Salisbury NHS
NHS Foundation Trust

STANDARD HANDLING AND OPERATING PROCEDURES

I.1 PROCEDURE FOR CHANGING BACTERIA FILTERS ON MEDICAL VACUUM SYSTEMS

A procedure for vacuum filter changes is provided by the Approved Competent Person (MGPS) and is posted near the vacuum plant.

Protective clothing must be provided, and worn by the Approved Competent Person (MGPS) viz.;

- disposable mask with filter
- disposable overalls
- disposable strong latex (or other non-allergenic waterproof material) gloves
- disposable overshoes
- Safety goggles.

If not removed by the Approved Competent Person (MGPS), is the responsibility of the Authorised Person (MGPS) to ensure that the clinical waste bag is disposed of in accordance with standard Hospital procedures.

I.2 CYLINDER STORAGE - GENERAL INFORMATION AND SAFETY INSTRUCTIONS

The Cylinder Stores must **NOT** be used for storage of anything other than medical gas cylinders and cylinder trolleys.

The Stores must be kept locked when not in use. Portering will control the combination lock.

Receipt, monitoring of stock levels, handling and storing of cylinders is only carried out by suitably trained personnel, defined as **DESIGNATED PERSONS**.

Access to the stores is restricted to persons directly involved in the handling and transporting of medical gas cylinders and essential maintenance personnel.

Suitable protective gloves and safety footwear are available and must be worn when moving cylinders.

Fire fighting equipment, as specified by the Fire Safety Officer, are available inside the stores.

All cylinders must be moved only on trolleys designed to BS 2718.

Responsibility for the provision and serviceable condition of these trolleys rests with Estates Technical Services.

Any loss or damage to this equipment must be reported **IMMEDIATELY** to Estates Technical Services (See Appendix A).

The Authorised Person (MGPS) also holds keys to the Stores.

The names and telephone numbers of all Key holders and Authorised Persons (MGPS) are posted on the doors of the Stores. This will be updated whenever any changes are made.

Up-to-date medical gas cylinder identification charts are displayed in the Stores.

Emergency instructions, including fire safety, no smoking/naked lights and compressed gas warning notices are displayed within the store and in prominent positions adjacent to the Stores.

It is the responsibility of Portering to ensure that the following storage conditions are met:

- Separate bays, clearly labelled, for full and empty cylinders and for different gases;
- Separate areas for the storage of non-medical gas cylinders;
- F, G and J-size cylinders, full or empty, restrained in an upright manner by safety chains;
- Smaller cylinders stored horizontally on racks, suitably protected to prevent damage to cylinder paintwork;
- Protective clothing and cylinder trolleys used when moving cylinders;
- The Stores kept clean, dry and free from flammable materials and other rubbish;
- The areas around the Store kept free of combustible material, including dried vegetation;
- Combustible weed-killers (e.g. sodium chlorate) are not used;
- Cylinder trolley and vehicle delivery access kept clear at all times;
- Unsecured cylinders must be reported immediately to the Head Porter by the Portering staff.

NB Entonox storage

If cylinders of Entonox are subject to temperatures **below minus 6 degrees Celsius**, Entonox can separate into its constituent components i.e. nitrous oxide (which liquefies in the cylinder) and oxygen (which remains as a gas).

Care should be taken to ensure that manifold rooms remain above 10 degrees Celsius in order to prevent this effect and that at least one bank of cylinders is kept inside the manifold room as "spares" ready for the next cylinder change.

Small cylinders of Entonox for use on individual demand regulators (e.g. for Ambulance, Maternity use) and that have been subjected to low temperatures, must be allowed to reach room temperature either:

- by leaving stored horizontally between 10 and 38 degrees Celsius for 24 hours, or
- by storing horizontally at within this range for 3 hours and then inverting 3 to 4 times to ensure that any remaining liquid has vaporised.

Cold cylinders must **NOT** be used for patient treatment.

Cylinder stock control and rotation

Care should be taken to ensure that excessive stocks of cylinders are not kept in the store as this will lead to instances where refill dates are exceeded.

Attempts should be made to store cylinders so that they are accessible, so that the most recently acquired cylinders will be used last and vice versa.

Portering and Pharmacy will liaise on appropriate cylinder stock levels, which will take into account normal daily usage and any contingency plans of the Authorised Person (MGPS) and other hospital specialities.

See also stock rotation policy for Emergency Supply Manifolds (Section **I.3** below).

I.3 MANIFOLD CYLINDER-CHANGING PROCEDURE (TO BE DISPLAYED IN ALL MANIFOLD ROOMS)

Note: Only **Designated Persons** will be allowed to change cylinders on SFT manifolds.

Other staff must not touch these manifolds without specialist training.

It is the responsibility of the Head Porter to ensure that all the Portering staff who carry out these duties are suitably trained and comply with the manifold cylinder changing procedure as below:

Ensure that hands are clean and grease-free before handling any medical gas cylinders or equipment and, where cylinders are handled on a regular basis, that safety footwear is being worn.

Use heavy protective gloves (preferably textile or leather) and eye/face protection.

IMPORTANT – when a bank of cylinders requires changing, **all cylinders in that bank** must be changed.

Remove empty cylinders from the medical gas manifold one at a time and replace each empty cylinder with a full cylinder immediately.

Check the name of the gas on the collar of the cylinder, the expiry date and the cylinder colour code. If in doubt, refer to the cylinder data sheet displayed in the manifold room.

Remove the plastic seal but always retain the valve cover caps fitted to bull-nose cylinder valves, for re-fitting after use.

Inspect the *Bodok seal* in the cylinder yoke for wear or damage. Change if necessary, taking care not to expose the surfaces to grease or oil; use only **one** *Bodok seal* on each cylinder yoke.

Connect the cylinder to the manifold and tighten firmly by hand, or with an appropriate spanner. **DO NOT** put undue strain on the manifold tail pipe and use no lubricant or sealing compounds.

Using the correct cylinder key (or hand-wheel/knurled knob where fitted), open the cylinder valve anticlockwise **SLOWLY** to its fullest extent and then turn it back by a **quarter turn**.
Check there are no leaks between the cylinder valve and the manifold. This can usually be determined by listening. If in doubt, leak-detection fluid can be used but always wipe off excess fluid with a clean damp cloth.
Note: Only leak detection fluid suitable for use with all types of medical gas should be used.

Once the bank has been fully changed, check that the contents gauge is reading 137 bar (137 kPa x 100) or FULL.

Complete the **Cylinder Change Register** held in the manifold room stating date, time and number of cylinders changed and readings on line pressure and contents gauges and sign the register.

If a problem or fault is detected or suspected, inform Estates immediately.

Ensure that any faulty cylinders e.g. leaking or damaged are **NOT** left in the manifold room. They must be labelled "FAULTY" and kept separate from all other cylinders. Pharmacy **must** be notified.

Outside normal working hours it is the responsibility of the Head Porter to ensure that all appropriate Portering staff comply with the above manifold cylinder changing procedure.

The pressure of cylinders connected to Emergency Standby Manifolds must be recorded in the Cylinder Change Register at each cylinder change. If this pressure has fallen to 100 bar (30 bar for nitrous oxide), Estates should be notified of a possible leak. Obvious leakage of gas (e.g. a hissing sound) from Emergency Standby Manifolds should be notified to the Estates Technical Services **immediately** for further action.

Ensuring Emergency Standby Manifolds cylinders are not used beyond refill date

Every 10 manifold cylinder changes, remove the Emergency Standby Manifolds cylinders and connect them to the main manifold as part of the cylinder change routine. Fit the Emergency Standby Manifolds with fresh cylinders. This will prevent cylinders being left on the Emergency Standby Manifolds for longer than about 3 months.

J size cylinders on the medical compressed air plant Emergency Standby Manifolds may only be used infrequently e.g. when the plant is shut down for maintenance, or for test purposes. Particular attention should be paid to ensure that these cylinders do not exceed their expiry dates.

I.4 PROCEDURE FOR CHANGING CYLINDERS ON MEDICAL EQUIPMENT

In this operation the equipment is connected to the cylinder via a pressure regulator, high pressure flexible hose and cylinder yoke or, in the case of star valves (or other integral flow-controller type), a flexible low-pressure tube.

To ensure patient and staff safety it is essential that;

a) Porters and users ensure a high standard of cleanliness when storing, transporting or connecting medical gas cylinders to regulators or other medical devices, particularly with respect to the presence of oil and/or grease (hands should be washed to ensure no residue of petroleum-based hand cream);

b) Users open medical gas cylinders slowly;

c) If resistance to opening of the cylinder is excessive, the cylinder should not be used and should be returned to the manufacturer/supplier with a label to indicate the problem (Pharmacy must be informed);

d) Users read, understand and follow all instructions and labelling provided by the manufacturer/supplier.

NB Always make sure that you are connecting equipment designed for the gas.

Oxygen and medical air flow meters read differently if interchanged. The threads connecting different gas flow meters to a regulator may be the same. Equanox/Entonox (N_2O/O_2 mix, 50%/50%) flow meters have a different thread from others.
Do not use a normal ward floweret when a paediatric type should be used.

<u>Connection procedure</u>

- Prepare the cylinder for use as above.
- Check the sealing washer at the valve/connector interface.
- Connect the cylinder to the equipment and tighten firmly with the correct spanner or by hand as appropriate. Do not use excessive force.
- Before opening the cylinder, check the equipment and other flow control valves are turned off.
- For two-stage regulators, turn the outlet pressure control to "OFF", usually fully ANTI-CLOCKWISE.
- Using the correct key (or knurled valve knob), open the cylinder valve **slowly**, fully anti-clockwise and then **back a quarter turn**.
- Check for leaks, either by using leak detection fluid, or by closing the cylinder valve and observing to see if the high pressure gauge on the regulator starts to fall. Correct if possible, replacing a faulty cylinder where necessary.
- **Slowly** adjust the pressure regulator/flow controller to the correct setting.
- Open equipment flow control valve(s) slowly, checking for correct equipment operation.

I.5 TAKING A CYLINDER OUT OF USE (from equipment or manifold)

- Turn off the valve and vent excess gas from the equipment regulator and connecting hoses by opening the equipment flow control valves for a few

seconds. On a manifold, gas from the tailpipe will vent as the cylinder connection is loosened.

- Shut off any equipment control valves.
- Using the correct spanner or manually, disconnect the cylinder from the equipment or tailpipe.
- Do not vent the cylinder or leave the cylinder valve open.
- Replace plastic valve covers on F and G size cylinders.
- The cylinder should be returned to the EMPTY rack in the Cylinder Store as soon as possible, checking that any contents status label has been amended as appropriate.

I.6 ORDERING, AND DELIVERY OF LIQUID OXYGEN.

See Pharmaceutical Services Medical Gases Policy (Appendix D)

I.7 ORDERING AND DELIVERY OF CYLINDERS

See Pharmaceutical Services Medical Gases Policy (Appendix D)

I.8 DELIVERY OF GAS CYLINDERS TO WARDS, DEPARTMENTS AND MANIFOLDS

NB. Porters are allocated to particular wards/areas.

- Portering will provide Bleep/telephone numbers.
- Duty Nurse telephones requests for cylinders on wards to Portering. Details of cylinder size, gas and number of cylinders must be given. If replacement or extra regulators are required, details should also be given, as these will have to be obtained from the Medical Engineering Department.
- (Theatre) Technicians telephone requests to Portering for cylinders for Theatre/Medical Engineering use.
- Manifold Room stock replacements to be made by Portering when changing cylinders following a "Change cylinders" alarm.
- Portering staff deliver cylinders to the wards/departments in accordance with the gas delivery job list.
- Nursing staff/Porters/Technicians change regulators
- Portering staff return empty cylinders to store
- Porters return any faulty regulators to the Medical Device Management Centre.