



QI[®] Services.

Solutions for Medical Gas Pipeline Systems.



Linde: Living healthcare

What is QI[®] Services?

We have collected all services provided by Linde Healthcare under the name QI Services. QI stands for Quality Improvement, and that is what we deliver.

For a healthcare facility, managing all aspects around medical gases in a compliant way can be quite a challenge. This requires many high quality activities and operations to be carried out continuously and in a consistent way.

Linde Healthcare can be your partner in all aspects of ensuring safe and reliable delivery of medical gases to patients in hospitals and clinics. Linde Healthcare can offer outsourcing and support solutions to your organisation enabling you the peace of mind that you need. Our QI Services range covers full support of your facility's responsibility in managing the gas piped distribution system, to the internal production of medical air, to analysis at point of use, staff training and beyond.

All these activities must be performed correctly and documented at all times to ensure patient safety.

Such requirements are recognised across International and National Standards for Medical Gas Pipeline Systems (MGPS). These include ISO7396, National Standards and guidelines such as SIS HB370, NFPA 99 and HTM-02, which have been adopted by many countries.



QI for Security and Quality.

QI Services will ensure you meet all your quality and operational objectives, whilst also complying with the MGPS standards.

Linde Healthcare operates with the guiding principles of **Security** and **Quality**, and with our global gas supply infrastructure and professional network of support specialists, we always try to find the best customer solution. Using QI Services gives you the assurance that “the right gas at the right quality” is always available when and where it is needed.

Security

1. Adequacy

Ensures there is always an adequate supply of medical gas, wherever needed. This involves accurately assessing demand, ensuring a correctly designed pipeline system, and managing the correct level of inventory to ensure a reserve stock for medical gas and medical devices.

2. Continuity

Medical gas and medical devices must always be available when needed, and require management of dual supply sources, emergency reserves of bulk and cylinders, and an effective alarm system to give early warnings and to ensure actions are taken.

Quality

3. Identity

The correct medical gas must be delivered to each terminal unit. This means detailed design and installation with formal commissioning and testing after any work on the system.

4. Conformity

Ensuring each medical gas is always in compliance with the pharmaceutical standard, requiring accurate tracking of all supplies and regular analysis of gases generated on-site. Also important is to ensure periodic checks at terminal units to ensure the quality of gas delivered to the patient is the same as delivered to the hospital.

Many years of experience

Achieving these four goals requires a wide range of activities, from controlling supply of gases, to maintaining pipe work, to handling and moving cylinders and devices, to monitoring, analysis and of course, training of staff.

These activities are usually spread across several hospital departments; pharmacy, portering, engineering, procurement, and nursing and therefore managing these activities and interactions in an efficient manner is very challenging.

Linde Healthcare has many years and world wide experience in managing all these activities. We are acknowledged experts in the field, indeed some of the standards now in use find their origins in Linde Healthcare company procedures.

The QI Services portfolio.

Our services can be offered on an individual basis or as part of a complete solution. Our preferred way of working together with you, is to identify your needs, and based on that we put together a customized solution of products and services.

QI Services offer everything you need to deliver medical gases safely and compliantly to patients. We can tailor solutions to your needs that support your existing operations and offer attractive financing alternatives for upgrades, new installations or rental schemes.

Linde Healthcare can be your outsourcing partner for all aspects of medical gas and medical device management. We can provide and monitor the quality of your gas products, carry out a risk audit, train staff, provide cryo services and even provide full on-site management.

Equipment based solutions

Designing, sizing, installing, commissioning, maintaining and operating the supply units and medical devices including medical gas pipeline systems.

- Bulk supply plant for medical O₂, medical N₂O, N₂
- QI Engineering
- QI Engineering Equipment
- QI Design

Maintaining operational standards

Providing management services to ensure medical gas operations are in compliance with required standards.

- QI Risk
- QI Training
- QI Maintenance
- QI Point Analysis

Equipment based solutions.

A Medical Gas Pipeline System (MGPS) is an integrated system from supply source (bulk tank, cylinders or compressors) to the point of use. Linde Healthcare can design, supply and install all components of this system for a complete high quality solution. The services provide continuous and reliable supply of medical gas, whenever needed. Equipment services for medical devices are available and can be financed in different ways as customized offers.

Bulk supply plant

Linked with the QI Services portfolio, a full range of both single and dual tank supply systems is available for medical O₂, medical N₂O, synthetic air or N₂.

QI Engineering

Provision of all aspects of the supply, installation, testing and commissioning of a bulk supply plant with tanks or a Medical Gas Pipeline System. The service can include:

- Turnkey supply and installation or modification of oxygen bulk tanks, and/or MGPS.
- Installation of new or modified MGPS.
- Project management and coordination during the installation project.
- Specialist management of installation contractors to ensure compliance with relevant Standards.
- Testing and commissioning.

QI Engineering Equipment

Our new central gas equipment have been developed based on requirements from the Nordic market and is providing the hospital with a perfect monitoring of the system and a peace of mind throughout the life time by the following features.

- Modern alarm system Medican integrated into both the products used in the manifold room and in the ward. All information can be sent to the Building Management System used by the hospital through e.g. relays, 4-20 mA signals or Modbus.



Stabilizer SQ1000 is covering your need both today and in the future.

- All events like e.g. too high or too low pressure are stored in the Medican alarm system log. Also all pressure and flow data are stored and visualized by graphs on the Medican display.
- Flow sensors connected directly to the Medican alarm system. Tested and ready to use directly from production. You decide if you want to measure the entire flow of the hospital or for each ward.
- Quick and reliable deliveries
- Quick installation
- For easy and reliable identification, tracking and commissioning an integrated electronic RFID tag transferring and exchanging data with a RFID reading device can be mounted. A wide range of data are stored in RFID tag directly from production; item number, serial number, production date and final check report ID. After each service the service technician writes into the RFID tag; date, service/test report ID and any remarks. All data are also digitally stored by the service technician.
- Easy operation and maintenance supported by a great coverage of AGA/Linde Healthcare service technician that will help you throughout the entire life of the products.

QI Design

Design of medical gas pipelines is a precise and skilled operation. Linde Healthcare is a global expert in the area and we offer a wide range of services for all medical gases, including:

- Full design from an outline brief.
- Consultancy and advice on internal proposals and designs.
- Review and formal assessment of contractor submissions.



SmartLet – The new innovative and intelligent terminal unit.

Maintaining operational standards.

All the major standards for Medical Gas Pipeline System (MGPS) highlight “operational management” as a key area to address, to ensure safety and security. Linde Healthcare can advise and provide support in all operational management areas.

QI MedAir and QI MedVac

Specification, design and installation of energy-efficient medical air and medical vacuum plants.

QI Risk

International and national standards require risk assessments; the classification of medical gases as pharmaceutical products places new demands on the hospital and staff to meet quality regulations. The QI Risk service provides:

- In-depth inspection and assessment of your Medical Gas Pipeline Systems and processes.
- Performed by experienced and qualified audit engineers.
- Full report showing compliance to relevant national and global standards.
- Detailed risk assessment with classification of every risk, each into an action programme.
- Advice and guidance on establishing an effective “Operational Policy”.

QI Training

Appropriately trained staff is essential in ensuring both safety and code compliance. We offer a wide range of training programmes, covering safe handling and use of medical gases, which is obligatory for all personnel

who handle medical gases. In addition, many of our courses are available as interactive trainings, e-learning, allowing maximum flexibility of learning whilst still allowing the management to track and ensure legal compliance.

QI Maintenance

- According to International and National Standards, a defined programme must be followed to ensure a correct maintenance schedule for every piece of equipment in the MGPS.
- We have teams of highly skilled maintenance engineers available for both routine preventive maintenance and for emergency response.
- Management of maintenance records.
- Reducing the risk of being exposed to component or MGPS failure.

QI Point Analysis

Full pharmacopoeia gas analysis services providing on-site sampling:

- At point of use (i.e. terminal units) to ensure the quality of gas delivered to patients from wall outlets.
- At on-site manufacturing plants (e.g. medical air and instrumental air) to ensure GMP compliance.

The sampling is performed by trained and certified AGA/Linde Healthcare staff and the analyses are done at Linde Healthcare's own laboratories in accordance with pharmacopoeia described methods.



Getting ahead through innovation.

Linde Healthcare is committed to working with healthcare providers and regulatory authorities in promoting continuous and safe use of medical products to improve patient care. We provide medical gas products, therapies, technical solutions and services to hospitals, clinics, nursing facilities, emergency management services and homecare providers around the world.

With our long experience and understanding of healthcare realities, you can depend on solutions that are delivered and serviced to the highest possible standards of quality, safety and efficacy.

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Contact us

For more detailed information please refer to the brochures for each QI Service. Please contact your local Linde Healthcare office or visit our QI Services global website www.linde-healthcare-qiservices.com

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