University Hospitals of Derby and Burton NHS Foundation Trust

TRUST POLICY FOR MEDICAL GAS PIPELINE SYSTEMS

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	1.0 1.1	February 2021 January 2022	R Ridge R Ridge	New merged policy Minor amendments
Intended Recipients: All staff groups.				
Training and Dissemination: Managers should receive the training necessary to ensure this policy is properly implemented and training should be made available to all staff identified in the Training Needs Analysis. Dissemination via the Trust Intranet.				
To be read in conjunction with: Trust Policy and Procedures for Manual Handling (RKM 2008 006); Trust Policy and Procedures for Incident Reporting, Analysing, Investigating and Learning (RKM 2008 020), Trust Fire Policy, Infection Control Policy, Emergency Oxygen Guidelines and Patient Transfer Policy.				
In Consultation with and Date: Medical Gases Group				
EIRA stage One Completed: Yes Stage Two Completed N/A				
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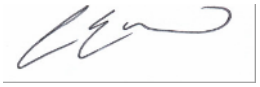
Contact for Review	General Manager, Facilities Management			
Executive Lead Signature	Executive Chief Nurse and Director of Patient Experience			
Approving Executive Signature				

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1. Introduction

This policy addresses the provision of Medical Gas Pipeline Systems (MGPS) use by the University Hospital of Derby and Burton NHS Foundation Trust (UHDB).

MGPS provide a safe, convenient and cost-effective system for the provision of medical gases to the clinical and nursing staff at the point of use for patient care. It reduces the problems associated with the use of gas cylinders such as safety, porterage, storage and noise.

UHDB recognises it's commitment to maintaining the MGPS to required standards and the training of all personnel associated with it's operation.

Health Technical Memorandum (HTMs) give comprehensive advice and guidance on the design, installation and operation of specialist building and engineering technology used in the delivery of healthcare, including MGPS. The focus of HTM guidance remains on healthcare-specific elements of standards, policies and up to date established best practice. They are applied to new and existing sites and are for use at various stages during the whole building lifecycle.

2. Purpose and Outcomes

The use of medical gases in the health service is extensive; they are classified as prescriptive medicinal products for patient care under the Medicines Act 1968. Allied to the use of medical gas is the containment of it, under pressure in cylinders and medical gas pipeline systems (MGPS). Medical gases do not burn; however, fire and explosion are risks, as the gases strongly support combustion.

This policy is intended for use by all staff involved with MGPS across the five sites of UHDB.

Royal Derby Hospital, Derby
Florence Nightingale Community Hospital, Derby
Queens Hospital, Burton
Sir Robert Peel Hospital, Tamworth
Samual Johnson Hospital, Lichfield

It applies throughout the UHDB premises to all fixed medical gas pipeline systems.

Compressed gas and vacuum supplies to general engineering workshops and Pathology Department equipment are separate from the general MGPS and are not included in this policy, although the general principles in this document should be followed for these departments.

MGPS outlets (wall mounted terminal units) define the limits of Estates and Facilities responsibility in this policy.

Equipment connected to the terminal units is not covered by this policy other than where it's mode of use may affect system operation or safety.

Medical gases should not be used for non-medical purposes other than a test gas for medical equipment.

Outcomes

UHDB recognises that the proper and safe operation of the various medical gas cylinders and pipeline systems is an integral part of it's responsibilities under the Health and Safety at Work Act 1974. Under this act it is incumbent upon both owners and occupiers of the premises to ensure that there is a management regime for the proper design, installation and operation of plant, equipment and systems.

It is UHDB Policy that, before any works on the MGPS can commence, a Permit to Work Form signed by an Authorised Person (MGPS) must be completed.

3. Definitions Used

MGPS	Medical Gas Pipeline System (All Pipework and Equipment up to the Outlet on the wall)
VIE	Vacuum Insulated Evaporator
MHRA	Medicines Healthcare Regulatory Authority
AGSS	Anaesthetic Gas Scavenging System
AVSU	Local Gas Isolation Valve (Area Valve Service Units)
BOC	British Oxygen Company
OUTLETS	Wall Mounted Terminals that medical devices are plugged into

4. Key Responsibilities/Duties

4.1 Chief Executive

Ultimate management responsibility for the MGPS rests with the UHDB Chief Executive. Responsibilities include the allocation of resources and the appointment of personnel.

The Chief Executive herein delegates day-to-day management responsibility for the MGPS to the Director of Patient Experience, Estates and Facilities Management. The Chief Executive herein also delegates written appointment of Authorised Persons (MGPS) to the Director of Patient Experience, Estates and Facilities Management.

4.2 Director of Patient Experience, Estates and Facilities Management

The Director of Patient Experience, Estates and Facilities Management is responsible for overseeing the day to day management responsibilities for MGPS including the written appointment of Authorised Persons (MGPS).

4.3 General Manager Facilities Contract Derby Healthcare PLC

The General Manager for Derby Healthcare will have responsibility for the operational management of contracted out services on the Royal Derby Hospital Site only.

4.4 Authorising Engineer (AE - MGPS)

The Authorised Engineer MGPS will act as an independent professional adviser to UHDB.

The duties and responsibilities of the Authorising Engineer (AE) are:

- To recommend to the Director of Patient Experience, Estates and Facilities Management [usually Estates] those persons who, through individual assessment, are suitable to be Authorised Persons (MGPS).

- To ensure that all Authorised Persons (MGPS) have satisfactorily completed an appropriate training course.

- To ensure that all Authorised Persons (MGPS) are re-assessed every three years and have attended a refresher or other training course before such re-assessment.

- To review the management systems of the MGPS, including the Permit to Work System.

- To monitor the implementation of the Operational Policy and Procedures.

- The AE will incorporate an annual review of The NHS Premises Assurance Model, Medical Gas Systems for the Trust.

- Operational and Management Policies – are these in place, if not, provide draft policies which the Trust can adjust to suit their needs.

- Determine current provision of Authorised Person(s) and provide recommendations on suitable provision.

- Assess existing and proposed Authorised Person(s) for their competency, including training, experience and site knowledge. This will be a gradual process working with the Authorised Person(s) and management team providing individual development plans.

- Authorise Authorised Person(s) and provide ongoing mentoring support once appointed. Due to the nature of this role, there would be frequent contact with the Authorised Person(s) over the course of the year, with an initial suggestion of four quarterly meetings on site and the potential to attend the Trust's Medical Gas Group Meetings if requested to do so.

- Ensure safe systems of work are implemented in accordance with HTM 02-01 Parts A and B.

- Carry out audits to see how the safe systems of work are working in practice and provide advice on how they can be improved. A written annual report will be issued to the co-ordinating Authorised Person(s) summarising the findings for the year.

- Provide support and scrutiny of any major medical gas infrastructure proposals being undertaken either via the discretionary capital route, the STP's or NHS frameworks.

- Advise of any safety alerts that have been issued which the Trust should be aware of.

- The AE would carry out any major incident investigations on the medical gas infrastructure that may occur and produce associated reports highlighting their findings and recommendations.

4.5 Authorised Person(s) (MGPS)

Authorised Person(s) MGPS are required for UHDB and will be site-specific based. The Authorised Person(s) MGPS are listed in Appendix 3 - The Site-Specific Procedures.

The Authorised Person(s) assume effective responsibility for the day to day management and maintenance of the MGPS.

The duties and responsibilities of Authorised Person(s) (MGPS) are:

- To ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines;

- To manage the Permit-to-Work System, including the issue of permits to Competent Persons (MGPS) for all servicing, repair, alteration and extension work carried out on the existing MGPS;

- To supervise the work carried out by Competent Persons (MGPS) and monitor the standard of that work (a register of Competent Persons (MGPS) must be kept);

- To ensure that UHDB MGPS Maintenance Specification and Schedule of Equipment (including all plant, manifolds, pipework, valves, terminal units and alarm systems) are kept up to date;

- To liaise closely with Designated Nursing/Medical Officers, the Quality Controller (MGPS) and others who need to be informed of any interruption or testing of the MGPS;

- To provide technical advice to those responsible for the purchase of any medical equipment which will be connected to the MGPS in order to avoid insufficient capacity and inadequate flow rates;

- In accordance with the UHDB Policy on Provision of Services, provide advice on the provision and/or replacement of MGPS central plant and associated systems. The Estates Department will hold overall responsibility for the provision and maintenance of MGPS services within UHDB;

- To organise such training of Estates Staff (and other staff if requested) and/or transfer of MGPS information as is needed for the efficient and safe operation of the MGPS.

4.6 Competent Person (MGPS)

All Competent Person(s) (CP) MGPS are craft persons, either employed contractors or inhouse direct labour staff.

All Competent Persons (MGPS) shall be registered to BS EN ISO 9001/BS EN ISO 13458, with clearly defined registration criteria.

The duties and responsibilities of Competent Persons (MGPS) include:

- To carry out work on the MGPS in accordance with the UHDB's Maintenance Specification;

- To carry out repair, alteration or extension work as directed by an Authorised Person(s) (MGPS) in accordance with the Permit-to-Work System and Health Technical Memorandum 02-01;

- To perform engineering tests appropriate to all work carried out and inform the Authorised Person(s) (MGPS) of all test results;

- To carry out all work in accordance with UHDB Health and Safety Policies and Procedures.

4.7 Quality Controller (MGPS)

It is the responsibility of the Director of Patient Experience, Estates and Facilities Management to appoint, in writing, on the recommendation of the Chief Pharmacist, a Quality Control Pharmacist with MGPS responsibilities.

The Authorised Person(s) (MGPS) will be responsible for liaising with the Quality Controller (MGPS) and organising attendance as required.

The duties and responsibilities of the Quality Controller (MGPS) are:

- To assume responsibility for the quality control of the medical gases at the terminal units (that is, the wall or pendant medical gas outlets);

- To liaise with the Authorised Person(s) (MGPS) in carrying out specific quality and identity tests on the MGPS, in accordance with the Permit to Work System and relevant Pharmacopoeia Standards;

- To organise MGPS training of pharmacy staff who may deputise for the Quality Controller (MGPS);

He/she should have received training on the verification and validation of MGPS and be familiar with the requirements of this MGPS Operational Policy.

4.8 Head of Pharmacy

As medical gases are medicines, their safe procurement, storage, prescribing and administration comes under the responsibilities and accountability of the Chief Pharmacist. Pharmacy will:

- Receive delivery notes for compressed gas cylinders, check against invoices received and pass invoices for payment;

- Order and supply (via for example, Portering) cylinders of medical gases and special gas mixtures;

- Maintain a record of cylinder rental charges and pass rental invoices for payment;

- Ensure that cylinder gases comply with Ph. Eur. Requirements;

- Ensure that other gases and gas mixtures comply with manufacturers' product licences.

4.9 Designated Medical Officer (MGPS) / Designated Nursing Officer (MGPS)

The most Senior Clinical Person (SCP) present on duty in each area is responsible for liaising with the Authorised Person(s) (MGPS) and will act as the Designated Medical Officer (MGPS) or Designated Nursing Officer (MGPS), on any matters affecting MGPS within their area of responsibility. All planned work on the MGPS will have been previously agreed with the Designated Medical Officer (MGPS) or Designated Nursing Officer and must be carried out under the MGPS Permit to Work System.

The Designated Medical or Nursing Officer (MGPS) (hereafter Designated Officer (MGPS)) is the person in each department with whom the Authorised Person(s) (MGPS) liaises on any matters affecting the MGPS and who would give permission for a planned interruption to the supply. There should ideally be a Designated Officer (MGPS) for every department; the MGPS Operational Policy should list the Designated Officers (MGPS) and the arrangements for cover due to absences of the Designated Officers (MGPS).

The Designated Officer (MGPS) acts as the focal point for communications related to the MGPS and advises on any special requirements for his/her department relating to MGPS, such as provision of emergency cylinders and vacuum pumps.

All patient facing professional staff are required to complete a clinical skills update training day which covers the practical use of MGPS Systems, including the safe use of basic equipment such as flow meters and suction controllers, safety procedures and actions in the event of an emergency (these are all integrated into the Trust Fire, Resus and Medical Devices Training).

This should be refreshed and reassessed on a regular basis (based upon a job role related risk assessment).

The duties and responsibilities of the Designated Medical Officer (MGPS) or Designated Nursing Officer (MGPS) are;

- To liaise between the medical and nursing staff that use the MGPS and the Authorised Person(s) (MGPS) to ensure that the MGPS is appropriate to their needs;

- Giving permission for a planned interruption to the supply by liaising with the Authorised Person(s) (MGPS) and signing the relevant sections (1 and 5) of the Permit to Work Form;

- Ensuring the safety of patients under their care, particularly when supplies are to be interrupted;

- Arrangements are made where required, for sufficient temporary cylinders to cover the period of the Permit to Work;

- Patients are not put at risk by any interruption to the MGPS;

- Liaising with the Authorised Person(s) (MGPS) when new equipment, which may affect gas supplies, is to be used or purchased;

- Reporting MGPS faults/problems to the Authorised Person(s) (MGPS) as quickly as possible.

On completion of the work, the Designated Medical Officer (MGPS) or Designated Nursing Officer, will accept the MGPS back into use and advise other affected clinical areas;

All nursing staff on duty that are not acting as Designated Medical Officer (MGPS) or Designated Nursing Officer, shall also ensure that clinical staff under their control are aware of any MGPS work that may affect them and shall understand the clinical/service implications.

Normal Operation of the MGPS

Medical gases are to be administered by prescription or by hospital agreed protocol and the SCP will ensure that those staff within his/her responsibility are aware of this.

Management shall ensure that training is provided and that their staff members are competent, prior to taking clinical responsibility for the use of the MGPS.

Emergency Work on the MGPS

In the case of an emergency such as a fire or a major leak, the Designated Medical Officer (MGPS) or Designated Nursing Officer shall first determine the usage of medical gases and where necessary, make alternative arrangements before arranging/authorising local isolation at the AVSU. Emergency isolation of the medical gases will take place only with permission of the nurse in charge of the relevant department.

There is no requirement to follow the Permit to Work Procedure to isolate the supply in an emergency. However, following such an event, the Authorised Person(s) (MGPS) will require the Designated Medical Officer (MGPS) or Designated Nursing Officer or nurse in charge to accept the system back into use by signing a permit to that effect.

If the MGPS is isolated in an emergency, it should never be returned to service without the required tests being carried out by the Authorised Person(s) (MGPS) and the Quality Controller (MGPS) if appropriate.

4.10 Designated Porter (MGPS)

A Designated Porter (MGPS) is a porter with responsibilities for medical gases. He/she will have undergone specialist training in the identification and safe handling and storage of medical gas cylinders, including relevant manual handling training.

Designated Porters (MGPS) at UHDB will undertake the following duties:

- Assist with the delivery of gas cylinders by gas suppliers e.g. BOC;
- Deliver full gas cylinders from the cylinder stores (as appropriate) to wards and departments and return empty cylinders to these stores;
- Transfer gas delivery notes from the delivery driver to the Pharmacy Department as required;

- Identify and remove from service, faulty (e.g. leaking) cylinders and subsequently notify [usually Pharmacy and Estates] of the location of such cylinders;

- Perform a weekly check on cylinder stocks and report any deficiencies to the Pharmacy Department;

- Perform a weekly check on manifold rooms, cylinder manifold and reserve cylinder manifold levels and report any issues to the site Authorised Person(s) (MGPS);

- Ensure that all cylinder contents are used within the three-year fill/refill timescale specified by the gas supplier;

- The Designated Porter (MGPS) must work safely at all times, using the appropriate personal protective and manual handling equipment, damage to which must be reported immediately to their supervisor.

4.11 Directorate/Department Managers

- Make arrangements for the effective management of medical gases in line with this Policy and the formulation of procedures under it;

- Be responsible for ensuring that risk assessment of identified hazards, is carried out by competent risk assessors;

- Establish and give effect to the appropriate procedures to be followed in the event of serious and imminent danger;

- Ensure the provision of information to the external emergency services on the number of cylinders involved in the event of a serious incident occurring i.e. fire;

- Provide Trust staff with understandable relevant information on health and safety issues relating to medical gases;

- Ensure staff training in the safe use and handling of medical gases, equipment and safe systems of work. Training shall be repeated and adapted periodically where appropriate.

4.12 All Staff

All staff are required to follow this Policy.

4.13 Medical Gases Group

The responsibilities of the Medical Gases Group are to:

1) Ensure the development and monitoring of reliable systems for the management, monitoring and safe use of medical gases within the Trust;

2) Prepare, implement, monitor and review policies and procedures for safe use of medical gases;

3) Ensure compliance with regulations and HTM 02-01 Medical Gas Pipeline Systems and National Best Practice;

4) Ensure incidents relating to medical gas use and supply are investigated appropriately and improvements made;

5) Maintain and review the Risk Register in relation to medical gases;

6) Monitor usage and develop contingency plans and emergency responses.

Core membership will include;

Consultant Anaesthetist (Chair)
Head of Pharmacy
Authorised Engineer - MGPS
Appointed Person(s) - MGPS
Quality Controller - MGPS
Medical Electronics Manager
Clinical Specialist and Equipment Library Manager
Lead Nurse Professional Development
BOC Account Manager
Portering Services Manager
Health and Safety Manager

Others may be invited to join the group as deemed necessary.

The Medical Gases Group shall report to the Drugs and Therapeutics Committee.

4.14 Oxygen Safety Group

The purpose of the Oxygen Safety Group is to review the harms and reported incidents caused by and related to oxygen administration, to identify learning that can be shared across the Trust, to reduce the risk of recurrence.

To ensure compliance with;

- British Thoracic Society (BTS) Guidelines for Oxygen Use in Adults in Healthcare and Emergency Settings;
- Trust Oxygen Clinical Guidelines;
- NHS Improvement National Patient Safety Alerts

Core Membership;

Lead Nurse, Patient Safety (Joint Chair)
Respiratory Medicine Consultant (Joint Chair)
Respiratory Specialist Nurse
Patient Safety Support Officer
Divisional Representatives (Medical and Nursing)
Junior Doctor Representative
Medicines Safety Pharmacist
Clinical Educators
Physiotherapist
Medical Devices Representative
Patientrack Representative (as required)

Others may be invited to join the group as deemed necessary.

The Oxygen Safety Group shall report to the Patient Safety Committee.

5 Implementation of the Policy

5.1 Key Operational Policy Considerations

Key management processes and actions for implementing the policy are detailed within HTM 02-01 and the requirement for operational policies for each site to be in place.

Key Operational Policy considerations include;

System Limitations

The Operational Policy should ensure users are aware of the capacity of the system and any particular limitations.

System Hazards

Users should be aware not only of the chemical hazards of any of the gases/gas mixtures delivered by the MGPS but also of the consequences of the loss of any services or the formation of incorrect mixtures.

Emergency Procedures

The Operational Policy should set out the procedures to be followed in the event of an emergency.

Medical Equipment

The MGPS Operational Policy is not intended to be applied to the use, maintenance, etc. of patient-connected equipment except when the use of such equipment may influence the operation of the MGPS. For example, when during the Covid-19 Pandemic, the use of Continuous Positive Airway Pressure Therapy (CPAP), placed increased demand upon oxygen usage significantly.

Gas Quality Requirements

Medical gases supplied from cylinder or liquid sources should comply with Ph. Eur. PSA Systems in accordance with the recommendations in HTM02-01 Chapter 5, Part A. All other gases or medical gas mixtures should comply with the product license specification held by the gas supplier.

Control of Work

Any work involving alterations, extensions or maintenance work on the system should be subject to the Permit-to-Work Procedure, under the control of the Authorised Person(s) (MGPS).

Responsibility for Gas Cylinders

The responsibility for gas cylinders should be clearly defined in the Operational Policy. This should include the training of personnel in the correct procedures for cylinder handling, storage and transportation.

Record Drawings

The Estates Department should have readily available, accurate and up to date drawings of the MGPS showing main sections and branches, departments served, control valves, terminal units and alarm systems for each medical gas service.

Locking of Valves and Plant Rooms

All valves on the MGPS, except those in plant rooms, should be secured in such a way that they can normally be locked in the closed or open position. In the case of emergency, the locking system should be capable of being overridden.

Contractors

All contractors should comply with the Trust's or Building Safety Policy. Work on pipelines should only be carried out by specialist firms registered to BS ENISO 9001/BS EN ISO 1348. Evidence of registration should be by sight of the current Certificate of Registration.

Carrying Medical Gas Cylinders in Vehicles

Users of personal vehicles carrying Oxygen and/or Entonox, for patient and healthcare use, must contact their insurance company to ensure that their car insurance covers them to carry medical gases in their personal car.

The cylinder must be transported in the appropriate bag and placed in the boot of the car or on the back seat securely fastened by the seat belts. If the car is left unattended, the cylinder must be placed out of sight in the car boot. However, it should not be left unattended for any length of time, particularly in hot weather. Vehicles must carry COSHH Data Sheets appropriate to the gases carried.

All cylinders must be kept well away from all sources of oil, including spillages or oil containers in vehicles.

There must be no smoking in any vehicle carrying cylinders of medical gases.

If cylinders of Entonox are subject to temperatures below minus six degrees celsius, Entonox can separate into it's constituent components i.e. Nitrous Oxide (which liquefies in the cylinder) and Oxygen (which remains as a gas).

Whenever possible, ensure stored cylinders remain above ten degrees celsius in order to prevent this effect.

Entonox that has been subjected to low temperatures, must be allowed to reach room temperature by leaving stored horizontally between ten and thirty eight degrees celsius for twenty four hours. Cold cylinders must NOT be used for patient treatment.

5.2 Training

Management aims to control work related risks and ensure safe working practices. All training needs will be identified and a programme of training, monitoring and control will be followed as detailed below. It is essential that personnel at all levels have a sound general knowledge of the principles, design and functions of MGPS. Further, that all staff will be trained in relationship to their particular responsibilities.

The relevant line manager for staff within the areas of responsibility should ensure that all staff have received this training prior to using the MGPS and that refresher courses are arranged in accordance with Table 1 below:-

Position	**Safe Use and Application of Medical Gases**	**Emergency Procedures and Permit to Work System**	**Management of the MGPS**	**Installation and Maintenance of MGPS**
Authorised Person	3 yearly	3 yearly	3 yearly	3 yearly
Competent Person	3 yearly	3 yearly	-	3 yearly
Designated Nursing Officer		3 yearly	-	-
Registered Nursing Staff	On Induction	-	-	-
Non-Registered Nursing Staff	On Induction	-	-	-
Designated Porter	Annually	-	-	-
Quality Controller (MGPS)	5 yearly	5 yearly	5 yearly	5 yearly

Individual training records will be held and used to determine future training events and requirements

The Trust has agreed not to fully meet the requirements set out by the Medical Gases Health Technical Memorandum 02-01: Medical Gas Pipeline Systems; for annual refresher training all medical and nursing staff who are involved in the use of medical gases for patient care and has agreed that the following training will be carried out.

Medical and Nursing Staff

All patient facing professional staff are required to complete Clinical Skills Training, which covers the practical use of MGPS Systems, including the safe use of basic equipment, such as flow meters and suction controllers, safety procedures and actions in the event of an emergency (these are all integrated into the Trust Fire, Resus and Medical Devices Training).

This should be refreshed and reassessed on a regular basis (based upon a job role related risk assessment).

New Starters

On commencement in the Trust, as part of the induction process, all new medical and nursing staff starters should complete a Clinical Skills Initial Training Day and be shown the local Area Valve Service Unit (AVSU), Medical Gas Alarm Panel and the location of this policy. The Trust Induction document should be completed as a record of training and held in the personal file.

5.3 Communications

Stakeholders in the provision of medical gases to patients have responsibilities as defined earlier in this document. Line Managers must ensure that any staff with responsibilities for MGPS are aware of this document and are fully conversant with the contents herein. Additionally, it is the responsibility of the Coordinating Authorised Person(s) to ensure that all staff have access to the policy and procedures or relevant departmental extracts.

6. Monitoring Compliance and Effectiveness

Monitoring Requirement:	Quarterly review on medical gas incidents. Quarterly review of training compliance. Quarterly review of planned preventative, reactive maintenance tasks and new installation or refurbishment programmes to Medical Gas Pipeline Systems. NHS Premises Assurance Model (PAM) – assurance framework compliance reporting.
Monitoring Method:	Reports to Medical Gases Group
Report Prepared by:	General Manager – Facilities Management
Monitoring Report Presented to:	The Drugs and Therapeutics Committee Strategic Health, Safety and Wellbeing Group
Frequency of Report	Six Monthly

7. References

Source of Data	Date of Publication/ Issue	Detail of Requirement
NHS	2006	Health Technical Memorandum (HTM) 02-01 “Medical Gas Pipeline Systems”, Part A, Design, Installation, Validation and Verification
NHS	2006	Health Technical Memorandum (HTM) 02-01 “Medical Gas Pipeline Systems”, Part B, Operational Management
NHS	2013	Supplements within Health Technical Memorandum (HTM) 08 “Specialist Services”
NHS	2003	No 1 “Dental Compressed Air and Vacuum Systems”
NHS	1997	No 2 “Piped Medical Gases in Ambulance Vehicles”
NHS	1989	National Health Service Model Engineering Specification, C11, “Medical Gases”
Ph. Eur.	2020	European Pharmacopoeia Standards for Medical Gases, including medical compressed air
BSI	1998	BS EN 737 1-4, 6
BCGA	2017	GN27 Guidance for the carriage of gas cylinders on vehicles
HMSO	1974	Health and Safety at Work Act
HSE	1999 -2006	Management of Health and Safety at Work Regulations
HSE	1992	Workplace (Health, Safety and Welfare) Regulations
HSE	1998	Provision and Use of Work Equipment Regulations
HSE	2013	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations

HSE	2002	Control of Substances Hazardous to Health (COSHH) Regulations
HMSO	2016	The Pressure Equipment (Safety) Regulations
BSI	1998	BS EN 737 1-4,6
BCGA	2017	GN27 Guidance for the Carriage of Gas Cylinders on Vehicles
HSE	1972	Highly Flammable Liquid and Liquid Petroleum Gas Regulations
HMSO	1968	Medicines Act 1968
HSE	1992	Manual Handling Operation Regulations
HSE	1992	Personal Protective Equipment at Work Regulations
HSE	1992	Electromagnetic Compatibility Regulations
HSE	1989	Electricity at Work Regulations
NHS/PSA	2018	Risk of death or severe harm from failure to obtain and continue flow from oxygen cylinders
NHSI Estates & Facilities	November 2020	Estates and Facilities Alert, NHSE/I-2020/003 Covid-19 Response – Oxygen Supply and Fire Safety
NPSA	2009	RRR006 Oxygen Safety in Hospitals
Estates and Facilities Alert	17th October 2011	FA2011/003 VIE (Vacuum Insulated Evaporator) Main storage vessel for bulk medical oxygen supply. Department of Health.
Estates and Facilities Alert	28th July 2010	EFA/2010/008 Unsecured Medical Gas Cylinders, including cylinders on trolleys. Department of Health.
HSIB	4 June 2021	Oxygen Issues During the COVID-19 Pandemic