Compressed Medical Gas Safety Standard Operating Procedure

Contents

1 Scope

1.1. South East Coast Ambulance (SECAmb) NHS Foundation Trust is committed to providing high quality patient care and the safe and secure management of medicines.

1.2. It is the responsibility of all SECAmb staff, subcontractors and community first responders (CFRs) to adhere to provisions in this SOP in order to ensure the safe use, handling, storage and cleaning of medical gas cylinders.

1.3. SECAmb, in its delivery of clinical care to patients, uses two medical gases; Oxygen and Entonox for therapeutic and pain relief purposes respectively. SECAmb also holds medical air for specialist units at 3 sites: Brighton, Chertsey and Ashford.

1.4. These medical gases are supplied as compressed gas in high pressure cylinders with valves to regulate the flow of gas to the patient.

1.5. As vessels containing pressurised gases with potentially hazardous properties, medical gas cylinders and/or equipment they are connected to present safety risks to staff, patients and others in the vicinity if they are mishandled, misused, faulty or defective including when certain conditions exist, the hazardous properties of the pressurised gas can give rise to adverse events.

1.6. Given the safety risks associated with use, handling, storage and cleaning of compressed medical gas cylinders, this SOP seeks to eliminate or minimise the chances of medical gas cylinders causing explosions, fires, cold burns or trauma amongst other possible adverse consequences associated with using or being in close proximity to them.

2 Procedure

2.1. Risk assessments and Reporting

2.1.1. The Trust shall carry out risk assessments on medical gas cylinders to make staff aware of the safety risks associated with using and handling them.

2.1.2. Staff involved in or who witness an adverse incident or hazard relating to the use or handling of medical gas cylinders should report the incident/hazard as per the Trust's Datix Incident Reporting process via a DIF1 form.

2.2. Storage

2.2.1. Line managers and staff shall ensure that compressed medical gas cylinders are stored and secured correctly in the appropriate designated stores, cabinets or holders.

2.2.2. Medical gas cylinders should be stored:

- Under cover, preferably in an area which is clean, dry and not subject to extremes hot or cold temperatures. The storage area should be well-ventilated; in the unlikely event of a leak, this will prevent the build-up of gases.
- In a secure area or cabinet that only allows authorised access to prevent damage or theft of the cylinders.
- Away from flammable substances, stocks of combustible material and/or any sources of heat or ignition. It is important that flammable substances are not stored or used in the immediate vicinity of the medical gas store.
- Restrained in suitable racking/brackets/shelves to prevent the cylinders from falling.
- In a manner which maintains segregation between full and empty cylinders as well as between different medical gases and cylinder sizes.

2.2.3. On vehicles, medical gas cylinders should be secured in their designated holding brackets and/or the appropriate response bags which should in turn be placed in their cupboards when not in use.

2.2.4. The medical gas cylinder store should:

- Be sited so that it is away from emergency exits.
- Have their location marked on the local site plan near the premises fire plan.
- Have good unobstructed access for safe cylinder handling and clear escape routes to be used in an emergency.
- Have a flat and level floor area.
- Clearly display compressed gas warning notices, e.g. prohibiting smoking and naked lights.

- Have a clearly defined area (or system) for cylinders that are faulty or rejected, to ensure that these cylinders cannot be used in error.

- Be free of accumulated waste (e.g. the plastic covering over the cylinder valve and handle).

- Maintain good segregation and separate storage of the different types of medical gases.
    - The Medical air and Oxygen should not be in the same location.
    - Any non-BOC cylinders for EPRR mass casualty vehicles (MCVs) should also be separated to reduce the risk of cylinder misselection.

- Be elevated from the ground to prevent rust or moisture buildup

2.2.5. Whilst in storage on a Trust deployed vehicle, the security of the medical gases is the responsibility of the crew on a Double Crewed Ambulance (DCA), or the individual on a single crewed vehicle.

2.2.6. Any vehicle carrying medical gases should be locked when not attended and cylinders should be kept out of plain sight.

2.2.7. Some of the Trust's DCAs are designed with the medical gas storage cupboard not activated through the central locking system and therefore should be locked manually at all times and only unlocked when the large cylinders are changed in a Make Ready type environment.

2.2.8. The types of medical gas cylinders currently held in the Trust vehicles are as follows;

- HX size Entonox cylinder (EX size Entonox is not carried).

- ED size or CD size oxygen cylinders depending on the size of the vehicle.

- EPRR hold mass casualty oxygen that is non-BOC and only available in the MCV.

- F size cylinder for medical air (for neonatal ambulance only).

2.2.9. At no time should a medical gas cylinder be left free standing, kept unsecured in a bag or outside of its holding bracket.

2.3. Manual Handling of Medical Gas Cylinders

2.3.1. When moving and handling medical gas cylinders, staff should conduct a dynamic risk assessment in order to maintain a safe system of work for the task and use correct PPE provided (e.g. footwear with toe protection), utilise moving aids like trolleys and asking for assistance when appropriate.

2.3.2. Medical gas cylinders should be handled with care, never knocked violently or allowed to fall over. Dropping cylinders can damage the regulator/valve and may cause injury.

2.3.3. Staff should never roll cylinders along the ground and should ensure that the cylinder is securely stowed when being moved.

2.4. Using Medical Gas

2.4.1. Staff should never use oils, grease, creams, or alcohol/oil-containing products on any part of medical gas equipment.

2.4.2. Before use of the medical gas,they should ensure that:

- Their hands are clean and dry.
- The correct gas to be used has been selected (read the label).
- The gas is within its shelf life.
- The cylinders should be used in rotation, first in first out.
- The equipment is within its service period.
- There is no damage to the cylinder, regulator/valve or any equipment to be used with the medical gas.

2.4.3. All equipment that is to be used with the medical gas cylinder must be clean and dry. If necessary, clean the connection with clean plain water. Do not use chemicals/solvents and use clean lint free cloths for cleaning and drying (see Appendix A).

2.4.4. If a **cylinder** is visibly contaminated, staff should isolate and clean the cylinder with clean warm water to remove any contaminants (e.g. blood, pus, faeces or other bodily fluids). When the cylinder is dry, staff should put the cylinder in a “contamination bag” (supplied by BOC Healthcare and found in each gas store/station), label the bag as contamiated and store it in a safe, designated place for collection by the medical gas supplier (see Appendix A and B).

2.4.5. If the **regulator/valve** on the cylinder is contaminated with blood/body fluids, put the cylinder in the “contamination bag”, label the bag/cylinder as contaminated and store the cylinder in a safe, designated place for collection and cleaning by the medical gas supplier (see Appendix A and B).

2.4.6. The Customer Service Centre should be contacted to advise that they have a contaminated cylinder for collection. As required, the customer can order “contaminated cylinder bags” free of charge from BOC Healthcare (see Appendix C).

2.4.7. When medical gas cylinders are in use, staff should ensure that they are:

- Only used for medicinal purposes.
- Turned off, when not in use, using only moderate force to close the valve.
- Handled with care and not knocked violently or at risk of falling.
- Firmly secured to a suitable cylinder support when in use.
- Not subjected to abnormally high or low temperatures.
- Never turned on quickly (via the cylinder regulator/valve). After use they are turned off (via the cylinder regulator/valve) using only moderate hand force.
- Always turned off (via the regulator/valve) and the system is depressurised before connecting a device to the pipeline/Schrader connection.
- Returned to the medical gas store when empty for return to medical gas suppliers.
- Only exchanged at a Trust approved gas store/supply station on a ‘like for like’ basis.

- Not accepting non-BOC medical gas cylinders for exchange or return.

- The vehicle/area is well ventilated.

2.5. When to remove cylinders from circulation

2.5.1. **When a cylinder reaches 25%,** then the cylinder needs to be removed from the ambulance/vehicle and placed in the 'Empty' section of the medical gas storage.

2.5.2. **Expired cylinders** should be removed from circulation and placed in in a clearly marked, empty section of the medical gas storage area separated from the full cylinders.

2.5.3. **Faulty or damaged cylinders** must be taken out of service and returned to the medical gas storage but segregated from the usual stock. A BOC cylinder complaint form must be completed and attached to the cylinder.

2.6. Additional considerations for Entonox

2.6.1. If Entonox cylinders are stored in an area where the temperature is under 10 degrees for 24 hours or more, then the bottle should be inverted before use.

2.6.2. If heavy patient use occurs with an Entonox cylinder, in a short period of time the vlave can freeze. There is a risk of the remaining cylinder contents discharging if the cylinder tubing is disconnected before the valce is allowed to thaw.

2.7. Additional considerations for all medical gases

2.7.1. Staff should report all untoward incidents involving medical gases equipment via a DIF1 (Datix) form. This should include any instances where non-BOC/non-SECAmb standard cylinders are found within Trust medical gas storage areas.

2.7.2. Ensure that you are aware of what is wrong with the cylinder and any specific consequential issues that may have occurred. It is important to understand if a patient has been affected by the complaint cylinder (see Appendix B).

2.7.3. Staff should not allow any modification or tampering with medical gas cylinders or associated equipment.

2.7.4. Staff should not use medical gas equipment that has been involved in fires nor attempt to repair or scrap any medical gas equipment.

2.7.5. All external users of SECAmb compressed medical gas stocks will receive appropriate training in the use of compressed medical gases.

2.7.6. The exchange of SECAmb compressed gas cylinders is on a one for one, full for empty, like for like basis and only with private ambulance providers (PAPs) and blue light responders working for SECAmb.

2.7.7. If a medical gas cylinder is misplaced or handed in without swapping like for like, then a DIF1 (Datix) form needs to be completed at the earliest conveniance.

2.7.8. Leaving medical gases with a patient is **not permitted**.

2.8. Abdactic compression

2.8.1. This describes the process of when pressurised gas, whilst passing through the regulator (depressurisation), may produce heat and combust causing ignition and effectively set the gas alight. This is very rare and extremely unlikely to happen.

2.8.2. If the flow selector is opened prior to opening the handwheel and abdactic compression occurs, this may increase the risk of combustion; this could result in fire traveling out of the cylinder into the oxygen tubing.

2.8.3. To minimise the risk of abdactic compression the process in **Appendix D** for the opening and closing of medical cylinders **MUST** be adhered to with immediate effect.

3 Definitions

3.1. Datix is the Trust's incident management system.

3.2. DIF1 is the report process used by Datix.

4 Responsibilities

4.1. The **Chief Executive Officer (CEO)** is accountable for Medicines use and governance in the Trust

4.2. The **Chief Medical Officer**through delegation by the CEO, has overall responsibility for medicines governance system design and overall assurance. The Chief Medical Officerhas responsibility for the implementation, review, and thus revision where required, of this procedure.

4.3. The **Chief Pharmacist** is the professional medicines governance lead for the Trust and is responsible for producing robust systems and processes which comply fully with legislation, national guidance, and regulatory requirements to ensure the safe and effective management and use of medicines throughout the Trust. The Chief Pharmacist supports the Chief Medical Officerand Executive Director of Operations providing pharmaceutical professional advice with regards to all medicines related policies, procedures and practices.

4.4. The **Executive Director of Operations**, through delegation by the CEO, has overall responsibility for the implementation, operation and local assurance of this policy. The Executive Director of Operations has overall responsibility for holding his/her staff to account for any deviations from this policy and is responsible for the operational compliance of this procedure.

4.5. The **Executive Director of Operations**, **Chief Medical Officer**and **Chief Pharmacist** are responsible for escalating unresolved concerns to the Medicines Governance Group (MGG).

4.6. The Executive Director of Operations delegates local responsibilities and accountability for this procedure to the **Associate Directors of Operations**, **Operational Unit Managers, Operational Managers, Specialist Managers** and where relevant the **Head of Fleet and Logistics.**

4.7. The **Associate Directors of Operations, Operational Units Managers**, **Operational Managers, Specialist Managers** and where relevant the **Head of Fleet and Logistics** delegate their local responsibility and accountability for this policy to their staff including the **Operational Team Leaders (OTLs), Logistics Manager**, and others.

4.8. The **Executive Director of Nursing and Quality** has responsibility for matters relating to regulatory compliance, risk management, health and safety relating to this procedure.

4.9. **Controlled Drug Accountable Officer** is responsible for the safe management and use of Controlled Drugs within the Trust along with co-operating and sharing information relating to concerns about the Trust's use and management under the Controlled Drug (Supervision of Management and Use) Regulations 2013. These responsibilities include keeping records of the investigation of concerns and acting where appropriate.

4.10. The **Medicines Safety Officer (MSO)** supports local medication error reporting and learning. The MSO acts as the main contact for NHS England and Medicines and Healthcare Products Regulatory Agency (MHRA).

4.11. The **Medicines Governance Group (MGG)** is responsible, for providing strategic direction for the implementation of medicines management and practice within the Trust The primary objective of MGG is to ensure appropriate clinical and cost effective use of medicines, promoting the highest standards of medicines management and safe practice throughout the Trust, by ensuring that senior managers are aware of issues relating to the use of medicines within the organisation as part of the overall clinical and corporate governance structure.

4.12. The **Medical Gas Subgroup** provides assurance to MGG that medical gases are effectively monitored and managed within the Trust.

4.13. The **Patient Group Direction (PGD) Approval and Working Group** provides assurance to MGG and ensures the development, review, updates and implementation of PGDs are in line with legislation and national good practice.

4.14. The **Medicines Governance Team (MGT)** are responsible for ensuring the safe and efficient procurement of medicines, including controlled drugs to ensure the quality of the product, safe dispensing/packing into medicines pouches through to safe disposal of pharmaceutical waste. The MGT will support the Chief Pharmacists with drug shortages, drug alerts and relevant information relating to medicines is communicated in a timely manner.

4.15. **All staff** are responsible for their own professional practice. All staff involved in the prescribing, supply, dispensing, handling, storage, administration and disposal of medicines, including controlled drugs, must receive appropriate training and assessment of competence before commencing their roles. All staff who handle medicines are personally accountable for complying with this policy and relevant standard operation procedures, for reporting any concerns and for the safe handling of all medicines.

5 Education and Training

5.1. Only staff who are trained in the appropriate handling and use of medical gas cylinders should handle and/or use the cylinders within the scope of their job role requirements and level of training.

5.2. The Trust via its Training Centres and Head of Community Engagement (voluntary services) will provide training, instructions and information to staff and Community First Responders in the safe use and handling of medical gases and associated equipment.

5.3. A central database of all the cylinders held outside of the ambulance stations should be held by the Medical Gas Subgroup leads.

6 Audit and Review

6.1. Operational Team Leaders (or other registered clinicians delegated by local managers) must complete Weekly and Monthly Medicines Security and Storage Audits on the central database to ensure compliance with this SOP.

6.2. Deviations from this SOP must be investigated within 24 hours and corrective action taken to obtain full compliance by the next audit.

6.3. Concerns arising from any audit that cannot be locally resolved and full compliance assured by next audit, must be escalated to the Executive Director of Operations, Chief Medical Officerand Chief Pharmacist via a DIF1 (Datix) report.

6.4. Any unexplained loss of medical gases or repeated deviation from this SOP must be reported via an DIF1 (Datix) report.

6.5. The Medicines Governance Team will routinely review the Weekly and Monthly Medicines Security and Storage Audits to ensure compliance with this SOP.

6.6. The Medicines Governance Team will complete bi-annual Medicines Security and Storage Audit and report any repeated deviations or other concerns to the Medicines Governance Group.

6.7. Adhoc inspection of medicines security and storage will also take place as part of the Crime Reduction Surveys and Quality Assurance Visits.

6.8. Deviations arising from these inspections must be escalated to the Executive Director of Operations, Chief Medical Officer and Chief Pharmacist via a DIF1 (Datix) report.

6.9. All procedures have their effectiveness audited by the responsible Management Group at regular intervals, and initially six months after a new policy is approved and disseminated.

6.10. Effectiveness will be reviewed using the tools set out in the Trust's Policy and Procedure for the Development and Management of Trust Policies and Procedures (also known as the Policy on Policies).

6.11. This document will be reviewed in its entirety every three years or sooner if new legislation, codes of practice or national standards are introduced, or if feedback from employees indicates that the policy is not working effectively.

6.12. All changes made to this procedure will go through the governance route for development and approval as set out in the Policy on Policies.

7 References

7.1. British Compressed Gases Association (BCGA): Code of Practice 44 (2022)

7.2. Specialist Pharmacy Service (SPS): Guidance on Security and Storage of Medical Gas Cylinders (March 2023)

7.3. Specialist Pharmacy Service (SPS): Medical Gases: Health Technical Memorandum 02-01(March 2016).

8 Financial Checkpoint

This document has been confirmed by Finance to have no unbudgeted financial implications.

9 Equality Analysis

9.1. The Trust believes in fairness and equality, and values diversity in its role as both a provider of services and as an employer. The Trust aims to provide accessible services that respect the needs of each individual and exclude no-one. It is committed to comply with the Human Rights Act and to meeting the Equality Act 2010, which identifies the following nine protected characteristics: Age, Disability, Race, Religion and Belief, Gender Reassignment, Sexual Orientation, Sex, Marriage and Civil Partnership and Pregnancy and Maternity.

9.2. Compliance with the Public Sector Equality Duty: If a contractor carries out functions of a public nature then for the duration of the contract, the contractor or supplier would itself be considered a public authority and have the duty to comply with the equalities duties when carrying out those functions.

Appendix A: Cleaning Precautions and Considerations

1. When the vehicles are returned to base, the technical staff clean the medical devices following the Trust IPC guidelines with the Trust supplied Clinell wipes.

2. If the cylinder has blood/body fluids on the outer covering, the crew should perform an initial clean at the scene following the Trust IPC guidelines with the Trust supplied Clinell wipes.

3. Should the internals of the valve be contaminated, then they should follow the BOC faulty cylinder guidelines and report it as contaminated to BOC.

4. The medical gas equipment, the pipelines and associated equipment are serviced annually by a contractor. The Make Ready contractors clean the vehicle and associated devices daily and in-depth at specified intervals.

Appendix B: BOC Customer Complaint Cylinder Handling Procedure

When a 'complaint cylinder' has been identified, it is important that the cylinder is immediately withdrawn from service, returned to the medical gas cylinder store and labelled appropriately so that it does not get mislaid when returned to BOC.

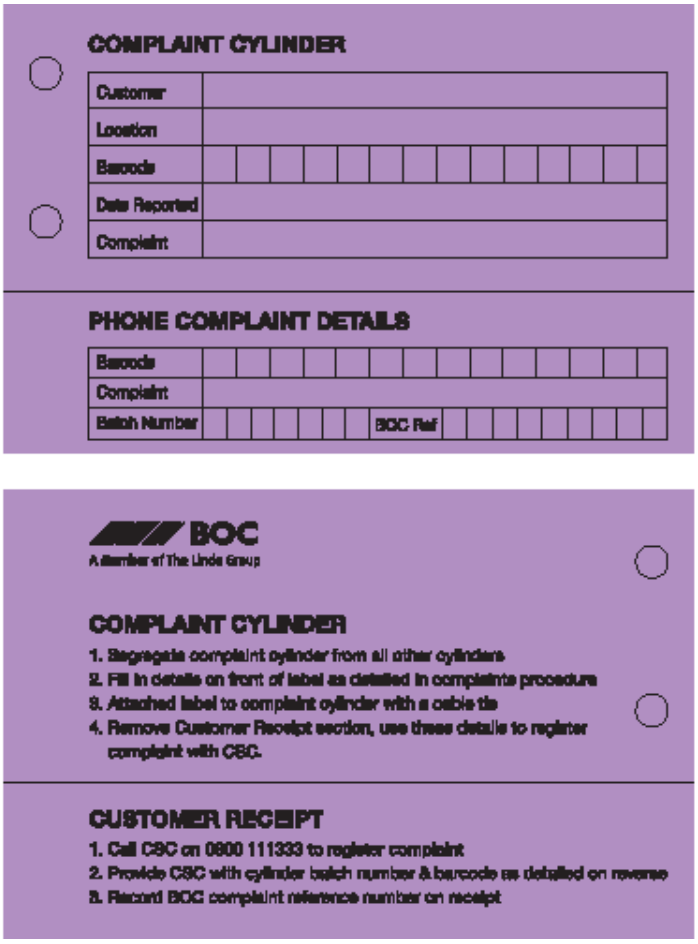
Once returned to the cylinder store:

1. Segregate the complaint cylinder from all other cylinders in the medical gas store (preferably in an area where quarantined cylinders can be securely stored) to ensure that no one is able to mix the complaint cylinder with either full or empty cylinders.

2. Ensure that you are aware of what is wrong with the cylinder and any specific consequential issues that may have occurred. It is important to understand if a patient has been affected by the complaint cylinder.

3. Take a BOC Customer Complaint Label (Figure 1)

Figure 1: Shows the front and back of the customer complaint label



4. In the top half of the label, complete the following fields:

- **Customer**: Hospital / Ambulance Service Name
- **Location**: Location of Hospital / Ambulance Service cylinder store
- **Barcode:** Found on the cylinder collar highlighted by a red box, see Figure 2
- **Date reported:** Date the complaint to be reported to BOC
- **Complaint:** Details of the complaint – including as much detail as possible.

5. In the bottom half complete the following fields:

- **Barcode:** Found on the cylinder collar highlighted by a red box, see Figure 2
- **Batch number:** Found on the cylinder collar. See Figure 2
- **Complaint:** Details of the complaint.

Figure 2: Indicates the batch number and barcode on cylinder collar

6. **The barcode and batch number are important for the traceability of the cylinder. They ensure the cylinder cannot be refilled before being investigated and any faults rectified. These numbers will be requested by the BOC when you inform them about the faulty cylinder.**

7. **Note**: If there is more than one faulty cylinder identified, make sure that a separate label is completed for each cylinder.

8. Detach and retain the bottom section of the BOC Customer Complaint Label for use when notifying BOC of the complaint cylinder.

9. Attach the top section of the BOC Customer Complaint Label to the complaint cylinder, using the tie supplied with the label.

10. Phone the BOC Freephone number (0800 111 333) during office hours to notify the Customer Service Centre (CSC) about the complaint cylinder to allow the cylinder to be recorded in the complaint system and arrangements to be made for its collection and replacement.

11. The CSC will ask for the batch number and barcode for each cylinder being reported to enable the cylinder to be identified. Use the bottom section

(Customer Receipt) of the BOC Customer Complaint Label to provide the correct information to the CSC.

12. The CSC will also ask for specific details about the complaint cylinder, including how the fault was identified, whether a patient had been affected and, where relevant, details of the person to contact if additional information is needed to help identify the nature of the complaint. Please answer the questions as fully as possible.

13. When the complaint has been raised the CSC will provide you with a unique BOC reference number. Record the reference number on the customer receipt section of the BOC Customer Complaint Label. Retain for your records.

14. The CSC will advise you when the faulty cylinder(s) will be collected. Please ensure the cylinder(s) is/are available for collection and clearly visible for driver when he arrives (especially where you have unassisted deliveries).

15. The faulty cylinder(s) will be collected and returned to the filling branch for a thorough investigation. Any faults found will be rectified before the cylinder is returned to service.

16. When the investigation is complete you will be notified of the outcome by either letter or e-mail.

BOC
A Member of The Linde Group

Segregate the Complaint Cylinder

Ensure that the complaint cylinder cannot be mixed up with either full or empty cylinders.

Customer Complaint Cylinder Label

Complete all required fields on the Customer Complaint Cylinder Label and attach to the complaint cylinder.
Detach the bottom section of the label. (This is your receipt)

Phone BOC on 0800 111 333

BOC will ask for the batch number and barcode, refer to your Customer Reciept. Details of the complaint will also be requested.

Important

A separate complaint must be raised for each cylinder

BOC Reference Number

BOC will give you a unique reference number. Record this number on the Customer Receipt and retain for your records.

Cylinder Collection

BOC will advise you when the complaint cylinder will be collected. Ensure the cylinder is available for collection, labelled and clearly visible especially for unassisted deliveries.

BOC Healthcare customer Service Centre, Priestly Road, Worsley, Manchester M28 2UT
Tel: 0800 111 333, Fax: 0800 111 555, Email: bochealthcare-uk@boc.com, www.bochealthcare.co.uk

Appendix C: Safe collection of contaminated medical gas cylinders from BOC

Safe collection of contaminated medical gas cylinders from BOC:

It is inevitable that at some time a medical gas cylinder may become "contaminated" to the extent that any person required to handle them may be exposed to possible risk. This normally involves medical gas cylinders being contaminated with bodily products from patients.

It is the responsibility of the Health Service to return all medical gas cylinders to the supplier in a safe condition.

However, as medical gas cylinders need to be handled by BOC personnel, BOC Healthcare has reviewed its procedures for collection of contaminated medical gas cylinders and is introducing a cylinder bagging process to protect personnel involved in handling such cylinders.

This protocol has been developed to ensure that cylinders are dealt with safely in order to minimise risk for everyone concerned.

The procedure for the collection of potentially contaminated cylinders is specified below and should be followed in all cases. On identification of a contaminated cylinder, the Healthcare facility should:

Isolate:

Where a medical gas cylinder is suspected of, or is visibly contaminated by blood, faeces, pus or otherbodily products from patients, **isolate** the cylinder in a suitable storage area on your site.

Clean the cylinder as described in the accompanying **"Decontamination of Medical Cylinders"** document with warm water to remove any solids and as much fluid contaminants as possible and leave it to dry.

Do not use any proprietary cleaning agents as these may damage the valve or cylinder.

Bag:

Once dry, place each medical gas cylinder in the special **"Contaminated Bag"** supplied by BOC Healthcare and secure with a cable tie.

A small supply of "Contaminated Cylinder Bags", for use when returning contaminated BOC medical gas cylinders can be requested by contacting medical.salessupport@boc.com

Notify:

As part of the Complaint Cylinder Process, **notify** BOC Healthcare on 0800-111333 that you have a contaminated cylinder for collection and we will make suitable arrangements for collection.

The purple complaint cylinder label should be attached to the bagged cylinder.

(Customer Procedure Rev 3 Oct 2019).

BOC Healthcare will collect all contaminated cylinders which you have cleaned and bagged for safetransportation. We will then be able to maintain the isolation of these cylinders until they can beappropriately cleaned and quality checked, ready to be safely put back into circulation for thetreatment of patients.

If you have any questions or issues relating to this process to deal with contaminated medical gas cylinders, please call our customer service team on 0800 111333 and we will make every effort to helpresolve your concerns.

South East Coast Ambulance Service NHS

NHS Foundation Trust

Instructions for use.

1. Initial safety checks

Before handling cylinders ensure your hands are clean. If you have been using alcohol based gel or liquids to decontaminate your hands make sure the alcohol has totally evaporated.

When selecting the cylinder for use, check that the cylinder is clean and free from any damage. Ensure the cylinder , particularly the Schrader and firtree outlets, are not contaminated with oil or grease.

2. Preparing a new cylinder for use

2.1 Check the cylinder label to ensure you have the correct medical gas.

2.2 Check the expiry date on the batch label.
The gas should not be used after this date and the cylinder returned to BOC.

2.3 Check the gauge to confirm the cylinder contents.
For new cylinders the needle should be in the green zone.

2.4 To determine there is enough gas in the cylinder check the duration chart for the required flow.
If the needle is in the red zone consider selecting a new cylinder.

2.5 Pull the tear ring to remove the tamper evident handwheel cover.
Discard the cover.
Note: If it is not fitted, it means the cylinder has been used before.

2.6 The cylinder should be set up away from the patient, with the outlets facing away from yourself and the patient.
Never place the cylinder near the patient until it has been set up.

2.7 Ensure the flow selector on top of the cylinder is set to zero and the cylinder valve hand wheel is turned off before connecting any equipment.

2.8 Lower the hinged grey outlet cover to enable equipment connection.
Ensure you do not remove the cover as it must be refitted after use to keep the outlets clean.

3. Setting up the cylinder using the firtree

3.1 Attach the tubing from mask or nasal cannula to the 6mm firtree outlet.
Ensure the tubing is pushed on securely.

3.2 To turn on the cylinder slowly rotate the cylinder valve hand wheel anticlockwise at least one complete turn.
Do not use excessive force. You may hear a click when opening the valve.

3.3 Once the cylinder valve hand wheel is open, rotate the flow selector clockwise to the prescribed flow.
Ensure that the correct flow rate number is clearly visible in the flow selector window.

3.4 Check the cylinder for leaks[c] before placing near the patient.
Leaks may be indicated by a hissing sound.

4. Setting up the cylinder using the Schrader outlet

4.1 To turn on the cylinder, slowly rotate the cylinder valve hand wheel anticlockwise at least one complete turn.
Do not use excessive force. You may hear a click when opening the valve.

4.2 Ensure the probe is clean before use.
Insert the oxygen probe into the BS 5682 Schrader outlet applying moderate force until it clicks securely into position.

4.3 Check the cylinder for leaks[c] before placing near the patient.
Leaks may be indicated by a hissing sound.

Note:

[c] If you suspect that you have a leak, turn off the cylinder and reconnect the equipment to ensure it is properly connected. Turn on the cylinder and re-check for leaks. If the leak continues, turn off and quarantine the cylinder and contact BOC Healthcare.
Where the cylinder is being used to supply gas to a medical device, ensure you follow the device manufacturers instructions for use.

5. Monitoring during use

5.1 Keep the cylinder upright and facing away from the patient by using a suitable cylinder holder.
Avoid placing the cylinder on the patient's bed. If there is no alternative, ensure the cylinder is turned on and leak checked before placing on the bed.

5.2 Fit the oxygen delivery device to patient. Regularly check the patients clinical condition during therapy to ensure it remains satisfactory.
If using a mask ensure it is a good fit.

5.3 Use pulse oximetry where appropriate.

5.4 Check the contents gauge at regular intervals, to ensure there is sufficient gas.
To determine there is enough gas in the cylinder check the duration chart for the required flow.

6. After use

6.1 When administration is complete, remove the mask or nasal cannula from the patient.

6.2 Turn off the cylinder by rotating the cylinder valve hand wheel clockwise until it comes to a stop.
Do not use excessive force.

6.3 Disconnect equipment from the firtree.
Remove the tubing by firmly pulling the tube whilst holding the cylinder handle.

6.4 Disconnect equipment from the Schrader.
If the Schrader is fitted with a ring, push the outer ring to release the probe.

6.5 Disconnect equipment from the Schrader.
If the Schrader is fitted with a capstan, release the probe by twisting the capstan clockwise.

6.6 Select a flow to ensure gas within the regulator is vented and then turn the flow selector to zero.

6.7 Protect the outlets by replacing the grey hinged outlet cover.

6.8 Check the remaining cylinder contents using the gauge. If there is sufficient gas for further treatment, return cylinder to designated in use store. If the needle is in the red section return to the empty storage area.