only to be transported in the purpose built trolley and **fitted with red plastic protective blank cap.**

16.15 Personnel must only carry one cylinder pack at a time. The twin cylinder pack should be carried by the 'handle' fitted to the cylinder valve.

16.16 The cylinder valve opening must always be directed away from yourself and other personnel.

16.17 **Never fully empty a cylinder**, as this will allow contaminants and/or moisture to enter the cylinder.

16.18 Do not remove stick-on labels.

16.19 Twin cylinders should be carried vertically ensuring that a firm grip is taken around the cylinder handle as shown. **Do not lift the cylinder using the cylinder hand wheel** – 300 bar cylinder outlets have increased jet reaction from inadvertent release of stored pressure which could lead to injury (see images 1136767 and 1136766 right).

LFB image 1136767 LFB image 1136766

Cylinder pack acceptance test

16.20 Examine both cylinders, if steps a, b, c or d apply, the cylinder pack is to be treated as defective:

(a) The hydraulic test is out of date see ' yellow label - date of next test'. Do not use cylinder once month and year shown has been reached.

(b) The body of the cylinder is scored so as to reveal the carbon fibre matrix.

(c) After removing the protective blank cap the cylinder connection thread is damaged or contaminated with dirt or debris.

(d) The carrying handle is damaged.

(e) Note the cylinder bar code number for entry into the BA log book.

Cylinder replacement

Note: the cylinder bar code number should be recorded in the BA log book after every change of cylinder. It is not required to be recorded in the log book for every 'A' test.

Cylinder removal EDBA

16.21 The BA set should be placed on the work surface cylinder downward. Unscrew and remove the reducer.

Note: ensure all pressure is removed from the BA set prior to attempting to remove the cylinder. The Bodyguard **display must read 0 bar.**

16.22 Remove anti-entanglement straps from BA set shoulder straps.

16.23 Press the spring plate on the top cylinder retaining bracket of the BA set away from the cylinder pack and towards the backplate.

16.24 Whilst maintaining pressure on the spring plate, push the BA set away from the top of the cylinder pack and towards the reducer. The BA set will detach from the cylinder pack.

16.25 Unfasten securing straps, remove cylinder cover, clean cylinder using Wypall x80 cloth and Safetywash solution. Mark cylinder empty (M/T) on the black quarter shoulder.

LFB image 684808

Fitting the cover to the cylinder

16.26 Before fitting ensure the cylinder pack has been acceptance tested.

16.27 Place the cylinder cover onto a firm surface with the opening facing up and the cylinder securing straps released (see image number 684808 right).

16.28 Insert the twin cylinder pack into the cylinder cover ensuring a snug fit.

LFB image 684809

16.29 Pass each strap under the twin cylinder securing bracket (as this prevents the straps from catching on the securing mechanism of the EDBA set) and fasten to the Velcro strip on the opposite side of the cover (see image number 684807 right).

LFB image 684807

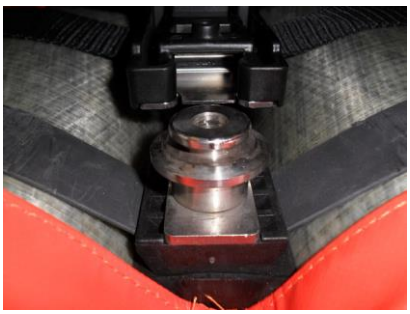
Cylinder pack replacement EDBA

16.30 With the cylinder valve nearest you and facing upwards, lift and position the backplate of the BA set over the twin cylinder pack with the reducer towards the cylinder valve end of the cylinder pack (see image 1136722 right).

16.31 Locate the BA set lower cylinder retaining bracket with the cylinder (valve end) locating lug and then lower the backplate assembly onto it.

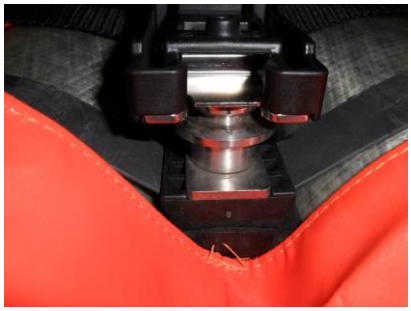
LFB image 1136772

16.32 Whist maintaining location of the locating lug in the lower cylinder retaining bracket, align the spring plate of the upper cylinder retaining bracket with the top locating lug of the cylinder pack (see image 250374 right).



LFB image 250374

16.33 Press and hold the backplate down onto the top cylinder retaining bracket to open the spring plate and slide the backplate away from the handle of the twin cylinder pack until a click is heard (see image 250378 right).

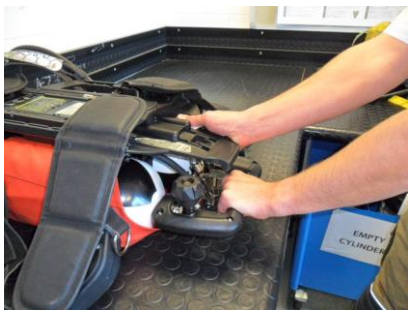


LFB image 250378

16.34 Check that the twin cylinder pack is secure. Grip base of set backplate and handle of cylinder and try to move the backplate up and down against the cylinder (see image 1136769 right).

16.35 Gently pulling to extend the hoses as necessary, lift the reducer to align with the cylinder connection and screw together.

Note: finger and thumb pressure only.



LFB image 1136769

16.36 Ensure that the shoulder straps are fully extended to assist with the attachment of the anti-entanglement straps. Follow the anti-entanglement strap fitting procedure as per SDBA see section 14.65 to 14.74.

16.37 The cylinder cover with anti-entanglement fixture is now complete.

16.38 Removal of the cylinder cover is a reversal of the above.

LFB image 684813

Cylinder cover cleaning

16.39 Cleaning the cylinder cover:

- Use warm soapy water and a cloth.
- Wipe off with clean warm water.
- Stubborn stains can be removed with the aid of a nylon hand brush and undiluted soap.
- Abrasive cleaners are **not to be used**.
- If in doubt contact OSG for further advice.

17 EDBA set – lifting and carrying instructions

17.1 Lifting and carrying the assembled EDBA set with its cylinder pack fitted is a two person lift.

17.2 Two persons are to position themselves appropriately. Using correct manual handling techniques the EDBA set is to be equally lifted, supported and carried.

17.3 If moving the EDBA set from one area to another don the set as per don and start so that the set harness and waist belt are secured this will ensure that the weight is transferred through the hips and legs. The face mask can be left in the bag and carried in one hand.

LFB image 1136770

18 Receipt test and monthly 28 day test

On receipt 'B' test

18.1 When a BA set is delivered in a sealed plastic bag from OSG it should be stored in the RPE spares box until required. The BA set should not be subjected to immediate receipt testing.

18.2 The BA set does not require a receipt 'B' test until the set is unwrapped and prepared for operational/training use.

Monthly 28 day test

18.3 The first 28 day test must be carried out 28 days after the receipt 'B' test.

18.4 The 28 day test and subsequent 'B' test will allow a thorough testing of the BA set under controlled conditions. It should be carried out when the BA set has not been worn under controlled conditions (i.e. at station drills) for a period of 28 days. Wearing BA at an operational incident or at a 'live fire' exercise is not considered controlled conditions.

18.5 The Bodyguard key must be removed for the duration of the 28 day test and placed in the entry control board (ECB) to test telemetry signal with the ECB. This will allow the 'operational' functionality of the Bodyguard to be tested and ensure data logging is recorded.

18.6 A BA set should not exceed 28 days without being worn for at least 15 minutes under controlled conditions. Following this wear the BA set will be the subject of a 'B' test.

18.7 The 28 day test can be carried out by personnel issued with a personal issue face mask. Provided that any BA set is not subject to two consecutive tests using a personal issue face mask. The subsequent 'B' test must include the visual examination of the standard BA set face mask as well as the visual and functionality testing of the personal issue mask. The functionality testing of the standard BA set face mask will be covered by subsequent 'A' testing.

Note: when a BA set has been used for training purposes and provided that it has been worn for a **minimum of 15 minutes**, this is acceptable as a 28 day test.

Note: the length of time the set was used must be noted in the remarks column of the set's log book.

After any use

18.8 The BA set must be 'B' tested.

Other

18.9 Other reasons for the set being tested (i.e. when a wearer takes over a BA set, 'A' test required).

BA log book

18.10 Read the front of the log book for detailed instructions. Check that the BA set is within the 28 day test period and within its annual test period. **Check front of BA log book for 'Do not use after' date and ensure this date corresponds to that on the Bodyguard display**.

18.11 Record all tests in the BA logbook.

18.12 The following log book annotations apply after insertion of the type of test carried out ('A' or 'B' test):

- 'R' on receipt from OSG only (BA set sealed in plastic bag).

- 'M' 28 day test (controlled conditions).
- 'U' following operational or training use.
- 'O' following the takeover and rebuild of BA set at training venues.

18.13 If test entry uses last entry line of the current page transfer the last '28 day test' date over the page and enter in the space provided.

Note: the 'remarks' column should be annotated with the details of use e.g. incident number/training venue. Incident ground 'A' and 'B' tests must be recorded in the appropriate BA log book on return to station (including cylinder bar code number).

Testing of BA sets and appliances becoming off the run

18.14 If an appliance is taken off the run for a prolonged period of time, for example, for a whole shift, there is no requirement to test the BA sets on that appliance for that period. All BA sets would be subject to a full 'A' test when the appliance is put back on the run.

If a BA set requires a 28 day test then this is still required and should be carried out on that day, even if the appliance that BA set is on is off the run.

18.15 To ensure when a Bodyguard download takes place and that unnecessary time is not lost identifying the reason an 'A' test hasn't taken place, the phrase 'APPLIANCE OTR' needs to be entered in the comments section of the BA log book by the duty person, along with the date and person entering the comment.

19 PSS 7000 'A' test

Note: Before conducting 'A' test don Nitrile gloves and consider respiratory protection following operational or real fire training use.

Frequency

19.1 An 'A' test is to be carried out on a BA set:

- When taking over a BA set.
- Following a cylinder change.
- When nominated to test a 'spare' BA set.
- Following respirator use only.

19.2 Check the front of the BA log book for the 'do not use after' date to ensure the BA set is still within its certified test date and ensure this date corresponds to that on the Bodyguard display (see 19.13).

19.3 'A' test: physical checks:

(a) Remove BA set from retaining bracket, charging connector will automatically disconnect.

(b) Ensure the nine BA set identification numbers located on the log book front and rear, backplate (see image 245554 and 245542), LDV (see image 245562) and face mask (see image 245540) match and are legible. Ensure BA tally and telemetry module identification numbers match. Bodyguard number will be checked at 19.13.

LFB image 245554

LFB image 245542

LFB image 245562

LFB image 245540

(c) If the numbers do **not** match take the set off the run and check all other BA sets on the station to find the mismatch. If the mismatch is not on the station inform the officer in charge (OIC) and contact OSG.

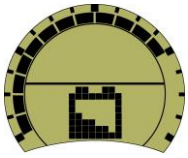
(d) Check the condition of cylinder cover and the cover markings. Ensure cylinder cover is correctly fitted.

(e) Check cylinder connection is hand-tight (finger and thumb pressure only). Check security of cylinder attachment.

(f) Check condition of backplate and adjust to preferred position if required (reposition second person connection hose as appropriate).

(g) Check the second person connection hose clips are secure and the hose is held securely in the clips.

19.4 Check operation of BA set retaining bracket and adjust height if appropriate. Connect charging lead, replace BA set and ensure that the BA set is being charged (indicated by green LED on rechargeable battery pack and Bodyguard showing 'battery charging' icon (see image right). Ensure retaining bracket holds the BA set securely. Then:



(a) Inspect the condition of shoulder straps, waist belt (ensuring they are fully extended), fastening buckle, fittings, BA personal line housing (ensure karabiner is attached to the small 'D' ring – the gate opening should face towards the wearers body – there is no requirement to check line condition) and BA cable cutter including pouch.

(b) Inspect the condition of the Bodyguard and clean the display screen as necessary.

(c) Inspect the second person connection, protective blank cap and hoses.

(d) Check the LDV connection (gently push, twist and pull).

(e) Check the face mask and fittings. Head harness straps are not twisted and are correctly roved. Clarity of vision through the visor.

(f) Check the exhalation valve cover is not damaged or blocked and that the securing screw is in place.

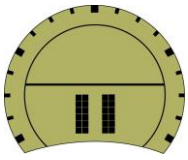
(g) Fit aids to vision if required.

(h) Operate the first breath button on top of the LDV, release the first breath mechanism by operation of the additional flow button at the front of the LDV, a click should be heard, this confirms the mechanism has operated, repeat this test.

'A' test: set reduced volume mode, do not use after date, confirm BA set I.D. and test ADSU

19.5 Press the **left** button of the Bodyguard unit. The unit will emit a single audible 'bleep', and then the 'self-check' sequence will start (see image right).

19.6 The initial short first display (see image right).

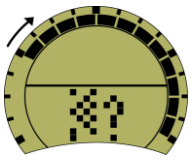


19.7 Quickly changes to the full 'LCD check' icon (see image right).

19.8 The display backlight will momentarily illuminate and the blue, red, and single green LEDs in the lower display cluster will also momentarily illuminate (see image right).

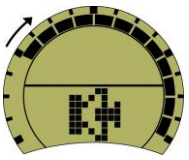
Note: during each sequence the outer radial segments will initially illuminate and then begin to switch off clockwise.

19.9 When all the segments have switched off, the display will change to 'leak test' icon (see image right).

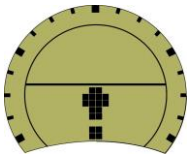


Set reduced volume mode:

19.10 When all the segments have switched off, the display will change to 'reduced volume' icon. When the 'reduced volume' icon appears the wearer should first press the **left** button followed by the **right** button to confirm this setting (see image right).

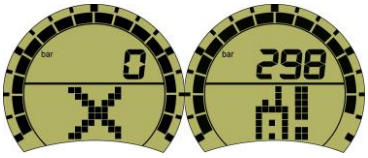


19.11 When all the segments have switched off, the display will change momentarily to 'automatic (motion sensor) DSU not active' icon (see image right).



19.12 The display will then quickly change to 'non-operational mode' (see image right).

Note: the display of an 'X' or 'telemetry fault code' icon alerts the user that the Bodyguard 7000 has failed the 'self-check' or the telemetry module has failed. Return the BA set to OSG (see images right).



'Do not use after date' and 'A' test: confirm BA set I.D.

19.13 To confirm the do not use after date and the BA set number; after the completion of the 'self-check' as in paragraph 13.1 above press the **right** button and the do not use after date, followed by the four digit BA set number will scroll across the display screen from

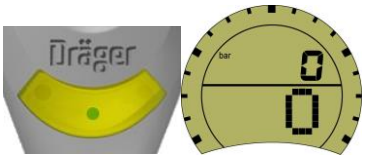
right to left (the example shown is BA set 0029). Check this date to ensure it corresponds with the front of the BA log book as per 19.2 above.

'A' test: test automatic and manual distress signals

19.14 **Operate** the first breath button.

19.15 Put neck loop on and **connect** the face mask to the retaining stud and check it holds securely.

19.16 Remove Bodyguard key, note the reduced volume of the Bodyguard. Note 'green' flashing LED and zero display (see images right).



19.17 **Open** the cylinder valve slowly and fully. The cylinder must have a minimum pressure of **270** bar to start the test. If cylinder change is required enter the cylinder bar code number into BA log book. **Note** the pressure reading for entry into the BA log book.

19.18 **Test** ADSU, to check pre alarm signal, **confirm** the 'green' LED continuously flashes.

19.19 Wait 30 seconds – pre-alarm sounds – cancel pre-alarm (tap side of unit).

19.20 Wait 30 seconds – pre-alarm sounds – do not cancel – wait 15 seconds - full alarm sounds –check LEDs, two 'blue', two 'red' and one 'green' illuminate alternatively – **Insert** Bodyguard key to cancel.

19.21 **Test** DSU by **pressing** the 'yellow' button in the centre of the unit to start the manual DSU alarm – Check LEDs, two 'blue' and two 'red' illuminate alternatively. **Remove** and **reinsert** Bodyguard key to cancel.

'A' test: leak test

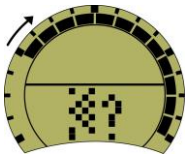
19.22 To undertake the leak test the wearer will need to access the 'leak test' icon.

19.23 Press and hold the **left** button of the Bodyguard unit. The unit will emit a single audible 'bleep', and then the 'self-check' sequence will start as described in 13.1 (see image right).

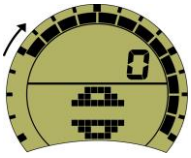
19.24 The initial short display quickly changes to the LCD check display, the backlight will momentarily illuminate and the 'blue', 'red', and single 'green' LEDs in the lower display cluster will momentarily illuminate (see image right).

Note: during each display the outer radial segments will initially illuminate and then begin to switch off clockwise. If no action is taken by the time the last segment disappears, the 'low pressure' icon is momentarily displayed followed by the 'self-check' icon which will restart.

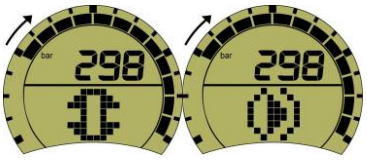
19.25 When the 'leak test' icon appears press the **left** button (see image right).



19.26 'Open cylinder' icon momentarily appears (see image right).



19.27 The Bodyguard unit will display the 'close cylinder' icon and then the 'press right button' icon; these two icons will alternate (see image right)



19.28 **Close** the cylinder valve and then press the **right** button to confirm.

'A' test: stabilisation

19.29 Once the cylinder valve has been closed the Bodyguard unit will take a few seconds to stabilise the air trapped between the cylinder valve and the first breath button on the LDV (see image right).

19.30 The 'leak test timing' icon, is displayed throughout the leak test period of approximately one minute. During this time the bar segments will switch off clock wise (see image right).

Note: during the leak test there may be a drop in pressure displayed. A pressure drop of up to **10** bar is acceptable and may be caused by the piston in the reducer settling.

19.31 On completion of the leak test one of the following icons will be displayed:

(a) **Leak test – pass.** This flashing icon indicates that the leak test was completed successfully (see image right).

(b) **Leak test – fail**. This flashing icon indicates that the leak test was not satisfactory and the BA set did not pass the test (see image right).

- Purge remaining air by operating the additional flow button.
- Check the cylinder connection is tight and the LDV is connected to the face mask correctly.
- Undertake a second leak test – If the BA set fails the leak test a second time it is to be taken off the run and sent to OSG workshops.

Note: the 'leak test pass' icon will remain displayed for up to three minutes, during which time the breathe down sequence should be completed. If the breathe down sequence is not completed the Bodyguard will display an 'X' icon, emit five audible 'bleeps' and then restart the 'self-check' if left the final icon displayed will be 'operational mode'. The timing out of Bodyguard would necessitate the leak test being repeated. Re-open the cylinder valve and repeat testing from section 19.22).

'A' test: breathe down sequence

19.32 Open the cylinder valve slowly and fully.

19.33 Disconnect neck loop retaining stud, wipe the face mask seal and inner mask with a damp PALTECH wipe, ensure all head harness straps are fully loosened and don face mask, drop the head forward into the face mask placing the chin firmly into the chin cup.

19.34 Position the head harness over the head, locating the harness centre plate square on the back of the head. Ensure that hair does not compromise the face seal area.

19.35 Tighten both lower straps together, and then the middle straps, ensuring all the straps are pulled evenly towards the back of the head, keeping them evenly tensioned and in line with the mask tongues. Check and if necessary tighten the top strap. The face mask should fit securely but not be over-tightened.

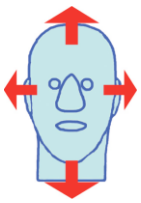
19.36 Breathe normally.

19.37 Test the constant flow of air to the face mask by briefly operating the 'additional flow' button on the front of the LDV once only.

19.38 Take a deep breath and hold, do not move head. Listen for any leakage from the face mask for approximately 8 seconds and then breathe normally. If any leaks are detected from the face mask readjust to fit and retest. If after readjusting the leak persists, get another wearer to try the mask to ensure it's the mask and not the wearer that is causing the leak before removing the BA set from service.

19.39 Take a deep breath and hold, **close** the cylinder valve, **continue to hold onto the valve**.

19.40 Take hold of the Bodyguard in other hand and observe the display for approximately 8 seconds whilst moving your head slowly up, down and side-to-side to ensure the face mask is not leaking outwardly (positive pressure), this will be noted by an excessive fall in pressure shown on the Bodyguard display.



19.41 After 8 seconds slowly breathe down the contents.

Observe and listen

19.42 Observe and listen to:

(a) The **electronic** low pressure warning and the 'red' and 'blue' LEDs flashing (operates at 84 bar).

and

(b) The **pneumatic** low pressure warning (operates at 74 bar +/- 5 bar).

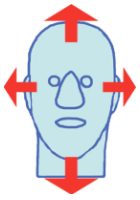
Note: due to the design of the BA set it may not be achievable for the wearer to accurately check the actuation pressures for both low pressure warnings although they **must** be heard to actuate. The pressure settings will be tested during any routine maintenance/repair of the BA set by OSG.

19.43 When zero is displayed (0 bar) **open** the cylinder valve slowly and fully and breathe normally, **note** this pressure and round down for entry onto the BA tally.

19.44 Take a deep breath and hold, **close** the cylinder valve, **continue to hold onto the valve**.

19.45 Breathe steadily until the air is exhausted (0 bar displayed) and the face mask collapses onto your face.

19.46 Continue holding your breath for approximately 8 seconds whilst moving your head slowly up, down and side-to-side to ensure the face mask is not leaking inwardly (negative pressure), this will be noted by the face mask failing to remain 'sucked down' onto your face.



19.47 After 8 seconds, breathe out slightly, release sliding buckles and remove the face mask.

19.48 Check operation of radio interface equipment if fitted.

19.49 Extend straps; wipe the face mask seal and inner mask with a damp PALTECH wipe.

19.50 Check and ensure the two inner mask non-return valves are in place and are seated correctly, restow the face mask into its bag. Note: Do not attach neck loop to the retaining stud. This will prevent the reflex seal becoming permanently distorted.

19.51 Fill out the BA tally – the pressure to be inserted is that noted in paragraph 19.43 above and rounded down. i.e. 292 bar would be entered as 290 bar. Ensure that printed details on the BA tally are clear and enter rank and name.

Note: if there is a leak as a result of the breathe down sequence above the wearer should operate first breath button and repeat the 'A' test 'breathe down sequence' from 19.32 above, paying particular attention to correctly fitting the face mask onto the face and the adjustment of the head harness. The straps should not be over tightened.

19.52 If the wearer continues to find a leak they should try another set and if there is still a leak they should inform the OIC.

19.53 Extreme movement of the head may in some cases 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. A continuous leak that does not stop even when the head is in the central position is **not** acceptable.

19.54 Anyone who consistently fails to get a seal with a range of standard issue face masks is to be taken off the run and placed on light duties. OSG is to be informed as soon as possible, and will arrange for a face fit test to be conducted and the issue of a personal issue face mask as appropriate.

19.55 Replace Bodyguard key (if removed), check that the Bodyguard returns to the 'battery charging' icon.

19.56 Check if available, that the spare cylinder is correctly stowed and is within the hydraulic test date. Note: for EDBA, check station stock.

19.57 Complete the BA log book for the BA set you are testing, record the exact pressure at the **start** of the leak test and do not round down.

19.58 Please refer to the following policy numbers if BA set is fitted with radio communications.

- Policy number 516 - Entel HT981 fireground radio and Savox interface equipment (B.A.R.I.E.).
- Policy number 592 - Breathing apparatus radio interface equipment (B.A.R.I.E.).
- Policy number 593 - Entel HT981 intrinsically safe fireground radio.

20 PSS 7000 'B' test

Note: Before conducting 'B' test don Nitrile gloves and consider respiratory protection following operational or real fire training use.

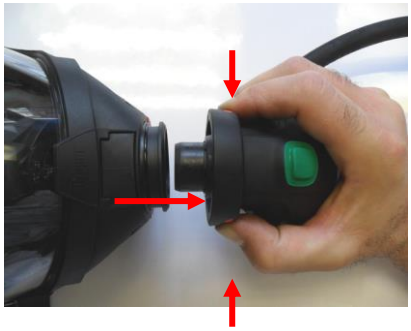
Frequency

20.1 A 'B' test is to be carried out on a BA set:

(a) On receipt at station (carried out when replacement BA set is unwrapped for use).
(b) After any use (including 28 day test).

20.2 Check the front of the BA log book for the 'do not use after' date to ensure the BA set is still within its certified test date and ensure this date corresponds to that on the Bodyguard display (see 20.54).

'B' test: cleaning the face mask



LFB image 250386

20.3 Clean the face mask bag in Safetywash solution as per 20.4, inspect and dry. Disconnect the face mask from the LDV.

20.4 Remove the face mask from the LDV by pressing both red buttons at the side of the LDV and pulling slightly to disconnect (see image 250386 right).To clean the FPS 7000 face mask:

Prepare 0.5-1.0% solution of Safetywash. This measurement equates to two full squirts from the pump-action dispenser into 10 litres of lukewarm water. Max 30 ^{0}C (measuring bucket available on POMS V2043 BUCKET, BLACK PLASTIC, 14 LITRE - NOT FOR USE ON APPLIANCE).

Note: do not immerse the LDV in solution as this may cause the LDV not to function correctly (see LDV cleaning instructions).

20.5 The whole face mask must be completely immersed in the recommended solution of Safetywash. The face mask should be cleaned using a lint free cloth (Wypall x80) soaked in Safetywash solution paying particular attention to the folds of the reflex seal. The face mask should then be immersed in the solution for 15 minutes and then removed. The face mask must then be rinsed in clean, **running** water. The face mask can be damaged by using higher dosages of cleaning solution and or applying them for a longer period of time than stated above.

20.6 After washing, the face mask should be shaken to remove excess water. Dry using a lint free cloth paying particular attention to the folds of the reflex seal and bottom of the mask where residual water gathers. A damp PALTECH wipe must be used to disinfect the face mask following cleaning. **No other means of drying or cleaning must be used**.

Removing the inner mask

20.7 The inner mask should not be removed as a routine action.

LFB image 245538

20.8 If it is necessary to remove the inner mask, take hold of the inner mask at the tip of the nose then gently remove the mask off the locating pin and out of the connection piece groove. To avoid damage care should be taken to ensure that the lower portion of the inner mask is clear of the groove before removal.

Replacing the inner mask

Caution: during the cleaning process care must be taken to ensure that the two inner mask non-return valves within the inner mask are not dislodged or removed, ensure that they are seated correctly (as arrowed in image 245538 right)

20.9 Put the inner mask onto the locating pin, and then press it into the connection piece groove around the speech diaphragm (as circled in image 245538 right).

20.10 Check the face mask port and seating ring are clean and undamaged - **do not remove** (as arrowed in image 245558 right).

LFB image 245558

20.11 Check clarity of vision through the visor. Check the exhalation valve cover securing screw is in place and that the cover is not damaged or blocked (as arrowed in image 245558 right).

'B' test: check identification numbers

20.12 Ensure the nine BA set identification numbers located on the log book front and rear, backplate (see image 245554 and 245542), LDV (see image 245562) and face mask (see image 245540) match and are legible. Ensure BA tally and telemetry module identification numbers match. Bodyguard number will be checked at 20.54.

20.13 If the numbers do **not** match check all other BA sets on the station to find the mismatch. If the mismatch is not on the station inform the OIC and contact OSG.

LFB image 245554

LFB image 245542

LFB image 245562

LFB image 245540

20.14 Fit aids to vision if required.

'B' test: cylinder removal SDBA

20.15 Release the anti-entanglement straps. Release the cylinder retaining strap mechanism and loosen the strap from the cylinder body.

20.16 Ensure **0** bar is displayed on Bodyguard. Unscrew the cylinder connection to the reducer.

20.17 Remove the cylinder from the retaining strap in the opposite direction to the cylinder connection.

20.18 Remove the cylinder cover and inspect for wear and tear and legibility of markings.

20.19 Clean cylinder using Wypall x80 cloth and Safetywash solution (see 20.5 above), mark cylinder M/T and place in the agreed collection point.

'B' test: cylinder removal EDBA

20.20 Lay EDBA set on suitable work surface cylinder downwards. Release the anti-entanglement straps.

20.21 Ensure **0** bar is displayed on Bodyguard. Unscrew the cylinder connection to the reducer.

20.22 Press and hold the spring plate of the backplate upper cylinder retaining bracket so it clears the connecting lug.

20.23 Holding the top of the backplate push the set towards the cylinder retaining bracket until the backplate separates from the cylinder pack.

Note: take care to ensure fingers are not caught in the release spring mechanism as it returns to its natural position when the cylinder pack is released.

20.24 Remove the cylinder cover and clean, inspect for wear, tear and legibility of markings.

20.25 Clean cylinder using Wypall x80 cloth and Safetywash solution (see 20.5 above), mark cylinder M/T and place in the agreed collection point.

'B' test: BA personal line and cable cutter

20.26 Remove cable cutter, clean and inspect as necessary. Inspect storage pouch before replacing cable cutter.

20.27 Clean personal line and housing (check condition of line and knot), inspect and check operation as necessary. Ensure karabiner is attached to the small 'D' ring – the gate opening should face towards the wearers body. (for detail see Policy number 798 – RPE – ancillary equipment)..

'B' test: LDV

20.28 Disconnect the in-line connection and inspect the LDV for visible damage.

20.29 Clean LDV using Safetywash solution (see 20.5 above).

20.30 Using a Wypall x80 cloth, immerse the cloth in the Safetywash solution and remove excess solution.

20.31 Only wipe the **outside** of the LDV and supply hose attached.

20.32 Wipe off using a Wypall x80 cloth rinsed in clean water to remove any residue Safetywash solution.

20.33 Dry thoroughly.

Note: if LDV is heavily contaminated contact OSG for advice.

20.34 Operate the 'first breath' button on top of the LDV, release the first breath mechanism by operation of the 'additional flow' button at the front of the LDV, a click should be heard, this confirms that the mechanism has operated. Repeat this test.

'B' test: general cleaning and inspection of the BA set

20.35 Clean using Safetywash solution as per 20.5 above.

20.36 The following are to be cleaned and inspected:

- Waist-belt and shoulder straps (fully extend straps and check operation of waist belt buckle).
- Backplate (adjust to preferred position if required).
- Telemetry module.
- Cylinder strap/attachment points.
- Front carrying frame.
- Second person connection hose (if backplate is adjusted reposition as appropriate).
- Bodyguard display unit and hose.

20.37 Wipe off using a Wypall x80 cloth rinsed in clean water to remove any residue Safetywash solution. Dry thoroughly.

Note: do not submerge backplate or allow water to enter the battery pack compartment, this could damage the battery terminals causing the Bodyguard unit to fail.

'B' test: test all the quick release couplings

20.38 Insert the male coupling of the LDV hose into the second person connection and release, check condition of protective blank cap and replace.

20.39 Reconnect the LDV hose to the in-line QRC.

20.40 Check the second person connection hose clips (three) are secure and the hose is held securely in the clips.

'B' test: refit face mask to LDV

LFB image 250385

20.41 Fit the LDV to the face mask by holding the face mask in one hand and with the LDV in the other gently push the LDV into the ESA connection of the face mask. A 'click' **must** be heard.

Test the connection by gently twisting and pulling the LDV away from the face mask, it should remain secure.

'B' test: cylinder replacement

20.42 Check the reducer cylinder connection 'O' ring and the anti-vibration 'O' ring are in place and not damaged.

20.43 Check the reducer cylinder connection thread is free from dirt and not damaged.

'B' test: Inspect the replacement cylinder

20.44 Examine the cylinder:

(a) Carry out cylinder acceptance test (for detail see section 14 for SDBA and section 16 for EDBA).

(b) Replace the cylinder cover (for detail see section 14 for SDBA and section 16 for EDBA).

(c) Fit the cylinder (for detail see section 14 for SDBA and section 16 for EDBA)

(d) The cylinder should now be held secure with no movement. Ensure cylinder cover is correctly fitted (including the anti-entanglement straps).

'B' test: set reduced volume mode, do not use after date, confirm BA set I.D. and test ADSU

20.45 Press the **left** button of the Bodyguard unit. The unit will emit a single audible 'bleep', and then the 'self-check' sequence will start (see image right).

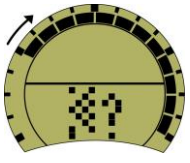
20.46 The initial short first display (see image right).

20.47 Quickly changes to the full 'LCD check' icon (see image right).

20.48 The display backlight will momentarily illuminate and the blue, red, and single green LEDs in the lower display cluster will also momentarily illuminate (see image right).

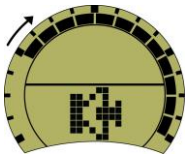
Note: during each sequence the outer radial segments will initially illuminate and then begin to switch off clockwise.

20.49 When all the segments have switched off, the display will change to 'leak test' icon (see image right).

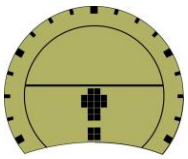


Set reduced volume:

20.50 When all the segments have switched off, the display will change to 'reduced volume' icon. When the 'reduced volume' icon appears the wearer should first press the **left** button followed by the **right** button to confirm this setting (see image right).

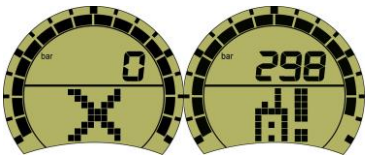


20.51 When all the segments have switched off, the display will change momentarily to 'automatic (motion sensor) DSU not active' icon (see image right).



20.52 The display will then quickly change to 'non-operational mode' (see image right).

Note: the display of an 'X' or 'telemetry fault code' icon alerts the user that the Bodyguard 7000 has failed the 'self-check' or the telemetry module has failed. Return the BA set to OSG (see images right).



'Do not use after date' and 'B' test: confirm BA set I.D.

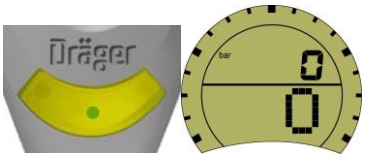
20.53 To confirm the do not use after date and the BA set number; after the completion of the 'self-check' as in paragraph 13.1 above press the **right** button and the do not use after date, followed by the four digit BA set number will scroll across the display screen from right to left (the example above is BA set 0029). Check this date to ensure it corresponds with the front of the BA log book as per 20.2 above.

'B' test: test automatic and manual distress signals

20.54 **Operate** the first breath button.

20.55 Put neck loop on and **connect** the face mask to the retaining stud and check it holds securely.

20.56 Remove Bodyguard key, note the reduced volume of the Bodyguard. Note 'green' flashing LED and zero display (see image right).



20.57 **Open** the cylinder valve slowly and fully. The cylinder must have a minimum pressure of **270** bar to start the test. If cylinder change is required enter the cylinder bar code number into BA log book. Note the pressure reading for entry into the BA log book.

20.58 **Test** ADSU, to check pre alarm signal, confirm the 'green' LED continuously flashes.

20.59 Wait 30 seconds – pre-alarm sounds – cancel pre-alarm (tap side of unit).

20.60 Wait 30 seconds – pre-alarm sounds – do not cancel – wait 15 seconds - full alarm sounds – Check LEDs, two 'blue', two 'red' and one 'green' illuminate alternatively – **Insert** Bodyguard key to cancel.

20.61 **Test** DSU by **pressing** the 'yellow' button in the centre of the unit to start the manual DSU alarm – check LEDs, two 'blue' and two 'red' illuminate alternatively. **Remove** and **reinsert** Bodyguard key to cancel.

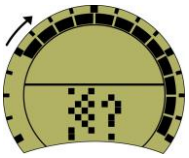
'B' test: leak test

20.62 To undertake the leak test the wearer will need to access the 'leak test' icon.

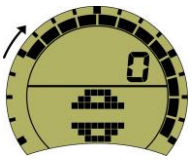
20.63 Press the **left** button of the Bodyguard unit. The unit will emit a single audible 'bleep', and then the 'self-check' sequence will start as described in (see image right).

20.64 The initial short display quickly changes to the LCD check display, the backlight will momentarily illuminate and the blue, red, and single green LED's in the lower display cluster will momentarily illuminate (see image right).

Note: during each display the outer radial segments will initially illuminate and then begin to switch off clockwise. If no action is taken by the time the last segment disappears, the 'low pressure' icon is momentarily displayed followed by the 'self-check' icon which will restart.

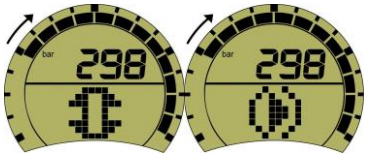


20.65 When the 'leak test' icon appears press the **left** button (see image right).



20.66 'Open cylinder' icon momentarily appears (see image right).

20.67 The Bodyguard unit will display the 'close cylinder' icon and then the 'press right button' icon; these two icons will alternate (see image right).



20.68 **Close** the cylinder valve and then press the **right** button to confirm.

'B' test: stabilisation

20.69 Upon the closing of the cylinder valve the Bodyguard unit will take a few seconds to stabilise the air trapped between the cylinder valve and the first breath button on the LDV (see image right).

20.70 The 'leak test timing' icon, is displayed throughout the leak test period of approximately one minute. During this time the bar segments will switch off clockwise (see image right).

Note: during the leak test there may be a drop in pressure displayed. A pressure drop of up to **10** bar is acceptable and may be caused by the piston in the reducer settling.

20.71 On completion of the leak test one of the following icons will be displayed:

(a) **Leak test – pass.** This flashing icon indicates that the leak test was

completed successfully (see image right).

(b) **Leak test – fail**. This flashing icon indicates that the leak test was not satisfactory and the BA set did not pass the test (see image right).

- Purge remaining air by operating the additional flow button.
- Check the cylinder connection is hand tight and the LDV is connected to the face mask correctly.
- Undertake a second leak test – If the BA set fails the leak test a second time it is to be taken off the run and sent to OSG workshops.

Note: the 'set passed' icon will remain displayed for up to three minutes, during which time the breathe down sequence should be completed. If the breathe down sequence is not completed the Bodyguard will display an 'X' icon, emit five audible 'bleeps' and then restart the 'self-check' if left the final icon displayed will be 'operational mode'. The timing out of Bodyguard would necessitate the leak test being repeated. Re-open the cylinder valve and repeat testing from section 20.63).

'B' test: breathe down sequence

20.72 Open the cylinder valve slowly and fully.

20.73 Disconnect neck loop retaining stud, ensure all head harness straps are fully loosened and don face mask, drop the head forward into the face mask placing the chin firmly into the chin cup.

20.74 Position the head harness over the head, locating the harness centre plate square on the back of the head. Ensure that hair does not compromise the face seal area.

20.75 Tighten both lower straps together, and then the middle straps, ensuring all the straps are pulled evenly towards the back of the head, keeping them evenly tensioned and in line with the mask tongues. Check and if necessary tighten the top strap. The face mask should fit securely but not be over-tightened.

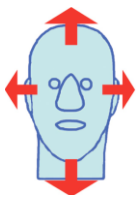
20.76 Breathe normally.

20.77 Test the constant flow of air to the face mask by briefly operating the 'additional flow' button on the front of the LDV once only.

20.78 Take a deep breath and hold, do not move head. Listen for any leakage from the face mask for approximately 8 seconds and then breathe normally. If any leaks are detected from the face mask readjust to fit and retest. If after readjusting the leak persists, get another wearer to try the mask to ensure it's the mask and not the wearer that is causing the leak before removing the BA set from service.

20.79 Take a deep breath and hold, **close** the cylinder valve, **continue to hold onto the valve**.

20.80 Take hold of the Bodyguard in other hand and observe the display for approximately 8 seconds whilst moving your head slowly up, down and side-to-side to ensure the face mask is not leaking outwardly (positive pressure), this will be noted by an excessive fall in pressure shown on the Bodyguard display.



20.81 After 8 seconds slowly breathe down the contents.

Observe and listen

20.82 Observe and listen to:

(a) The **electronic** low pressure warning and the 'red' and 'blue' LEDs flashing (operates at 84 bar).

and

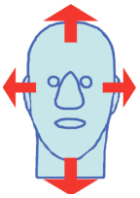
(b) The **pneumatic** low pressure warning (whistle operates at 74 bar +/- 5 bar).

Note: due to the design of the BA set it may not be achievable for the wearer to accurately check the actuation pressures for both devices although they **must** be heard to actuate. The pressure settings will be tested during any routine maintenance/repair of the BA set by OSG.

20.83 When zero is displayed (0 bar) **open** the cylinder valve slowly and fully and breathe normally, **note** this pressure and round down for entry onto the BA tally.

20.84 Take a deep breath and hold, **close** the cylinder valve, **continue to hold onto the valve**.

20.85 Breathe steadily until the air is exhausted (0 bar displayed) and the face mask collapses onto your face.



20.86 Continue holding your breath for approximately 8 seconds whilst moving your head slowly up, down and side-to-side to ensure the face mask is not leaking inwardly (negative pressure), this will be noted by the face mask failing to remain 'sucked down' onto your face.

20.87 After 8 seconds, breathe out slightly, release sliding buckles and remove the face mask.

20.88 Extend straps, wipe the face mask seal and inner mask with a damp PALTECH wipe.

20.89 Check and ensure the two inner mask non-return valves are in place and are seated correctly, restow the face mask into its bag (face mask bag must be cleaned using a mild detergent solution and then dried).

Note: do not attach neck loop to the retaining stud. This will prevent the reflex seal becoming permanently distorted.

20.90 Fill out the BA tally – the pressure to be inserted is that noted in paragraph 20.84 above and rounded down. i.e. 292 bar would be entered as 290 bar. Ensure that printed details on the BA tally are clear and enter rank and name.

Note: if there is a leak as a result of the breathe down sequence above the wearer should repeat the 'B' test 'breathe down sequence' from 20.73 above paying particular attention to correctly fitting the face mask and the adjustment of the head harness. The straps should not be over-tightened.

20.91 If the wearer continues to find a leak they should try another BA set and if there is still a leak they should inform the OIC.

20.92 Extreme movement of the head may in some cases 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. A continuous leak that does not stop even when the head is in the central position is **not** acceptable.

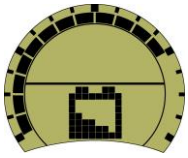
20.93 Anyone who consistently fails to achieve a seal with a range of standard issue face masks is to be placed on light duties. OSG is to be informed as soon as possible, and they will arrange for a face fit test to be conducted and issue a personal issue face mask as appropriate.

20.94 Please refer to the following policy numbers if BA set is fitted with radio communications.

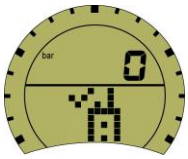
- Policy number 516 - Entel HT981 fireground radio and Savox interface equipment (B.A.R.I.E.).
- Policy number 592 - Breathing apparatus radio interface equipment (B.A.R.I.E.).
- Policy number 593 - Entel HT981 intrinsically safe fireground radio.

'B' test: securing bracket and BA set restow

20.95 Check operation of BA set retaining bracket and adjust height if appropriate. Connect charging lead, replace BA set and ensure that the BA set is being charged indicated by green LED on rechargeable battery pack (see image right) and Bodyguard showing 'battery charging' icon. Ensure retaining bracket holds the BA set securely.



20.96 Place BA tally into ECB and ensure signal is achieved ('green' and 'blue' LEDs established on Bodyguard and 'telemetry signal radio' icon on ECB). (see image right 'telemetry signal radio' icon ticked for 'in' telemetry signal).



20.97 Replace Bodyguard key, check that the Bodyguard returns to the 'battery charging' icon. (see 20.96 above).

'B' test: spare cylinder

20.98 Check if available, that the spare cylinder is correctly stowed and is within the hydraulic test date. Note: for EDBA, check station stock.

'B' test: completing log book

20.99 Select and complete the corresponding BA log book for the BA set you are testing record the exact pressure at the **start** of the leak test and do not round down.

21 Equipment allocation

21.1 It is essential that equipment levels are maintained and managed at a local level. The chart below gives information on the levels of equipment that are allocated. This can be used to cross reference the appliances and station reserves applicable and work out totals for any given location i.e. PL and P station would have a total of 10 x SDBA sets and 27 x SDBA cylinders.

21.2 If deficiencies are identified reference should be made to any outstanding POMs orders, which may account for any missing items.

21.3 Equipment found in excess of allocation should be returned as surplus to requirements to enable redistribution to those locations that show deficiencies.

	SDBA set	SDBA cylinder	EDBA set	EDBA cylinder	Remarks
Pump Ladder (PL)	5	10	0	0	
Pump (P)	4	8	0	0	

Aerial	2	4	0	0	
Fire Rescue Unit	0	0	5	9	Inc EDBA cylinder attached to RTC frame x 4
Rapid Response Team	0	0	8	8	
Station Reserve	1	PL x 5 P x 4 Aerial x 2	0	0	
Station Reserve FRU/RRT	0	0	1	8	

22 Defective equipment

Returns procedure

22.1 When an item becomes defective the station is to complete a POMS order and fill out the details required for the defective item.

22.2 POMS will automatically print off a docket for the defective item (OSG items only). This should be attached to the item that is to be exchanged and the item left in the agreed collection point at your location.

22.3 A replacement item will automatically be issued from OSG/Operations Support Centre (OSC) on receipt of a POMS order. Once the item has been received the station should close the order on POMS.

22.4 Stations should contact logistics manager at RMC on extension 88321 for 'urgent' replacement of BA set(s). For example if appliance BA set level has dropped below two BA sets.

22.5 All items must be cleaned before returning to OSG/OSC.

Defective BA sets

22.6 The following items must be sent with the BA set:

- Bodyguard key and tally (ensure tally and telemetry module identification numbers match).
- Face mask in its bag.
- Personal line .
- Log book (completed with details of the defect and reversed in wallet, to indicate that the BA set is defective).
- All protective blank caps including the cylinder connection blank cap should be in position.

22.7 Do **not** send:

- BA cylinder or its cover.
- BARIE equipment if fitted.
- BA cable cutter and pouch.

Defective BA personal line

22.8 If the BA personal line or its housing becomes defective treat the BA set as defective.

Defective BA cylinder

22.9 If the BA cylinder becomes defective or the hydraulic test date has expired remove the cylinder from service, clean the cylinder and mark the cylinder M/T on the black quarter shoulder.

22.10 Attach a label to the cylinder valve group clearly stating "defective cylinder" and the nature of the fault i.e. "for hydraulic test" or "valve group letting by".

22.11 Leave the cylinder for collection by the day van service who will exchange the cylinder on a one for one basis and then deliver to the OSG area charging room for repair/service.

Defective BA cylinder covers

22.12 If the cylinder cover becomes defective do not treat the whole BA set as defective.

22.13 The following constitute a 'defective' cylinder cover requiring immediate replacement:

- Torn anti-entanglement strap.
- Broken zip (SDBA).
- Damaged zip that prevents proper or complete closure (SDBA).
- Broken or missing zip fastener (SDBA).
- Missing 'Velcro' flap over the zip fastener (SDBA).
- Broken cylinder strap (EDBA).

22.14 Damaged cylinder cover **not requiring** immediate replacement:

- Damaged reflective strip.
- Tears or splits in the fabric (except as in 22.13 above).
- Stitching becoming unravelled.

Note: if in doubt contact OSG for further advice.

22.15 Use the spare cylinder cover from the RPE spares box and send the defective cylinder cover to PSG under cover of POMS order.

Defective BA tally

22.16 If the BA tally becomes defective remove the BA set from service and store in the RPE maintenance room until the replacement BA tally is received.

22.17 Order a new BA tally on POMS and ensure that the telemetry module number is included in the order comments. This enables OSG to program the correct number onto the BA tally.

22.18 The defective BA tally must be forwarded to OSG with a copy of the POMS order enclosed.

22.19 Use the spare BA set from the RPE spares box until the new tally is received.

Defective BA cable cutter and pouch

22.20 If the BA cable cutter and/or pouch become defective do not treat the whole BA set as defective.

22.21 Use the spare BA cable cutter and/or pouch from the RPE spares box and send the defective BA cable cutter and/or pouch to OSC under cover of POMS order.

22.22 A docket will not be printed for the BA cutter and/or pouch. Attach a label to the defective item stating "Deliver to OSC Croydon – Defective".

23 RPE maintenance rooms

23.1 RPE maintenance rooms must be kept in a clean and tidy condition to ensure that items of RPE (including resuscitators and oxygen equipment) are not contaminated with oil, dirt and grease during cleaning and storage. This is particularly important with regard to oxygen resuscitation equipment.

Under no circumstance should RPE maintenance rooms be used to store anything other than RPE, nor should they be used for the cleaning of other items.

23.2 Serious accidents can result from the misuse of RPE and oxygen equipment. The materials provided for the cleaning and maintenance of RPE are the only ones that should be used. Under no circumstances should solvents or other non-approved cleaning agents or cloths be used.

23.3 Oxygen enrichment of the atmosphere could be a cause of accidents. Ensure that oxygen equipment is turned off and does not leak. Small increases in the oxygen content of the atmosphere in a confined space can lead to fires or explosions.

RPE maintenance rooms are a no smoking, no drinking and no eating area.

24 Technical data

PSS 7000 BA set

24.1 The Dräger PSS®7000 series conforms to EN 137: 2006 and to the requirements of the EC Council Directive 89/686/EEC. BSEN 133.

24.2 The equipment is CE mark approved and is issued with an EC type examination certificate.

24.3 ATEX certification (94/9/EC) – For specific combinations of the PSS®7000 Series of SCBA, the approved groups/classes are defined as follows:

- 0359 I : CE 0359 Ex 1M/II 1GD ITS 07 ATEX 25580 Ex ia I/IIC T4 (Ta-30°C to+60°C).

24.4 Weight of BA set with battery pack, FPS face mask and LDV plus BA personal line attached but without cylinder SDBA = **6.45 kg.** EDBA **= 7.05 kg.**

24.5 Weight of BA set with battery pack, FPS face mask and LDV, BA personal line attached, fully charged cylinder with cover fitted is approximately SDBA = **15.50 kg.** EDBA = **22.15 kg.**

Conformity

24.6 The Dräger PSS® 7000 Series conforms to EN137 and to the requirements of EC Council directive 89/686/EEC, BSEN 133. The equipment is CE mark approved and is issued with an EC type examination certificate.

24.7 ATEX certification (94/9/EC) for specific combinations of the PSS7000 Series (the approved groups/classes) is defined as follows: CE I M1/II 1 GD IIC T6 (Ta -30°C to +60°C).

Reducer

24.8 The main body of the reducer is manufactured from brass to specification BSEN 12420 - CW 617N. The pressing is precision machined and then externally Nickel plated.

24.9 The thread of the standard hand wheel, fitted to the reducer, is to DIN G5/8 as per EN 144-2: 1999.

24.10 The inlet to the reducer has a threaded hand wheel for connection to the high pressure outlet port of the valve of a compressed air 300 bar cylinder.

24.11 Normal first stage output pressure 8 bar.

24.12 First stage output flow (l/min) > 1000.

24.13 High pressure pneumatic whistle activation pressure (bar) 74 (+/- 5 bar).

24.14 Whistle sound level (dBA) > 90.

24.15 Whistle frequency range (Hz) 2000 – 4000.

Threaded hand wheel: (300bar)

24.16 The thread of the standard hand wheel is to DIN G5/8 as per EN 144: 2000.

Cylinder SDBA

24.17 Dräger 8 litre 300 bar carbon composite cylinder (30 year design life).

24.18 Charging pressure 300 bar.

24.19 Right-angled valve fitted.

24.20 Cylinder weight (empty) = **5.55 kg.**

24.21 Cylinder weight (full) **= 8.50 kg.**

24.22 Weight (full with cylinder cover on) = **8.95 kg.**

Cylinder EDBA

24.23 Dräger 6.8 litre 300 bar carbon composite cylinder twin pack (15 year design life).

24.24 Charging pressure 300 bar.

24.25 Right-angled valve fitted incorporating second cylinder connection tube inside carry handle.

24.26 Cylinder weight (empty) = **10.60 kg.**

24.27 Cylinder weight (full) **= 15.10 kg.**

24.28 Weight (full with cylinder cover on) = **15.55 kg.**

FPS 7000 DPFM

24.29 Meets the full face mask standard EN 136:1998 Class 3.

24.30 The face mask is marked with the CE mark of conformity, including the flame engulfment requirements stipulated in EN 137.

24.31 Face mask weight: approximately 600 g.

Connection

24.32 **ESA** – einheit stecken anschluss (German translated into 'standard plug-in connection').

24.33 Connection can be used to connect the LDV or a filter cartridge meeting the EN 143 standard.

Mask body

24.34 Ethylene Propylene Diene Monomer -class. The **E** refers to Ethylene, **P** to Propylene, **D** to diene and **M,** this refers to its classification in ASTM standard D-1418. EN 136:1998 Class 3+, CE0158.

24.35 Sizes (Outer Mask): - **S** (small), **M** (medium), **L** (large).

24.36 Sizes (Inner Mask): - **1** (small), **2** (medium), **3** (large).

Visor

24.37 **PC, F** (fire brigade), according to EN 166 – 2002.

24.38 **A** (ballistic protection class/190 m/s).

24.39 **T** (ballistic protection at extreme temperatures, tested at -30°C and +60 °C with 190 m/s).

24.40 **PCaf** (coated with scratch-resistant material on the outside, with anti-fog on the inside).

Bodyguard 7000

24.41 High pressure connection = 300 bar.

Pressure transmitter unit

24.42 Pressure connection - electronic pressure sensor for connection to the high pressure outlet port of the first stage pressure reducer.

24.43 Outlet connection to the electronic user interface unit (display unit).

Electronic low pressure warning

24.44 Activation set to 84 bar.

Note: all electronic devices may suffer a temporary loss of function if subjected to extreme levels of RF radiation. The Bodyguard will continue to operate with no loss of performance or loss of function, once the RF radiation has been removed.

- ATEX Certification (94/9/EC)
- Radio Frequency (RF) Compliance
- EN6100-4-3 compliance
- 30 V/m to ISO11452 Part 2 compliance

Power supply

24.45 Main power – 6.5 volts

24.46 Low battery warning – 5.5 volts

24.47 Power-up shut off – 5.0 volts

24.48 The Bodyguard electronic monitoring unit is powered by the battery pack.

24.49 Actual operating time of the battery pack depends on usage although typically from fully charged and tested an hour per day it will last approx five months. This is dependent on how long the system has been in operation, frequency of alarms, ambient temperature and the frequency of use of the back light.

24.50 With the system switched 'off', a small amount of power is still consumed.

Bodyguard sound level (distress alarm)

24.51 Sound level = 102 – 112 dBA

Operating temperature

24.52 Operating temperature range = -32°C to +70°C

Approvals

24.53 EN137: 2006 Type 2

24.54 Atex I M 1 / II 1 GD IIC T6 (Ta -30°C to +60°C)

24.55 IM 1/II GD IIB T6 (Ta-30°C to +60°C)

Glossary RPE generic

- ADSU - Automatic distress signal unit.
- BA - Breathing apparatus.
- Comms - Communications.
- Comms-Op - Communication operator.
- CPC - Chemical protective clothing.
- CU - Command unit.
- DSU - Distress signal unit manually operated.
- DPFM - Dual purpose face mask.
- ECO - Entry control operative.
- ECP - Entry control point.
- EDBA - Extended duration breathing apparatus.
- EMU - Electronic monitoring unit.
- ESA - Einheit stecken anschlussfilter (meaning standard plug-in connection).
- FC - Filter cartridge.
- FPS - Face protection system.
- FRU - Fire rescue unit.
- GTS - Gas tight suit.
- HMEPO - Hazardous materials and environmental protection officer.
- HSE - Health and Safety Executive.
- IC - Incident commander.
- IS - Intrinsically safe.
- LCD - Liquid crystal display.
- LED - Light emitting diode.
- LPW - Low pressure warning (can be electronic or pneumatic in operation).
- LPM - Litres per minute.
- LTS - Liquid tight suit.
- OiC - Officer in charge.
- OSU - Operational support unit.
- OSG - Operations Support Group.
- POMS - Purchase and ordering management system.
- PSS - Personal safety system.
- RA - Risk assessment.
- RPE - Respiratory protective equipment.
- RPELO - Respiratory protective equipment logistics officer.
- SA - Scientific advisor.
- SAI - Senior accident investigator.
- SDBA - Standard duration breathing apparatus.
- TAP - Turn-around pressure.
- TAT - Turn-around time.
- TM - Telemetry module.
- TOW - Time of warning (audible and visual warnings to indicate end of working duration)
- TTW - Time to warning (end of working duration and the start of safety margin).
- USAR - Urban Search and Rescue.

Appendix 1 – Working in hi-expansion foam

1 If a BA wearer has to make an entry into hi-expansion foam (Hi-Ex), a situation may arise where the wearer may experience the LDV operating in constant flow. This is due to an 'over pressure' building up between the outer rubber casing and the constant flow button situated directly beneath.

2 To overcome this phenomenon, the wearer is required to partially remove the outer rubber casing so as to equalise the pressure on the constant flow button.

Removing the outer rubber protective casing

3 Insert finger under outer rubber casing on the opposite side to medium pressure supply hose (see image 250392).

4 Using finger to lift the rubber casing away from the LDV body work round to bottom of LDV taking care to carefully lift the rubber casing over the raised pin (see image 250394).

LFB image 250392

LFB image 250394

5 Push rubber casing away from LDV body (see image 250391) and leave rubber casing loose for duration of the Hi-Ex wear (see image 250390).

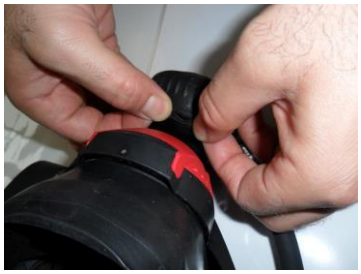
LFB image 250391

LFB image 250390

Replacing the outer rubber protective casing

6 Hold the bottom of the outer rubber casing and lift over the raised pin (see image 250393) and push into position ensure that the casing is locked into position (see image 250395).

LFB image 250393



LFB image 250395

Appendix 2 – Returning the BA set to OSG

1 Insert the face mask into the bag with the LDV placed nearest the Velcro closure of the bag. Note: the face mask bag clip must be in the position shown to ensure the face mask lays correctly when secured to the BA set cylinder strap later in the procedure (see image 250389).

2 The head harness and LDV supply hose should lay inside the face mask. The LDV hose should be detached from the BA set at the in-line connection (see image 250388).

LFB image 250389

LFB image 250388

3 Secure the face mask bag using the Velcro seal (see image 250387).

4 Place a red protective cap over the reducer cylinder connection (see image 1136809.

LFB image 250387

LFB image 1136809

5 Position the BA log book against the backplate with the window of the log book cover facing outwards so that the set number can be seen through the window. Use snap hook to attach the log book (see image 250419).

6 Position the face mask bag as shown, the face mask bag upper clip to the right shoulder side of the set and the face side of the mask against the backplate (see image 1136798).

LFB image 250419

LFB image 1136798

7 Bring the shoulder straps and hoses over the face mask bag as shown.

Note: ensure that the tally and telemetry module identification numbers match and leave the tally attached to the Bodyguard key (see image 1136800).

8 Clip the face mask bag to the cylinder retaining mechanism 'D' fixing using the upper bag clip (see image 250414).

LFB image 1136800

LFB image 250414

9 Bring both halves of the waist belts across the front of the shoulder straps trapping them underneath as shown (see image 1136802).

10 Turn the set over and connect the waist belt buckles; turn set over again and pull the tabs of the waist belts to tighten (see image 250417).

LFB image 1136802

LFB image 250417

11 The waist belt buckle should be secure and lay-flat against the set backplate and the trailing end of the cylinder strap should be fastened using the Velcro closure (see image 1136807).

12 Secure the lower face mask bag clip to the large 'D' ring on the waist belt.

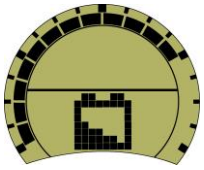
13 The BA set is now secure and ready to be transported (see image 1136808).

LFB image 1136807

LFB image 1136808

14 Once wrapped place the BA set into a sealed plastic bag for transport to OSG.

Appendix 3 – 'A' test aide-memoire and BPA

	Dräger PSS 7000 breathing apparatus – 'A' test aide memoire and best practice assessment		
EV	**CHECK IN ORDER**	**P**	**NYP**
1	**CHECK** the front of the BA log book for the 'do not use after date' to ensure the BA set is still within its certificated test date and ensure this date corresponds to that on the Bodyguard display (EV 15). Note: Before conducting 'A' test don Nitrile gloves and consider respiratory protection following operational or real fire training use.		
2	**REMOVE** BA set from retaining bracket, charging connector will automatically disconnect.		
3	**CHECK** the nine identification numbers match and are legible – located on the: Face mask, Lung demand valve (LDV), Backplate front and rear, BA tally and telemetry module, Log book front and rear, Bodyguard number (checked at EV 15). Note: if mismatch found, check all other BA sets on station before contacting OSG.		
4	**CHECK** the condition of cylinder cover and the cover markings. **ENSURE** cylinder cover is correctly fitted.		
5	**CHECK** cylinder connection is hand-tight. Finger and thumb pressure only. **CHECK** security of cylinder attachment.		
6	**CHECK** condition of backplate and adjust to preferred position if required (reposition second person connection hose as appropriate).		
7	**CHECK** the second person connection hose clips are secure and the hose is held in the clips.		
8	**CHECK** operation of BA set retaining bracket and adjust height if appropriate. **CONNECT** charging lead. **REPLACE** BA set and ensure that the BA set is being charged (indicated by green LED on rechargeable battery pack and Bodyguard displaying 'battery charging' icon). **ENSURE** retaining bracket holds the BA set securely. 		

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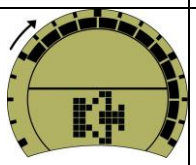
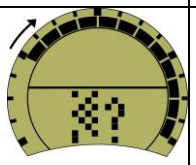
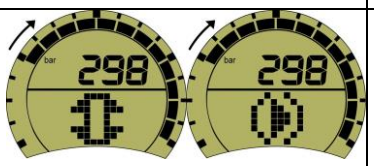
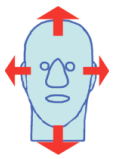
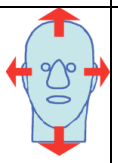
EV	CHECK IN ORDER	P	PYP
9	**INSPECT** the condition of: Shoulder straps, waist belt (ensuring they are fully extended), Fastening buckle and fittings, BA personal line housing (ensure karabiner is attached to the small 'D' ring - the gate opening should point towards the wearers body – there is no requirement to check line condition), Cable cutters and pouch, Bodyguard, Quick release couplings, Protective blank cap, Hoses.		
10	**CHECK** the LDV connection (gently push, twist and pull).		
11	**CHECK** the face mask and fittings. Head harness straps are not twisted and are correctly roved. Clarity of vision through the visor. **CHECK** exhalation valve cover is not damaged or blocked and that the cover securing screw is in place. **FIT** aids to vision if required.		
12	**OPERATE** the first breath button on top of the LDV. **RELEASE** the first breath mechanism by operation of the additional flow button on the front of the LDV, a click should be heard, this confirms the mechanism has operated. **REPEAT** this test.		

	SET REDUCED VOLUME, DO NOT USE AFTER DATE, CONFIRM BA SET IDENTIFICATION AND TEST ADSU		
EV	**CHECK IN ORDER**	**P**	**PYP**
13	**PRESS** the Bodyguard **LEFT** button to start the 'self-check' sequence. 		
14	When the 'reduced volume' icon appears **PRESS** the **LEFT** button followed by the **RIGHT** button to confirm this setting. 		
15	**PRESS** the **RIGHT** button to scroll and **CONFIRM:** 'Do not use after date' and BA set identification number.  **CHECK** this date to ensure it corresponds with the front of the BA log book (EV 01).		
16	**OPERATE** first breath button.		
17	**PUT** the neck loop on. **CONNECT** face mask to retaining stud. **CHECK** it holds securely.		
18	**REMOVE** the Bodyguard key noting the reduced volume of Bodyguard (repeat from EV 13 if not reduced).		
19	**OPEN** the cylinder valve **SLOWLY** and **FULLY**. The cylinder must have a minimum pressure of **270** bar to start the test. **NOTE** the pressure reading for entry into the BA log book (EV 46).		
20	**TEST** ADSU, to test pre-alarm signal: **CONFIRM** the **green** LED continuously flashes, **WAIT 30 seconds** – pre-alarm sounds, **CANCEL** pre-alarm (tap side of unit), **WAIT 30 seconds** – pre-alarm sounds – do not cancel, **WAIT 15 seconds** – full alarm sounds, **CHECK LED's**, **two blue, two red** and **one green** illuminate alternatively, **INSERT** Bodyguard key to cancel.		
21	**TEST** the manual DSU by: **PRESSING** the yellow button in the centre of the unit to start the manual DSU alarm,  **CHECK LEDs**, **two blue** and **two red** illuminate alternatively **REMOVE** and **REINSERT** Bodyguard key to cancel.		

	UNDERTAKE LEAK TEST		
EV	**CHECK IN ORDER**	**P**	**PYP**
22	**PRESS** and **HOLD** the Bodyguard **LEFT** button until the 'return arrow' icon appears. **RELEASE** to start the 'self-check' sequence. 		
23	When the 'leak test' icon appears **PRESS** the **LEFT** button. 		
24	The 'open cylinder' icon momentarily appears before the display changes to 'close cylinder' and 'press right' button alternating icons. **CLOSE** the cylinder valve and then **PRESS** the **RIGHT** button to confirm. 		
25	**WAIT** – Stabilisation taking place. 		
26	'Leak test timing' icon appears for approximately one minute. Bar segments progressively switch off clockwise. Note: during the leak test a pressure drop of up to **10** bar is acceptable. 		
27	On completion, the 'leak test passed' icon is displayed. Note: the 'breathe down' sequence should be completed within three minutes of the **'**leak test pass' icon being displayed. The timing out of Bodyguard would necessitate the leak test being repeated. Re-open the cylinder valve and repeat testing from EV 22. 		
28	If the: 'leak test failed' icon appears: **PURGE** remaining air by operating additional flow button. **CHECK** cylinder connection and LDV connection to face mask. **UNDERTAKE second leak test from EV 22** – If test fails again return set to OSG as defective. 		

	BREATHE DOWN SEQUENCE		
EV	**CHECK IN ORDER**	**P**	**NYP**
29	**OPEN** the cylinder valve **SLOWLY** and **FULLY**.		
30	**DISCONNECT** neck loop retaining stud, **WIPE** the face mask seal and inner mask with a damp PALTECH wipe. **DON** face mask, drop the head forward into the face mask placing the chin firmly into the chin cup. **POSITION** the head harness over the head, locating the harness centre plate square on the back of the head. Ensure that hair does not compromise the face seal area. **ADJUST** the straps, lower two first, then middle two and top one (if required). **BREATHE** normally.		
31	**TEST** the constant flow of air to face mask by briefly operating the additional flow button on the front of the LDV once only.		
32	**TAKE** a deep breath and hold, do not move head. **LISTEN** for any leakage from the face mask for approximately **8 seconds** and then, **BREATHE** normally.		
33	**TAKE** a deep breath and hold, **CLOSE** the cylinder valve; **continue to hold onto the valve**.		
34	**TAKE HOLD** of the Bodyguard in other hand and **OBSERVE** display for approximately **8 seconds** whilst slowly moving your head up, down and side-to-side. **ENSURE** the face mask is not leaking outwardly (positive pressure). This will be noted by an excessive fall in pressure. 		
35	After **8 seconds** slowly **BREATHE DOWN** the contents.		
36	**OBSERVE** and **LISTEN** to the low pressure warnings**:** • The electronic low pressure warning and the **red** and **blue** LEDs flashing (operates at 84 bar). • The pneumatic low pressure warning (operates at 74 bar +/- 5 bar). Note: both must be heard to actuate.		
37	When zero is displayed (0 bar): **OPEN** the cylinder valve **SLOWLY** and **FULLY** and breathe normally. **NOTE** pressure displayed and round down for entry onto the BA tally at EV43.		
38	**TAKE** a deep breath and hold, **CLOSE** the cylinder valve; **continue to hold onto the valve**.		
39	**BREATHE** steadily until the air is exhausted (0 bar displayed) and the face mask collapses onto your face.		

EV	CHECK IN ORDER	P	NYP
40	**CONTINUE HOLDING BREATH** for approximately **8 seconds** whilst slowly moving your head up, down and side-to-side to ensure the face mask is not leaking inwardly (negative pressure). This will be noted by the face mask failing to remain 'sucked down' onto your face. 		
41	After **8 seconds**, **BREATHE OUT SLIGHTLY,** release sliding buckles and remove the face mask. **CHECK** the operation of radio interface equipment if fitted.		
42	**EXTEND** straps, **WIPE** the face mask seal and inner mask with a damp PALTECH wipe. **CHECK** and ensure the two inner mask non-return valves are still in place and are seated correctly. **RESTOW** the face mask into its bag. Note: do not attach neck loop retaining stud.		
43	**FILL OUT** the BA tally (enter rounded down pressure noted at EV 37). **ENSURE** that printed details on the BA tally are clear and enter rank and name.		
44	**REPLACE** Bodyguard key (if removed). **CHECK** that the Bodyguard returns to the 'battery charging' icon.		
45	**CHECK** if available, that the spare cylinder is correctly stowed and is within the hydraulic test date. Note: EDBA, check station stock.		
46	**COMPLETE** the BA log book (enter pressure recorded at the cylinder contents check EV 19).		

Note: if there is a leak as a result of the 'breathe down' sequence above the wearer should repeat the 'A' test 'breathe down' sequence from EV 29 above, paying particular attention to correctly fitting the face mask onto the face and the adjustment of the head harness. The straps should not be over tightened.

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Appendix 4 – 'B' test aide memoire and BPA

	Dräger PSS 7000 breathing apparatus – 'B' test aide memoire and best practice assessment		
	CLEANING AND INSPECTION		
EV	**CHECK IN ORDER**	**P**	**NYP**
1	**CHECK** the front of the BA log book for the 'do not use after' date to ensure the BA set is still within its certificated test date and ensure this date corresponds to that on the Bodyguard display (EV 22). Note: Before conducting 'B' test don Nitrile gloves and consider respiratory protection following operational or real fire training use.		
2	**CLEAN** the face mask bag, **INSPECT** and dry. **DISCONNECT** the face mask from the lung demand valve (LDV), clean, inspect and dry. **CHECK** clarity of vision through the visor. **CHECK** the exhalation valve cover securing screw is in place and that the cover is not damaged or blocked. **CHECK** LDV/filter port for damage. Only remove the inner mask if necessary and ensure the two non-return valves are in place and are seated correctly.		
3	**CHECK** the nine identification numbers match and are legible – located on the: Face mask, LDV, Backplate front and rear, BA tally and telemetry module, Log book front and rear, Bodyguard number (checked at EV 22). Note: if mismatch found, check all other BA sets on station before contacting OSG.		
4	**FIT** aids to vision if required.		
5	**SDBA –** Ensure **0** bar is displayed on Bodyguard. **RELEASE** the anti-entanglement straps. **RELEASE** the cylinder retaining strap mechanism and loosen the strap from the cylinder body. **UNSCREW** the cylinder connection to the reducer.		
	EDBA – Ensure **0** bar is displayed on Bodyguard. **RELEASE** the anti-entanglement straps. **UNSCREW** the cylinder connection to the reducer. **OPERATE** spring plate and **GENTLY** push the BA set backplate towards the reducer and release the cylinder pack. Note: take care to ensure fingers are not caught in the release spring mechanism as it returns to its natural position when the cylinder pack is released.		
6	**REMOVE** and **CLEAN** the cylinder (remove in the opposite direction to the cylinder connection).		

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EV	CHECK IN ORDER	P	NYP
7	**REMOVE** and **CLEAN** the cylinder cover, inspect for wear and tear and legibility of markings.		
8	**REMOVE** cable cutter, **CLEAN** and **INSPECT** as necessary. **INSPECT** storage pouch before replacing cable cutter. **CLEAN** personal line and housing (check condition of the line and knot), **INSPECT** and **CHECK** operation as necessary. Ensure karabiner is attached to the small 'D' ring - the gate opening should face towards the wearers body.		
9	**DISCONNECT** the in-line connection and **INSPECT** the LDV for visible damage. **OPERATE** the first breath button on top of the LDV, **RELEASE** the first breath mechanism by operation of the additional flow button on the front of the LDV, a click should be heard, this confirms the mechanism has operated. **REPEAT** this test.		
10	**CLEAN** and inspect: Waist belt and shoulder straps (**FULLY** extend straps and **CHECK** operation of waist belt buckle), Front and rear of backplate, Telemetry module, Cylinder strap, All hoses, Bodyguard unit and facia. **DRY** thoroughly. **CHECK** and adjust backplate to preferred position if required and reposition second person connection hose as appropriate.		
11	**TEST** all quick release couplings (QRC) using the LDV male coupling. **CHECK** condition of second person QRC protective blank cap and replace. **CHECK** the second person connection hose clips are secure and the hose is held in the clips.		

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REASSEMBLE THE BA SET			
EV	**CHECK IN ORDER**	**P**	**NYP**
12	**RECONNECT** the LDV hose to the in-line QRC.		
13	**FIT** the LDV to the face mask, a 'click' **MUST** be heard. **GENTLY PUSH, TWIST** and **PULL** to test the connection.		
14	**CHECK** the reducer cylinder connection and anti-vibration 'O' rings are in place and not damaged.		
15	**CHECK** the reducer cylinder connection thread is free from dirt and not damaged.		
16	**CHECK** cylinder hydraulic test is not due. See ' yellow label - date of next test'. Note: do not use cylinder once month and year shown has been reached.		
17	**INSPECT** the replacement cylinder and **CHECK** for damage to the surface of the cylinder. **CHECK** the cylinder connection thread is free from dirt and not damaged. **NOTE** the cylinder bar code number for entry into the BA log book (EV 55).		
18	**REPLACE** the cylinder cover.		
19	**SDBA – FIT CYLINDER.** Do not cross-thread or over-tighten the cylinder connection. Finger and thumb pressure only. **TIGHTEN** cylinder strap and close securing mechanism, ensuring it functions correctly. **ENSURE** cylinder cover is correctly fitted (including the anti-entanglement straps).		
	EDBA – FIT CYLINDER PACK a 'click' **MUST** be heard**. CHECK** cylinder pack is securely attached. Do not cross-thread or over-tighten the cylinder connection. Finger and thumb pressure only. **ENSURE** cylinder cover is correctly fitted (including the anti-entanglement straps).		

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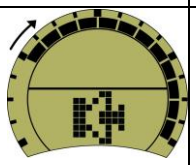
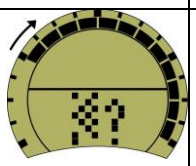
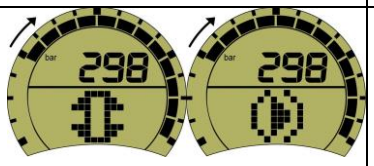
	SET REDUCED VOLUME, DO NOT USE AFTER DATE, CONFIRM BA SET I.D. AND TEST ADSU		
EV	**CHECK IN ORDER**	**P**	**NYP**
20	**PRESS** the Bodyguard **LEFT** button to start the 'self-check' sequence. 		
21	When the 'reduced volume' icon appears **PRESS** the **LEFT** button followed by the **RIGHT** button to confirm this setting. 		
22	**PRESS** the **RIGHT** button to scroll and **CONFIRM:** 'Do not use after date' and BA set identification number.  **CHECK** this date to ensure it corresponds with the front of the BA log book (EV 01).		
23	**OPERATE** first breath button.		
24	**PUT** the neck loop on. **CONNECT** face mask to retaining stud. **CHECK** it holds securely.		
25	**REMOVE** the Bodyguard key noting the reduced volume of (repeat from EV 20 if not reduced).		
26	**OPEN** the cylinder valve **SLOWLY** and **FULLY**. The cylinder must have a minimum of **270** bar to start the test. **NOTE** the pressure reading for entry into the BA log book (EV 55).		
27	**TEST** ADSU, to test pre-alarm signal: **CONFIRM** the **green** LED continuously flashes, **WAIT 30 seconds** – pre-alarm sounds, **CANCEL** pre-alarm (tap side of unit), **WAIT 30 seconds** – pre-alarm sounds – do not cancel, **WAIT 15 seconds** - full alarm sounds, **CHECK LED's**, **two blue, two red** and **one green** illuminate alternatively, **INSERT** Bodyguard key to cancel.		
28	**TEST** the manual DSU by: **PRESSING** the yellow button in the centre of the unit to start the manual DSU alarm, **CHECK LEDs**, **two blue** and **two red** illuminate alternatively **REMOVE** and **REINSERT** Bodyguard key to cancel. 		

	UNDERTAKE LEAK TEST		
EV	**CHECK IN ORDER**	**P**	**NYP**
29	**PRESS** and **HOLD** the Bodyguard **LEFT** button until the 'return arrow' icon appears. Then **RELEASE** to start the 'self-check' sequence. 		
30	When the 'leak test' icon appears **PRESS** the **LEFT** button. 		
31	The 'open cylinder' icon momentarily appears before display changes to 'close cylinder' and 'press right' button alternating icons. **CLOSE** the cylinder valve and then **PRESS** the **RIGHT** button to confirm. 		
32	**WAIT** – Stabilisation taking place. 		
33	'Leak test timing' icon appears for approximately one minute. Bar segments progressively switch off clockwise. Note: during the leak test a pressure drop of up to **10** bar is acceptable. 		
34	On completion, the 'leak test passed' icon is displayed. Note: the 'breathe down' sequence should be completed within three minutes of the 'leak test pass' icon being displayed. The timing out of Bodyguard would necessitate the leak test being repeated . Re-open the cylinder valve and repeat testing from EV 29. 		
35	If the: 'leak test failed' icon appears: **PURGE** remaining air by operating additional flow button. **CHECK** cylinder connection and LDV connection to face mask. **UNDERTAKE second leak test from EV 29** – If test fails again return set to OSG as defective. 		

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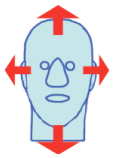
	BREATHE DOWN SEQUENCE		
EV	**CHECK IN ORDER**	**P**	**NYP**
36	**OPEN** the cylinder valve **SLOWLY** and **FULLY**.		
37	**DISCONNECT** neck loop retaining stud, **WIPE** the face mask seal and inner mask with a damp PALTECH wipe. **DON** face mask, drop the head forward into the face mask placing the chin firmly into the chin cup. **POSITION** the head harness over the head, locating the harness centre plate square on the back of the head. Ensure that hair does not compromise the face seal area. **ADJUST** the straps, lower two first, then middle two and top one (if required). **BREATHE** normally.		
38	**TEST** the constant flow of air to face mask by briefly operating the additional flow button on the front of the LDV once only.		
39	**TAKE** a deep breath and hold, do not move head. **LISTEN** for any leakage from the face mask for approximately **8 seconds** and then, **BREATHE** normally.		
40	**TAKE** a deep breath and hold. **CLOSE** the cylinder valve; **continue to hold onto the valve**.		
41	**TAKE HOLD** of the Bodyguard in other hand and, **OBSERVE** display for approximately **8 seconds** whilst slowly moving your head up, down and side-to-side. **ENSURE** the face mask is not leaking outwardly (positive pressure). This will be noted by an excessive fall in pressure. 		
42	After **8 seconds** slowly **BREATHE DOWN** the contents.		
43	**OBSERVE** and **LISTEN** to the low pressure warnings**:** • The electronic low pressure warning and the **red** and **blue** LEDs flashing (operates at 84 bar). • The pneumatic low pressure warning (operates at 74 bar +/- 5 bar). Note: both must be heard to actuate.		
44	When zero is displayed (0 bar): **OPEN** the cylinder valve **SLOWLY** and **FULLY** and breathe normally. **NOTE** pressure displayed and round down for entry onto the BA tally at EV 50.		
45	**TAKE** a deep breath and hold. **CLOSE** the cylinder valve; **continue to hold onto the valve**.		

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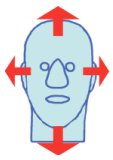
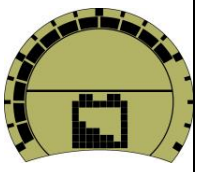
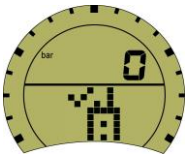
EV	CHECK IN ORDER	P	NYP
46	**BREATHE** steadily until the air is exhausted (0 bar displayed) and the face mask collapses onto your face.		
47	**CONTINUE HOLDING BREATH** for approximately **8 seconds** whilst slowly moving your head up, down and side-to-side to ensure the face mask is not leaking inwardly (negative pressure). This will be noted by the face mask failing to remain 'sucked down' onto your face. 		
48	After **8 seconds**, **BREATHE OUT SLIGHTLY**, release sliding buckles and remove the face mask. **CHECK** the operation of radio interface equipment if fitted.		
49	**EXTEND** straps, **WIPE** the face mask seal and inner mask with a damp PALTECH wipe. **CHECK** and ensure the two inner mask non-return valves are still in place and are seated correctly. **RESTOW** the face mask in the face mask bag. Note: do not attach neck loop retaining stud.		
50	**FILL OUT** the BA tally (enter rounded down pressure noted at EV 44). **ENSURE** that printed details on the BA tally are clear and enter rank and name.		
51	**CHECK** operation of BA set retaining bracket and adjust height if appropriate. **CONNECT** charging lead. **REPLACE** BA set and ensure that the BA set is being charged (indicated by **green** LED on rechargeable battery pack and Bodyguard displaying 'battery charging' icon). **ENSURE** retaining bracket holds the BA set is securely. 		
52	**PLACE** BA tally into entry control board (ECB). **ENSURE** signal is achieved (**green** and **blue** LEDs illuminated on Bodyguard and 'telemetry signal radio' icon displayed on ECB). 		
53	**REPLACE** Bodyguard key. **CHECK** that the Bodyguard returns to the 'battery charging' icon.		
54	**CHECK** if available, that the spare cylinder is correctly stowed and is within the hydraulic test date. Note: EDBA, check station stock.		
55	**COMPLETE** the BA log book (enter pressure recorded at the cylinder contents check EV 26).		

Note: if there is a leak as a result of the 'breathe down' sequence above the wearer should repeat the 'B' test 'breathe down' sequence from EV 36 above, paying particular attention to correctly fitting the face mask onto the face and the adjustment of the head harness. The straps should not be over tightened.

Appendix 5 – BA set charging point and stowage defect codes

P, PL and FRU	Code
1 x charging point or stowage defect.	2
2 x charging points or stowage defects.	1(d) 24
3 x charging points or stowage defects. Note: if it is not possible to restore all units to operation this can be downgraded according to number of charging points available.	1(d) 4
4 x or more charging points or stowage defects. Note: if it is not possible to restore all units to operation, this can be downgraded according to number of charging points available.	1 (PL & P) 1(d) 4 (FRU)
Aerial appliances	
Any BA set charging point defect. Note: BA sets can be rotated with charged BA sets on pumping appliances.	2
Any BA set stowage defect.	1
AWD vehicle and fire boat	
Any BA set stowage defect	2
DIM vehicle 101	
Any BA set charging point or stowage defect .	1
DIM vehicles 003 & 009 (alternative maintenance arrangements)	
Any BA set charging point or stowage defect.	24hr response

Response Time	Defect Code
2 hour response – appliance OFF the run	1
4 hour response – appliance ON the run	1(d) 4
24 hour response – appliance ON the run	1(d) 24
5 day response – appliance ON the run	2

Document history

Assessments

An equality, sustainability or health, safety and welfare impact assessment and/or a risk assessment was last completed on:

EIA	16/10/19	SDIA	N/A	HSWIA	19/06/18	RA	03/02/20

Audit trail

Listed below is a brief audit trail, detailing amendments made to this policy/procedure.

Page/para nos.	Brief description of change	Date
Throughout	Policy rewritten as the old BA sets have been replaced by Dräger PSS 7000 sets. Please read through this policy to familiarise yourself with the content.	06/12/2010
Page 41-42	Introduction of annual test date on Bodyguard and insertion sections regarding the cylinder cover fitting and removal. Whole policy updated to reflect this.	24/12/2010
P28 para 15.22	Removal of details of BA Personal line testing, addition of referral to PN471.	07/01/2011
Throughout	"28 day test removal of Bodyguard key" added and "static leak test 8 second duration" and "Bodyguard timeout" updated.	14/01/2011
Throughout	Incorporation of PN 479 EDBA and telemetry. Removal of Don and start (now contained in PN 466 RPE – Operational Procedures).	31/05/2011
Appendix 8	Appendix added contains BA set and stowage fault codes.	12/09/2011
P34 para 15.26	Image 250375 replaced with image 400969. Reference to 250375 updated.	24/01/2013
P14 para 7.3	Insertion of information regarding 28 day face mask testing.	15/04/2013
Throughout	Road traffic accidents/RTAs updated to road traffic collisions/RTCs as requested by Andy Roe.	11/09/2013
Throughout	'A' and 'B' tests updated to reflect issue of BA cable cutter and pouch. 'A' test updated to reflect not checking hydraulic test date. References to not cleaning face mask visor removed following PEG replacement of all face mask visors with cleanable version.	18/11/2013
Page 26 Page 87	Paragraph 14.46 paragraph added to cylinder removal SDBA section. Appendix 9 added.	23/07/2014
Page 33 Page 91	Paragraph 15.20 paragraph added to cylinder removal EDBA section. Appendix 10 added.	04/08/2014
Page 59 Throughout	Appendix 2 removed and following appendices renumbered. Minor updates throughout. Reviewed as current.	28/10/2015

Page/para nos.	Brief description of change	Date
Page 55, para 22. Page 14 para 7.7 to 7.11 Throughout	Addition of RPE maintenance room information transferred from PN 466. Addition of face mask seal paragraph transferred from PN466. Addition of face mask seal care information. Removal of cylinder contents gauge information due to being withdrawn from service by PEG. A and B tests updated including aides memoire.	07/09/2017
Page 38, para 17.13 and 17.14	Information added about testing of BA sets and appliances becoming off the run.	29/09/2017
Page 52, para 19.90	Additional sentence added to paragraph.	13/12/2017
Page 52, para 19.90	Changes made to paragraph.	10/01/2018
Page 44, para 19 Throughout	Wearing Nitrile gloves for B test added. Style change and addition of version 7 A and B test. Wypall X80 clothes are no longer to be used for face mask cleaning following change in policy by PEG. Wipex/PAL wipes replaced by PALTECH wipes.	19/06/2018
Throughout Page 37, para 18.7 Page 46, para 20.20, 20.26 Appendix	Face mask donning and cleaning guidance updated. Images updated for new PPE and retractable personal line. Update to 28 day test, testing with personal issue face mask. Update to cylinder cleaning. 'A' and 'B' test aides memoire and BPA now updated and combined.	13/02/2020
Throughout	Additional use of Paltech wipe added to 'A' and 'B' test. Reference to PEG changed to Operations Support Group (OSG).	26/03/2020
Page 14, para 7.3	The words 'for BA but not OTR for mobilisation' deleted to bring this policy in line with PN232.	05/05/2020

Subject list

You can find this policy under the following subjects.

BA	BA entry control board
BA tallies	Breathing apparatus
Drager PSS7000	EDBA
Respirator	RPE
SDBA	Standard Tests

Freedom of Information Act exemptions

This policy/procedure has been securely marked due to:

Considered by: (responsible work team)	**FOIA exemption**	**Security marking classification**