Holy Cross Hospital

Operational Policy for Medical Gas Pipeline systems

Target Group: Clinical Staff, Maintenance staff, Authorising Engineer (MGPS) Leadership Team, Training and Development Staff.	**Version: 5**	**Issue Date:** 12 February 2025
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Printed copies are for reference only.

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1. Introduction

At Holy Cross Hospital, we are committed to ensuring a safe and secure environment for our patients, staff, and visitors while upholding the highest standards of clinical care. The Medical Gas Operational Policy is designed to guarantee the safe, efficient, and sustainable delivery of oxygen and medical suction to patients. This policy outlines the necessary arrangements and procedures to maintain a reliable medical gas supply, addressing potential hazards and ensuring compliance with relevant regulatory standards.

The Medical Gas Pipeline System (MGPS) offers a safe and convenient method for delivering essential medical gases directly to the point of use, mitigating issues associated with gas cylinders such as safety risks, handling difficulties, storage concerns, and noise. The effective operation of the MGPS relies on skilled staff who understand the system and can collaborate with clinical users to ensure ongoing patient safety.

Regular inspection and maintenance of the MGPS, supported by comprehensive installation drawings and maintenance manuals, are crucial for safe operational management. This policy aligns with the guidance provided in Health Technical Memorandum 02-01 (HTM 02-01), which covers the design, installation, validation, verification, and operational management of medical gas systems.

By adhering to this policy, Holy Cross Hospital aims to foster a culture of safety and continuous improvement in the handling and use of medical gases, ensuring that all staff involved are adequately trained and competent.

2. Purpose of Policy

Holy Cross Hospital takes responsibility for providing a safe environment for all patients, staff, and visitors while maintaining high standards of clinical care. This policy outlines the arrangements to ensure that the delivery of oxygen and medical suction to patients is always safe, secure, sustainable, and efficient.

3. Objective

The objective of this Medical Gas Operational Policy is to ensure the safe, efficient, and compliant management of medical gas pipeline systems within Holy Cross Hospital. This policy aims to align with the standards and guidelines in Health Technical Memorandum 02-01 (HTM 02-01), covering the design, installation, validation, verification, and operational management of medical gas systems. By adhering to these standards, we aim to:

- Ensure the safety and well-being of patients, staff, and visitors by maintaining a reliable and effective medical gas supply.
- Comply with all relevant regulatory requirements and best practices as outlined in HTM 02-01.
- Provide clear guidelines and procedures for the management, maintenance, and monitoring of medical gas systems.
- Foster a culture of safety and continuous improvement in the handling and use of medical gases.

- Ensure that all staff involved in the management and use of medical gases are adequately trained and competent.

4. Policy Statement

The Medical Gas Pipeline System (MGPS) provides a safe and convenient method for delivering oxygen and medical vacuum to nursing staff at the point of use. It addresses issues associated with gas cylinders, such as safety, moving and handling, storage, and noise.
Skilled staff who understand the system and can liaise with clinical users are essential for the safe operation of the MGPS, ensuring ongoing patient safety. The pipeline system contains gas under pressure, which can pose a hazard to staff. Regular inspection and maintenance, along with the availability of comprehensive installation drawings and maintenance manuals, are key to safe operational management.

Engineering Health Technical Memorandums (HTMs) offer comprehensive advice and guidance on the design, installation, and operation of specialist engineering technology used in healthcare delivery. For MGPS, this guidance is found in Health Technical Memorandum 02-01 Medical Gas Pipeline Systems (Part A: Design, Installation, Validation, and Verification, and Part B: Operational Management).

5. Scope

All staff involved with the Medical Gas Pipeline Systems (MGPS) in the hospital must use this policy. It applies to all fixed gas pipeline systems, associated plant, portable cylinders, and suction equipment throughout the premises.

It is the Hospital's policy that, before work on the MGPS can commence, a permit to work form arranged by an Authorised Person (MGPS) must be completed. The Authorised Person (MGPS) must have specific knowledge of the MGPS on which they take responsibility and liaise with other permit signatories of competent person Designated Nursing officer (DNO)

6. Responsibilities

The following are key personnel who have specific responsibilities within the operational policy:

- Chief Executive
- Designated Nursing Officer (DNO) – List of all DNOs is found in Appendix 2
- Designated porter
- Director of Operations
- Authorising engineer (Stephen Goddard MGPS Ltd)
- Authorised persons
- Competent person
- Quality controller

Due to the specialist requirements associated with the Medical Gas Pipeline System (MGPS), contractors who are trained and licensed as Competent Persons (MGPS) carry out the actual work on the systems. Identified Authorised Persons (MGPS) manage the day-to-day operations of the MGPS.

Only the Authorised Person (MGPS) can decide whether to take the MGPS into or out of use, and this decision requires written permission (permit to work) from the Designated Medical/Nursing Officer if the action directly affects the patient.

The Authorised Persons (MGPS) will hold and maintain the Medical Gas Permit to Work books, which are kept in the Support Services office.

Description of individual responsibilities:

Chief Executive
The Chief Executive holds ultimate management responsibility, including allocating resources and appointing personnel for the organisation where the MGPS are installed. Although the Chief Executive formally holds responsibility for the MGPS, the Authorised Person manages the MGPS daily.

Authorising Engineer (Engaged under contract to MGPS Services)
The Hospital appoints an Authorising Engineer (MGPS Services). The Authorising Engineer:

- Recommends to the Chief Executive those suitable to be Authorised Persons (MGPS) through individual assessment.
- Ensures all Authorised Persons (MGPS) complete an appropriate training course and documents all training.
- Re-assesses all Authorised Persons (MGPS) every three years and ensures they attend a refresher or other training course before re-assessment.
- Conducts an annual audit and review of the MGPS management systems, including the Permit to Work.
- Assists the Authorised Person (MGPS) with monitoring the implementation of the MGPS Operational Policy and Procedures when required.

Authorised Persons (MGPS)
The Chief Executive designates the Authorised Person to manage the MGPS daily at the hospital. This includes issuing permits, operating the Permit to Work procedure, managing system documentation and security, and maintaining and operating the MGPS safely and effectively according to statutory requirements and other guidelines. The Chief Executive appoints the Authorised Person in writing.

An individual assessment ensures the Authorised Persons (MGPS) are suitably qualified and experienced. Re-assessment occurs every three years to ensure the continuation of the appointment.

The Authorised Persons (MGPS):

- Lead in coordinating the work, explaining the extent and duration of any service disruption.
- Ensure all contractors' "Competent Persons (MGPS)" follow the Permit procedures and work according to hospital policies. This involves providing and updating 'As-fitted' drawings, assessing risks, preparing and assessing method statements, and checking compliance with Contractors' Health and Safety policies, training records, test equipment, etc.

The Authorised Person (MGPS) ensures:

- All Designated Nursing Officers involved are advised of the estimated duration of the work and the interruption to the MGPS.
- All terminal units affected (out of service) are identified on the permit to work, and the relevant staff are informed.

Authorised Persons (MGPS) liaise closely with other professionals in various disciplines. The appointment is made known in writing to all interested parties. The Authorised Person (MGPS) has direct contact with the Quality Controller (QC (MGPS)), users, and other key personnel.

They ensure work is carried out only by approved specialist contractors, with the scope of registration defined as design, installation, commissioning, and maintenance of MGPS as appropriate.

Two caretakers are trained to act as Authorised Persons if the Director of Operations is unavailable. They keep the Director of Operations informed of any action taken and consult with the Director of Operations before making any decisions.

Competent Person (MGPS)
The Competent Person (MGPS) is the specialist contractor/contractor's employee who carries out the work on the MGPS as directed by the Authorised Person (MGPS) according to the MGPS Permit to Work procedures and appropriate Method Statements and Health and Safety policies submitted by the Contractor. The Competent Person (MGPS) must receive appropriate training from their employers. The specialist contractor assesses the competence of their directly employed competent staff and maintains a register of Competent Persons (MGPS). This register must be available to an Authorised Person (MGPS) on request.

Quality Controller (MGPS) (Under contract to MGPL)
The Chief Executive appoints a Quality Controller with MGPS responsibilities in writing. Quality Controllers (MGPS) are responsible for the quality control of the medical gases according to the latest European Pharmacopoeia and Manufacturers' Product Licences. Companies supplying medical gases have their own product licences and Qualified Person who ensures the quality of gas delivered to the site meets the specified criteria.

Designated Nursing Officer (MGPS)
The Designated Medical/Nursing Officer (MGPS) is the person in each ward or department with whom the Authorised Person (MGPS) liaises on any matters affecting the MGPS. The Designated Nursing Officer (MGPS) has ultimate responsibility for giving authorising permission for a planned interruption to the supply. They must give permission before any interruption to the MGPS takes place and sign the appropriate parts of the permit when satisfied that the interruption may safely proceed. The Designated Nursing Officer (MGPS) ensures all relevant staff are aware of the interruption to the MGPS and which terminal units cannot be used. All Designated Nursing Officers (MGPS) must receive adequate training on the MGPS relevant to their departments and on the action to be taken in an emergency. They must fully understand the implications of the permit to work before their authorising signature. The Designated Nursing Officer Competency Framework should be completed before assuming this role.

It is the responsibility of the Bleep Holder on each shift to ensure that adequate supplies of cylinders are held on site at all times. The cylinders held should be suitable for the normal day to day to requirements and to act as a 24-hour supply in the event of a loss of the Primary and Emergency Oxygen manifolds.

They should ensure that minimum stock holding levels are communicated to the caretakers so that they can order adequate stocks. They will communicate with the caretakers when demand increases or decreases so that stocks of cylinders held can be increased or decreased accordingly.

Designated Porter (MGPS)
Caretakers trained in the handling of medical gas cylinders will be known as Designated Porters and will be responsible for delivery of emergency supply cylinders to wards, plant rooms etc. No other persons should be involved in cylinder handling unless properly trained or supervised.
The Designated Porter will undertake connection of cylinders to manifold systems.

7. Definitions

1. Medical Gas Pipeline System (MGPS): A system installed to provide a safe, convenient, and cost-effective method for delivering medical gases to clinical and nursing staff at the point of use. It reduces issues associated with gas cylinders, such as safety risks, handling difficulties, storage concerns, and noise.

2. Oxygen: A medical gas used to treat patients with respiratory conditions by providing supplemental oxygen to maintain adequate oxygen levels in the blood.

3. Medical Vacuum: A system used to provide suction for various medical procedures, such as clearing airways or draining fluids.

4. Health Technical Memorandum 02-01 (HTM 02-01): A set of guidelines providing comprehensive advice on the design, installation, validation, verification, and operational management of medical gas pipeline systems in healthcare facilities.

5. Authorising Engineer (MGPS): A professional responsible for ensuring that the MGPS is designed, installed, and maintained according to relevant standards and guidelines. They provide expert advice and oversee the safe operation of the system.

6. Clinical Users: Healthcare professionals who use the medical gas pipeline system to deliver care to patients, including doctors, nurses, and respiratory therapists.

7. Installation Drawings: Detailed diagrams that show the layout and components of the medical gas pipeline system, used for reference during installation, maintenance, and inspections.

8. Maintenance Manuals: Documents that provide instructions and guidelines for the regular inspection, maintenance, and repair of the medical gas pipeline system to ensure its safe and efficient operation.

9. Prescription Only Medicines (POM): Medications, including certain medical gases, that can only be supplied with a prescription from a qualified healthcare professional.

10. Regulatory Compliance: Adherence to laws, regulations, and guidelines that govern the safe and effective use of medical gas pipeline systems in healthcare settings.

8. Policy and Procedure Implementation

8.1 Description of the System

The Medical Gas Pipeline System (MGPS) at Holy Cross Hospital includes the source of supply, pipeline distribution system, terminal units, and warning/alarm systems. These components ensure the convenient distribution of medical gases, meeting European Pharmacopoeia (Ph Eur) quality standards, for clinical and nursing staff to provide patient care. The medical gases supplied are limited to Oxygen (O2) and Medical Vacuum (Med Vac).

The primary supply consists of two LC200 cryotanks, which BOC refills automatically every fortnight. The secondary emergency reserve manifold (ERM) is provided by four J-sized cylinders.
The ERM activates automatically if the cryotank supply fails or is empty, delivering 24 hours of supply at normal rates.

Medical Vacuum (Suction) is delivered via a triplex plant, designed to serve both the primary and emergency reserve systems for medical vacuum. In the event of a total failure of this plant, portable suction machines are available at ward level.

The Authorised Person maintains system drawings and plant schedules, which are kept in the Support Services Department. It is essential that staff with day-to-day operational responsibility for the MGPS have site-specific knowledge of the plant, systems, and procedures. The Authorised Person (MGPS) is responsible for maintaining record drawings and documentation.

8.2 Documentation

List of documents to be maintained by the Authorised Person (AP MGPS)

- Up to date and accurate drawings including valve/key numbers for MGPS
- Any MGPS insurance/statutory documentation
- MGPS safe valve replacement schedule
- New and completed permit to work forms
- Schedule of hose replacement
- Plant history and maintenance records
- Manufacturers technical data sheets and manual for all components of the system
- Health technical memorandum 02, all latest editions and associated supplements
- MGPS contractors service contracts, staff training records, equipment calibration certificates
- A register of all personnel associated with MGPS especially the permit to work system
- Emergency and other useful telephone numbers
- Calibration certificates for all test equipment if owned by Hospital. At present all test equipment will be owned by the Competent Person who will supply copies of calibration Certificates
- The MGPS operational policy

Director of Operations and Caretakers will maintain copies of the following:

- delivery notes for medical gas cylinders;
- sales invoices for medical gas cylinders;
- delivery summary form (tracks cylinder stock information); cylinder rental invoices;
- cylinder rental reconciliation form (monitors trends in cylinder use over six months);
- delivery notes for special gas and industrial gas cylinders;
- sales invoices for special gas and industrial gas cylinders;
- rental invoices for special gas and industrial gas cylinders;
- ***BOC will have overall responsibility of delivery and quality of Liquid Oxygen to the LC200***

8.3 Permits

There are two classifications of permits based on defined hazard levels. A High Hazard Permit is divided into five parts and requires signatures from the Authorised Person (MGPS), Competent Person (MGPS), Designated Nursing Officer (MGPS), and QC (MGPS). The Low Hazard Permit is simpler and does not require QC testing of the work.

At Holy Cross, the Authorised Person (MGPS) is only qualified to issue Low Hazard Permits. Any High Hazard work will be planned, and the Authorising Engineer from MGPS Services will act as the Authorised Person (MGPS) in these situations. They will be responsible for completing these permits but will involve Holy Cross's Authorised Person (MGPS) in the process.

Permits will be retained on site for the life of the Medical Gas Pipeline System.

8.4 Key Inventory

Key Number	Location	Storage arrangements
92292	1st Floor Vac	DOO holds all keys. Individual keys are securely stored in a dedicated key case located in Support Services Office (GM only has access) A set is stored in a Key Safe located in St Hugh's
92380	Grd floor vac	
92320	1st Floor O2	
92237	Grd floor O2	

8.5 Daily Checks of Oxygen and Suction Plant

The caretaking staff will carry out daily checks of the Oxygen and Suction Compound (Piped services compound) and bring any issues to the attention of the Authorised Person immediately. (Appendix 6)

8.6 Training Requirements

All training must comply with the requirements of the Medical Gases Health Technical Memorandum 02-01: Medical Gas Pipeline Systems Part B: Operational Management. For patient safety, no one should operate or work on any part of the MGPS unless they are adequately trained or supervised.

Essential and refresher training must be specific to the functional responsibilities of key personnel involved in the day-to-day operation, maintenance, and use of the MGPS. All training must be documented. Staff expected to work with the MGPS must receive familiarisation training.

Upon completing the initial training course, the following table outlines the maximum intervals for further updated training requirements. All staff members with specific responsibilities regarding the Medical Gas Pipeline System must sign this policy.

	Retraining	**Reassessment**
Authorised Person	Every three years	Every three years
The training is carried out by MGPS, following successful completion of the course the AP is interviewed the AE who will recommend their appointment to the CEO.		
Designated Nursing officers	Every three years	Every three years
The Director of Operations (AP) will carry out training for DNO and will ensure that their competence to fulfil the role is fully assessed.		
Designated Porter	Annually	Every year
The Director of Operations (AP) will carry out training for all Designated Porters and will ensure that their competence to fulfil the role is fully assessed.		
General Nursing staff	Annually	N/A but regular competency checks should be carried out by Ward Sisters. All general Nurses carry out an annual refresher training course with a short exam completed at the end to test understanding.

With the exception of the Authorised person training, all training is carried out in house.

List and contact details of Designated Personal:

	Responsible Person	Contact details
Senior Authorised Person	Joanna Speed	01428 647644 Ext 1324 077667734809 07414 571978
Authorised Person	Matthew Brace	07518 287 554
	Alan Pearce	07724 758 546
Designated Nursing Officer	Gina Guo Or in her absence all bleep holders	Contact most Senior Nurse on Duty
Designated Porter	Caretakers	Refer to on call list
Competent Person	Medical Gas Pipelines Limited	Medical Gas Pipelines Ltd Witheybed Farm, Embley Lane, East Wellow, Romsey SO51 6DN Mobile: 07825187445 Office: 01794 515777 Fax: 01794 511930
Quality Controller	Medical Gas Pipelines Limited	
Authorising Engineer	Steve Goddard (MGPS services Limited	Tel 0345 652 4901

8.7 Medical Gas Committee

The medical gas committee meets twice a year. The members of the committee are as follows:

Designated Nursing Officer
Authorised Person *
Infection Control Lead
Competent Person for Health and Safety *

The Committee will meet after The Senior Nurse's meeting in March and September. Additional meetings will be scheduled following any incidents and ahead of any planned work on the Medical Gas Pipeline System.

** Director of Operations is both Authorised Person and Competent Person for Health and Safety.*

Medical Gas Safety will also be a permanent agenda item for the Health and Safety Committee.

8.8 Delivery of Oxygen via terminal units

In order to deliver an oxygen supply to a patient a flow meter must be inserted into the oxygen terminal in the bedhead unit.

The hospital holds in stock two sizes of flowmeters for ease of delivery of oxygen at the correct rate. In most cases 0-4.5 litre flow meters will be used but for patients requiring higher levels of oxygen a 0-15litre flowmeter can be obtained from the clinical stores. **Flowmeters are not left in patients' rooms when there is not a requirement for Oxygen delivery** but a start-up kit containing all items required for oxygen delivery will be kept at all times in clean holding. It is the responsibility of the Ward Sister to request additional units from the Clinical stores department. The serial number of all flowmeters must be recorded on the Equipment database on receipt and the flowmeter location must be recorded. It is the Ward Sister's responsibility to ensure that location of the flowmeters is correctly recorded. (O:Equipment/Medical equipment/MEDICAL DEVICE INVENTORY)

All flowmeters that are in use must be subject to a weekly check to ensure that they are working correctly. The Clinical Stores Coordinator will issue a weekly checking record sheet with each flowmeter and it is the Ward Sister's responsibility to ensure that the weekly checks are carried out and documented.

User instructions for Flowmeters attached to this document (Appendix 3).

8.9 Prevention of waste of resources and safety considerations

Care should be taken to ensure that devices that are not being used are not left on the beds or armchairs which will pass high oxygen concentrations into the bedding and mattress, or into surrounding atmosphere. Not only is this an extremely dangerous practice from fire risk point of view, it is wasteful and will mean that oxygen supplies will need replenishing more frequently than they would otherwise. After use, Oxygen must be switched off at the flow meter in the terminal unit by a member of staff who has received the correct training. If Oxygen is no longer regularly required the flow meter should be removed from the outlet. It is the Nurse's responsibility to ensure the Patient is receiving the correct flowrate via the correct device to correlate with the patients' oxygen saturations. This should be routinely checked and recorded on the patient's medication chart.

8.10 Cylinder use in wards and departments

The primary means of delivering oxygen in patient's rooms and the physiotherapy gym is via the medical gas pipeline. Cylinders are only provided as a means of delivering oxygen to patients when they are in an area not covered by the pipeline system (activities, grounds, senses garden) or when on an outing.

When using cylinders the nursing staff concerned should be aware of the individual requirements of the patient, the contents of the cylinder and the time available within the cylinder. It is the responsibility of nursing staff to ensure that the medical gases are administered correctly and are secured either in a purpose made trolley (ZX sized cylinders) or in a cradle attached to bed or wheelchair (CD sized cylinder).

IN NO CIRCUMSTANCES SHOULD A CYLINDER BE PLACED ON THE PATIENTS BED.

The Contents of a cylinder for the required flow rate is shown in the table below.

		Gauge Contents					
		Full (100%)		**Half (50%)**		**Low (25%)**	
	Flow rate ltr/Min	**hr/Min**	**mins**	**hr/Min**	**mins**	**hr/Min**	**mins**
CD Cylinder (460 litres)	15	0.30	30	0.15	15	0.07	7
	10	0.46	46	0.23	23	0.11	11
	6	1.16	76	0.38	38	0.19	19
	4	1.55	115	0.57	57	0.28	28
	2	3.50	230	1.55	115	0.57	57
	Flow rate ltr/Min	**hr/Min**	**mins**	**hr/Min**	**mins**	**hr/Min**	**mins**

ZX Cylinder (3040 litres)	15	3.22	202	1.41	101	0.5	50
	10	5.04	304	2.32	152	1.16	76
	6	8.26	507	4.13	253	2.06	127
	4	12.40	760	6.2	380	3.1	190
	2	25.20	1520	12.4	760	6.2	380

If a cylinder is required, the nurse in charge of the ward or department should contact the duty caretaker to request cylinder delivery. Out of hours the Nurse in Charge will be responsible for arranging for a cylinder to be collected from the cylinder store.
To ensure patient and staff safety, it is essential that all 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 oil and / or grease (e.g. barrier creams) and alcohol gel products.

If hand creams or gels have been used, wash hands before connecting regulator or flowmeters.

Users should ensure that they open medical gas cylinder valves slowly; if resistance to opening of the cylinder is excessive, the cylinder should not be used and should be returned to the supplier labelled to indicate the problem as either a faulty or incident cylinder.

Cylinders should be transported in a purpose made trolley suitable for the size of cylinder. Small cylinders can be carried, although no more than one at a time. Small cylinders must be secured using a bracket on the bed or wheelchair when in use.

A manual handling risk assessment should be carried out on each cylinder size, specific to the task to be completed and the person involved.

Caretaking staff will deliver cylinders to the wards and return the empty cylinders to store Medical gases in cylinders have a number of hazards that staff, patients and public need to be aware of. In ward areas these relate primarily to the risks associated with oxidizing substances, pressure and manual handling.

No more than 2 CD Sized cylinders will be stored in Ward Offices in a suitable wall bracket for use for patients who require oxygen in areas not served by the Medical Gas Pipeline System.

An emergency reserve of 24 hours supply of oxygen is stored in ZX and CD sized cylinders stored in the cylinder store attached to the Piped Services Compound. Designated Officers may access the compound at any time additional cylinders are required.

Any damaged, faulty or out of date cylinders should not be used and returned to Support Services Department.

8.11 Medical Vacuum

High suction controllers are provided for the delivery of medical vacuum to patients. Any patient who requires suction will have a suction controller, tubing and collection canister permanently installed in their room. A supply of additional suction start up kits are located in the clean holding so they can be accessed at any time. The serial number of all suction controllers must be recorded on the Equipment database on receipt and the suction controller location must be recorded. It is the Ward Sister's responsibility to ensure that location of the suction controller is correctly recorded. (O:Equipment/Medical equipment/MEDICAL DEVICE INVENTORY)

The Clinical Stores Coordinator should be informed if the equipment in clean holding is used so it can be replenished.

8.12 Cleaning Routines

Cleaning of all equipment should follow the guidelines in the infection control policy. With the exception that medical gas equipment including cylinders, should only ever be wiped down with a damp cloth with warm water containing no solvents.

All patient connected administration sets and facemasks are designed to be single patient use only and should be disposed of appropriately after use.

Tracheal suction tubing and Yankeur catheters (oral suction) are disposable and single patient use medical devices. They are changed at least weekly. Tracheal suction tubing are flushed with clean water in the stainless steel kidney dish after every use, and Yankeur suction catheters (oral suction) are flushed in a separate green plastic bowl. Kidney dishes and plastic bowls must be cleaned and dried after each use.

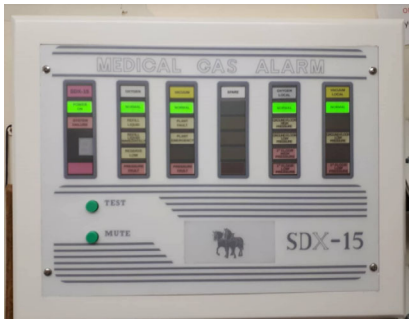
Tracheal suction catheters are single use items so are detached from the tubing prior to flushing Suction tubing. The catheters are changed each time after suctioning and disposed of as clinical waste.

Suction canisters should be emptied and cleaned when 2/3 full or at the end of shift (at least twice daily).

Suction canisters and removable parts are re-usable and cleaned by disassembling the machine and cleaning with hot water and a mild detergent, rinsed and dried. The canisters are disinfected by sterilising Milton solution fluids and the lids are autoclaved on a weekly basis

All ward-based equipment is serviced and maintained by the Support Services Department and specialist contractors for ease of use by nursing staff. No person should operate medical gas systems or equipment unless they are adequately trained or supervised. With regard to medical gas systems, the ward equipment covered by this document falls into two main categories.

8.13 Alarms



8.13.1 Central Alarm Panel

These panels constitute an array of legends with, in each column, a “Normal” condition followed by 4 alarm conditions. They provide forewarning of imminent failure and under normal circumstances will display a first level alarm when things start to require attention (such as oxygen requiring refilling on the LC200)

The first legend is the most important and advises staff that everything is OK and safe to use. Nursing staff should make a point of checking this every day.

Additionally, an individual alarm condition might occur at position 3 on the panel and this would indicate that the second source of supply, the reserve system, was only 50% full. These would not normally constitute an emergency.

However if any other alarm indication arises or if two or more alarm indication are displaying within the same column, then a caretaker should be contacted immediately.

Pressing the "Mute" button on the front of the panel, will silence the alarm. If the supply plant problem is not rectified within 15 minutes, the alarm panel will reset itself and the audible signal will be re-instated.

The Nurse in charge is responsible for carrying out and documenting daily checks of the panel (Appendix 4).

8.13.2 Medical Oxygen Pipeline system: Alarms & Actions

Alarm Panel			
		Meaning	Action
Normal	Normal	Normal	No action
1	Liquid low	Primary supply is at 50%	Normal working hours: inform Caretaker to contact BOC to arrange delivery. Out of hours – note to inform caretaker at 8am (Monday to Friday). Weekends – call duty caretaker.
2	Liquid Very Low	Primary Supply is at 25%. When this is depleted the supply will automatically switch over to Emergency supply manifold.	Call duty Caretaker irrespective of time.
3	Reserve Low	The reserve manifold has depleted to its alarm level of 50%. Replace cylinders as soon as possible. If this message is in addition to conditions 1 and 2 then the supply is in danger of imminent failure. Action required immediately.	Call duty Caretaker irrespective of time.
4	Pressure Fault	Emergency. Pressure Fault on Oxygen System. The system pressure is outside the set limits, this could mean that the system is over-pressurised or that all gas has been exhausted. Action is required immediately.	AT ALL TIMES: Urgently inform AP (MGPS) and Duty Caretakers of the situation. DNO will need to ensure Caretakers are given precise information about number of cylinders that should be delivered to ward areas.

8.13.3 Local Area Alarm

Local Alarm panels are contained within the central alarm panel. They are provided for nursing staff, who need to be aware of what is happening to the medical gas systems, and the condition of the gas being delivered to the patient. These units work by monitoring the gas supply inside each ward or department, so that if an alarm occurs, the fault has already happened. There is no time allowance, and no forewarning, you will need to act immediately as this could be an emergency.

8.13.4 Medical Vacuum alarms

The Medical vacuum alarms are incorporated into the Central Alarm panel and have four levels of alarm. The first level being green indicating that the system is operating as normal. The next level is yellow 1 meaning plant fault, an error has been detected on a medical vacuum pump. The system is still functional but could be running on the standby pump set, if this alarm persists the duty caretaker should be contacted.

The second yellow being plant emergency means that a fault has been detected in the medical vacuum system and this has escalated to a point where the system integrity could be compromised, if alarm persists then duty caretaker should be called. A pressure fault is indicated by a red pressure fault alarm, this could mean that the system is low on vacuum capacity or may have already run out so duty caretaker must be contacted immediately and portable suction machines must be made ready.

8.13.5 Medical Vacuum Panel Actions

Alarm Position	Alarm Indication	Meaning	Action required
Green	**Normal**	**Normal**	**No action required**
Yellow	**Plant Fault**	An error has been detected on a medical vacuum pump. The system is still functional but could be running on the standby pump set.	If alarm persists then alert duty caretaker.
Yellow	**Plant Emergency**	The fault in the medical vacuum system has escalated to a point where system integrity could be compromised. There might be minimal medical vacuum. Remaining before the system is completely depleted.	Notify Caretaker.
NOTE: There is no 3rd level alarm condition with vacuum systems as there is no emergency reserve manifold.			
Red	**Pressure Fault**	Emergency. Pressure Fault on Medical Air System. The system pressure is outside the set limits, this could mean that the system is outside the set limits, this could mean that the system low on vacuum capacity or that has already run out immediately.	Notify Duty Caretaker, ensure all patients requiring medical vacuum have a portable unit ready for use.

8.14 Emergency Procedures – Wards & Department

It is impossible to list here all possibilities or scenarios where an emergency might occur. The following is a selection of emergencies that might arise and the relevant actions to be taken as a result.

FIRE
Procedures in accordance with the Hospital's Fire Policy should be followed in the event of a fire involving, or likely to involve the MGPS. During a fire the Fire Service Incident Controller, the DNO and Fire Team Leader will assume full control of the area(s) affected.

If a fire occurs in a ward or department covered by the piped medical gas system, the DNO must evaluate the oxygen usage within that area and wherever possible isolate the medical gases at the area valve service unit (AVSU).

UNDER NO CIRCUMSTANCES SHOULD MEDICAL GAS SUPPLIES BE ISOLATED UNTIL THE DESIGNATED MEDICAL NURSING OFFICER HAS CONFIRMED THAT ALL PATIENTS LIKELY TO BE AFFECTED HAVE BEEN EVACUATED AND /OR HAVE ALTERNATIVE GAS PROVISION

8.14.1 Failure of mains electricity supply

In the event of an electricity failure, medical gas supplies should be maintained by the emergency generator system.

The vacuum plant, and medical gas alarm systems are connected to the "essential" electricity supply and will continue to provide and monitor gas supplies as normal.

In the event of failure of both mains and generator supplies:

The oxygen system will continue to supply gas from the primary or reserve VIEs.

The Vacuum plant will not operate and central vacuum service will be lost.

"Normal" portable vacuum units can be used only if local electricity supplies are available. Ejector or battery driven units will have to be used where available and where vacuum provision is essential for critical care.

Alarm panels will display a "System Failure" red warning light and give an audible alarm.

If the electricity supply failure is local and power to an alarm panel only is interrupted the panel will display a "System Failure" red warning light and emit an audible alarm; gas supplies will not be affected.

In any of these circumstances:

The Authorised Person (MGPS) will be informed of the situation.

Caretakers will arrange for staff to monitor gas consumption, replacing empty cylinders as necessary, until the electricity supply is restored.

The Authorised Person (MGPS) will arrange emergency cylinder and regulator supplies as necessary.

The Authorised Person (MGPS) will monitor the situation and confirm resetting of the (MGPS) plant and system alarms following restoration of supply.

8.14.2 Serious leak of Medical Gases

In these circumstances:
The Duty Caretaker should be contacted. If there is likely to be a requirement for large numbers of cylinders, the caretakers will make arrangements for an emergency delivery from BOC.

Details of the leak should be confirmed: i.e. the floor level, department, room number and if patient ventilators are in use. During out of hours working – the On-call Caretaker should notify the Authorised Person (MGPS).

It is the responsibility of the DNO to authorise the isolation of medical gases to the area, after ensuring that no patients will be put at risk in any affected area(s).

The DNO shall notify the Health and Safety Competent Person when a serious leak of medical gas occurs.

The DNO will issue appropriate instructions to make the situation safe, such as opening windows in the affected area and closing doors. If necessary, evacuation will be considered.

The caretaker will remain on standby to provide extra gas cylinders as required.

The Authorised Person (MGPS) will arrange for repairs to the system(s) to be carried out under the Permit to Work system.

8.14.3 Total or Partial failure of medical gas supply

In these circumstances:

The person discovering the failure will inform The Designated Nursing Officer(s). The DNO will then contact the Duty Caretaker and the Authorised Person (MGPS).

Details of the failure should be confirmed: i.e. floor level, department, room number(s), the gas involved and if patient ventilators are in use.

Depending on the reason for the failure and its possible duration:

The Authorised Person (MGPS) will decide the most appropriate method of long-term emergency gas provision. This may involve establishing locally regulated cylinder supplies at ward / department entrances

Nursing and medical staff should attempt to reduce gas consumption to a minimum during the emergency.

Caretaking staff will be required to monitor / replenish cylinders at any emergency stations and at plant room emergency supply manifolds.

Caretakers will arrange emergency cylinder deliveries as necessary.

The Authorised Person (MGPS) will liaise with the approved contractor and competent person (MGPS) to complete emergency repairs needed to re-instate the gas supply, using the Permit to Work system.

8.14.4 Contamination of a medical gas supply:

(Evidenced by unusual fumes coming from connected equipment)

It is not unusual for a smell to be noticed when using “plastic” equipment hoses to deliver gas to a patient. This smell usually disappears rapidly after first uses of the hose and will generally be familiar to operatives.

However, if either operatives or patients complain of any unusual or strong smells from equipment, or if any patient suffers an adverse reaction to the provision of medical gas, the situation MUST be treated seriously and IMMEDIATE action taken to ascertain the cause.

Where it is obvious that the smell is coming from the pipeline rather than a piece of connected equipment, the GAS SUPPLY MUST NOT BE USED and steps taken to prevent others from using the same supply. In this event the fault should be treated as a complete gas failure to that area and the actions described above taken IMMEDIATELY.

The AP should be informed immediately.

8.14.5 Contamination of a medical vacuum system

Contamination of the medical vacuum system can occur where the vacuum regulators or jars are incorrectly assembled. This will usually be detected during routine maintenance inspection and evidenced by the presence of liquid in the on- line bacteria filter drain flask, however contamination in sufficient quantity can also cause a blockage of the pipeline system. The Infection Control lead should be informed immediately where any contamination has been found or suspected. They should advise on any additional precautions required and to effect bacterial filter changes safely.

Portable suction units may be used in areas where there is a possibility of the vacuum system being contaminated. (The need for portable suction units should be discussed with the Infection Control Team

It is the responsibility of the approved Competent Person (MGPS) to change the filter in accordance with the procedure described in HTM 02-01 taking into consideration any additional advice from the Infection Control Team.

If the contamination is due to system misuse, the ward/department must complete an Incident Report Form.

Decontamination of pipework (if necessary) should be carried out in accordance with the procedure described in HTM 02-01 BEFORE filters are changed.

8.14.6 High or Low Pressure of one or more systems

All medical gas systems are protected by the use of pressure safety valves. However, these units operate at pressures 25% above the normal system working pressure. Although all connected equipment should be designed to withstand this (and higher) excess pressures, it is not good practice to operate with system pressures higher than normal. In some instances, gas-mixing devices may give incorrect mixtures if one gas supply to the mixer is subjected to higher than normal pressures.

A similar effect can take place with lower than normal pressures but a more serious consequence of the latter is the inability of some equipment e.g. ventilators and surgical tools to operate below certain pressures. Be especially aware that a low pressure alarm could actually mean that there is no pressure and that no gas is getting to the equipment / patient.

High (or low) pressure problems are signalled local alarm displays and should be reported in accordance with this Policy.

8.15 Emergency Cylinder Request Procedure

In the event of a shortage of cylinders the DNO officer should contact the caretakers who will arrange further cylinder deliveries.

8.16 Maintenance

Planned preventative maintenance of the pipeline system and medical vacuum is carried out every three months by a suitably qualified medical gas contractor. In most cases, this work will not result in an interruption of supply. Prior notice will always be given for any work that has the potential to cause any interruption to supply.

For all routine planned servicing, a Low Hazard permit will be completed.

The Cryotanks and associated alarm panels in the plant room are owned by BOC and are serviced by BOC annually.

9. Regulatory Requirements/References

Regulatory Requirements:

Health and Safety at Work Act 1974: This act places a duty on employers to ensure the health, safety, and welfare of their employees and others who may be affected by their activities.

Management of Health and Safety at Work Regulations 1999: These regulations require employers to carry out risk assessments and implement necessary measures to ensure health and safety.

Control of Substances Hazardous to Health (COSHH) Regulations 2002: These regulations require employers to control substances that are hazardous to health, including medical gases.

Medicines Act 1968: This act regulates the manufacture and supply of medicines, including medical gases.

Health Technical Memorandum 02-01 (HTM 02-01): This memorandum provides comprehensive guidance on the design, installation, validation, verification, and operational management of medical gas pipeline systems in healthcare facilities.

British Standards (BS) EN 737: These standards specify requirements for medical gas pipeline systems, ensuring safety and reliability.

References:

Health Technical Memorandum 02-01 (HTM 02-01): Part A covers the design, installation, validation, and verification of medical gas pipeline systems, while Part B focuses on operational management.

Health and Safety at Work Act 1974: Provides the legal framework to promote, stimulate, and encourage high standards of health and safety in workplaces.

Management of Health and Safety at Work Regulations 1999: Outlines the responsibilities of employers to manage health and safety effectively.

Control of Substances Hazardous to Health (COSHH) Regulations 2002: Details the requirements for controlling hazardous substances to prevent ill health.

Medicines Act 1968: Regulates the production and distribution of medicines, including medical gases.

British Standards (BS) EN 737: Specifies the requirements for medical gas pipeline systems to ensure safety and performance.

10. Evaluation Measures

1. **Regular Audits**:
    - Conduct annual audits by the Authorising Engineer (MGPS) to assess compliance with the policy and relevant standards
    - Perform internal audits to review the operational management and maintenance of the Medical Gas Pipeline System (MGPS).
2. **Risk Assessments**:
    - Carry out regular risk assessments to identify potential hazards associated with the MGPS and implement necessary control measures.
    - Review and update risk assessments periodically or when significant changes occur.
3. **Incident Reporting and Investigation**:
    - Establish a system for reporting and investigating incidents related to the MGPS, including near-misses and actual incidents.
    - Analyse incident reports to identify trends and areas for improvement.
4. **Training and Competency Assessments**:
    - Ensure all staff involved in the management and use of medical gases receive regular training and competency assessments.
    - Maintain records of training and competency evaluations to ensure staff are adequately skilled.
5. **Maintenance and Inspection Records**:
    - Keep detailed records of all maintenance and inspections carried out on the MGPS.
    - Review maintenance logs regularly to ensure timely and effective maintenance activities.
6. **Compliance with Health Technical Memorandum 02-01 (HTM 02-01)**:
    - Regularly review the policy and procedures to ensure alignment with the latest guidance provided in HTM 02-01.
    - Implement any updates or changes recommended in HTM 02-01 to maintain compliance.
7. **Feedback Mechanisms**:
    - Collect feedback from clinical users and staff involved in the MGPS to identify any issues or areas for improvement.
    - Use feedback to make necessary adjustments to the policy and procedures.
8. **Performance Metrics**:
    - Develop key performance indicators (KPIs) to measure the effectiveness of the MGPS, such as system uptime, incident rates, and compliance levels.
    - Monitor and report on these metrics regularly to track performance and identify areas for improvement.

11. Related Documents

Health and Safety Policy: Outlines the overall approach to health and safety within the hospital, ensuring a safe environment for patients, staff, and visitors.

Dangerous Substances Policy: Provides guidelines for the safe handling, storage, and use of hazardous substances, including medical gases.

Safe Manual Handling Policy: Details procedures for safely moving and handling equipment and materials, including gas cylinders, to prevent injuries.

Medical Devices Policy: Covers the management, maintenance, and use of medical devices, ensuring they are safe and effective for patient care.

Health Technical Memorandum 02-01 (HTM 02-01): Provides comprehensive guidance on the design, installation, validation, verification, and operational management of medical gas pipeline systems.

Control of Substances Hazardous to Health (COSHH) Regulations 2002: Sets out the requirements for controlling hazardous substances to prevent ill health.

Medicines Act 1968: Regulates the manufacture and supply of medicines, including medical gases.

British Standards (BS) EN 737: Specifies requirements for medical gas pipeline systems to ensure safety and reliability.

12. Appendices

APPENDIX 1 – Equality impact Assessment (EIA) Tool

To be considered and where judged appropriate, completed and attached to any policy document when submitted to the appropriate committee for consideration and approval.

Policy Title	Operational Policy for Medical Gas Pipeline systems		
		Yes/No	**Comments**
	Does the policy/guidance affect one group less or more favourably than another on the basis of:		
	Race	No	
	Gender reassignment	No	
	Marriage & civil partnership	No	
	Pregnancy & maternity	No	
	Ethnic origins (including gypsies and travellers)	No	
	Nationality	No	
	Sex	No	
	Culture	No	
	Religion or belief	No	
	Sexual orientation	No	
	Age	No	
	Disability- both mental and physical impairments	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**Is the impact of the policy/guidance likely to be negative?**	No	
4.	**If so can the impact be avoided?**	N/A	
5.	**What alternatives are there to achieving the policy/guidance without the impact?**	N/A	
6.	**Can we reduce the impact by taking different action?**	N/A	
7.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	**No**	

APPENDIX 2 - Signatures of key personnel

The Following staff have read and understood their duties and responsibilities with regard to the safe operation of the Medical Gas Pipeline System.

List of named staff available from the Director of Operations

	Name	Designation	Signature	Date
Authorised Person And Health and Safety Competent Person				
Designated Nursing officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer & Infection Prevention Lead				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing Officer				
Designated Nursing officer				
Designated Nursing Officer				
Designated Porter				
Designated Porter				
Designated Porter & AP				
Designated Porter & AP				

APPENDIX 3- Flowmeter User instructions

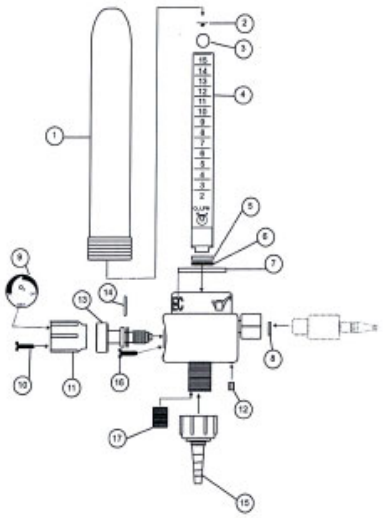
MEC

MEC MEDICAL LTD

FLOWMETERS

MEC Medical Limited
Unit 3 Trust Estate
Wilbury Way
Hitchin
Hertfordshire
SG4 0UZ
UK
Tel: (+44) 01462 436396

Warnings: Flowmeter must be vertically mounted. NEVER use oil or grease as a lubricant. If the flow meter bobbin sticks at all it is not suitable for use until re-paired.



User instructions

1. **Nut & Liner version :**
   Attach a gas specific probe to the flowmeter. Tighten nut making sure the slot in the probe is uppermost
   Direct probe version :
   Probe is already in place
2. If an accessory is to be attached to the flowmeter, remove tubing nipple [15] and replace with the accessory. Otherwise attach suitable tubing to tubing nipple
3. Plug the flowmeter into an appropriate gas specific socket.
   When attaching the device to supply, ensure that this device is in the **Vertical** position (scale tube upright)
4. Using the control knob [11] slowly open the flowmeter valve to the required flow rate reading to the **top of the ball**
   DO NOT TURN KNOB BEYOND MAXIMUM SCALE READING
5. When not in use the flowmeter should be turned off
6. Do not apply excessive torque to the flow valve.

Cleaning

DO NOT allow moisture to enter the flowmeter
DO NOT use any form of polish, including spray
Clean the flowmeter exterior with a clean, dry, lint free cloth
During servicing, individual internal parts of the flowmeter may be cleaned with a clean, dry, lint free cloth
The filter [5] may be cleaned using clean, dry air

Servicing and maintenance

Use only recognised spare parts as listed below. For additional spare part information please contact MEC Medical Ltd

High flow flow-meters (0-15 lpm) should be checked for function on a weekly basis by :

- Slowly open the valve to give a flow of 15 lpm
- Close the valve to zero

This procedure will ensure there are no blockages in the unit

Low flow flow-meters (0-4.5 lpm) should be checked for function on a weekly basis by :

- Slowly open the valve to 4.5 lpm
- Close the valve to zero

This procedure will ensure there are no blockages in the unit

Spares

Tubing Nipple Oxygen	Part Number 60168
Tubing Nipple Air	Part Number 60168BL

Warning Only authorised /trained personnel may service this unit.

ILFM60 R4/2015

CE 0120

APPENDIX 4- Flowmeter weekly check (high flow)

Flowmeter	Serial Number		High Flow (0-15l)	Checking Regime- High Flow meter • Slowly open valve to give a flow of 15lpm • Close valve to zero • This procedure will ensure there are no blockages in the unit • Ensure this is documented			
SERVICE DATE							
			Week 1	Week 2	Week 3	Week 4	Week 5
Date		October					
Initials							
Date		November					
Initials							
Date		December					
Initials							
Date		January					
Initials							
Date		February					
Initials							
Date		March					
Initials							
Date		April					
Initials							
Date		May					
Initials							
Date		June					
Initials							
Date		July					
Initials							
Date		August					
Initials							
Date		September					
Initials							

APPENDIX 4 - Flowmeter weekly check (low flow)

Flowmeter	Serial Number		Low Flow 0-5lpm	Checking Regime- High Flow meter • Slowly open valve to give a flow of 4.5lpm • Close valve to zero • This procedure will ensure there are no blockages in the unit • Ensure this is documented			
SERVICE DATE							
			Week 1	Week 2	Week 3	Week 4	Week 5
Date		October					
Initials							
Date		November					
Initials							
Date		December					
Initials							
Date		January					
Initials							
Date		February					
Initials							
Date		March					
Initials							
Date		April					
Initials							
Date		May					
Initials							
Date		June					
Initials							
Date		July					
Initials							
Date		August					
Initials							
Date		September					
Initials							

APPENDIX 5- Daily Senior Nurse Check

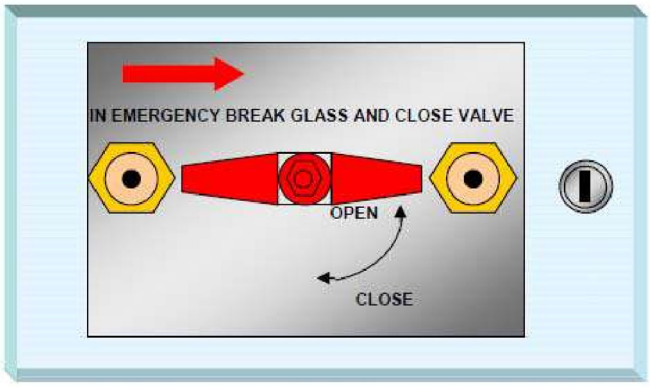
There is an alarm system located in each ward office which contains a main plant or central alarm system that monitors the supply units or failure or imminent failure of supply and a local area alarm system that monitors the condition (Pressure) of gas at the point of use.

Nurse-in-Charge of the ward should make a daily check to the **alarm panel**, including **pressing the test button**, and document it on the chart below to ensure that the system display "Normal" on the panel. Otherwise, a duty caretaker should be contacted.

Nov 17	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
Dec 17	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
Jan 18	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
Feb 18	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
Mar 18	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
Apr 18	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															
May 18	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Normal																															
Initials																															

APPENDIX 6- QR codes for caretakers daily and weekly checks

APPENDIX 7- Emergency AVSU Isolation Procedure



Typical Area Valve Service Unit in normal supply condition is shown above.

The Area Valve Service Unit (AVSU) valve operating handle is shown in the “on” position supplying gas to the ward or department.

Adjacent to each AVSU there should be a sign detailing which areas / beds will be isolated. If the sign is not perfectly clear detailing the exact extent of supply from that particular AVSU, the valve should not be operated.

Before isolation of a gas supply it is essential that patients connected to the system be provided with alternative supplies.

Be aware that ISOLATION CAN KILL.
ENSURE THAT ESSENTIAL LIFE SUPPORT IS MAINTAINED

To isolate a gas supply:
BREAK THE GLASS WINDOW in the valve box door with a hard / heavy object.

Be sure that all glass shards are out of the opening before reaching in to turn the valve quarter-turn from fully on to fully off i.e. to the vertical position, as shown below.

Be aware of splintering glass and any shards that may be left in the door aperture.