Medical Gas Pipeline Systems

Design, Installation, Maintenance & Repair — Standards, Compliance & Best Practice

FORMAT	DATES	CPD POINTS	
Live Online Training	29 – 30 September 2026	2 Points	**R 8 999** per delegate

Overview

Medical gas systems are essential infrastructure within any hospital or healthcare facility, supporting life-saving interventions in operating theatres, intensive care units, emergency departments and general wards. The safety, reliability and compliance of these systems are therefore not optional — they are mission-critical.

This 2-day interactive workshop provides delegates with comprehensive, practical knowledge of medical gas pipeline systems used in hospitals and healthcare facilities across South Africa, covering the full system lifecycle from initial planning and pipeline routing to component selection, risk zoning, testing protocols and long-term maintenance.

Design & Standards → Components & Layout → Installation & Testing → Maintenance & Fault-Finding → Compliance & Certification

By the end of the programme, attendees will leave with actionable engineering insights into how to design, install, test and maintain medical gas systems that are fully compliant, safe and aligned with modern healthcare demands.

Who Should Attend

- Healthcare Facility Managers & Maintenance Supervisors
- Hospital Engineering Services Teams
- Procurement Specialists
- Consulting Mechanical Engineers
- Medical Gas Installers & Maintenance Contractors
- Biomedical & Clinical Engineering Personnel
- SAQCC Gas Practitioners & Trainees
- Compliance Inspectors
- OEM & Supplier Representatives

Learning Outcomes

- ✓ Understand the legal and clinical requirements of medical gas systems in SA healthcare facilities
- ✓ Identify and interpret relevant standards
- ✓ Apply sound design principles for oxygen, vacuum, nitrous oxide and air systems
- ✓ Specify appropriate materials, components and layouts for pipeline safety and efficiency
- ✓ Recognise common installation errors and how to avoid them
- ✓ Develop preventive maintenance schedules and troubleshoot common system faults
- ✓ Conduct pressure tests, leak detection and functional testing procedures
- ✓ Navigate SAQCC Gas compliance processes and documentation requirements
- ✓ Respond effectively to gas-related failures or emergencies
- ✓ Evaluate and retrofit older systems in line with updated compliance frameworks

DAY 1 — Design & Installation of Medical Gas Pipeline Systems

Sessions 1–5

1 Introduction to Medical Gas Systems in Healthcare

- Importance of medical gas systems in clinical care (oxygen, vacuum, medical air, nitrous oxide)
- Context of challenges in South African healthcare infrastructure
- Overview of how pipeline systems support ICU, theatres, wards
- Real examples of system failures and their impact on patient safety

2 Applicable Codes and Standards

- Introduction to key standards used in South Africa
- Differences and similarities between SANS, ISO and HTM standards
- Role of SAQCC Gas and regulatory bodies
- Understanding the structure and purpose of SANS 7396-1
- Legal responsibilities for design and installation compliance

3 Design Principles for Medical Gas Systems

- System planning based on healthcare facility type and patient load
- Redundancy and emergency backup design
- Overview of system types: oxygen, vacuum, medical air, nitrous oxide, AGSS
- Demand calculations and flow rate considerations
- Application of diversity factors and zoning principles

4 Pipeline Components — Materials, Outlets, Valves & Zone Valve Boxes

- Overview of approved pipe materials (e.g. degreased copper)
- Safety features and shut-off valve arrangements
- Component demonstration or visuals (if available)
- Core components: valves, outlets, terminal units, alarms
- Colour coding, labelling and gas identification standards

5 Pipeline Layout, Zoning, and Pressure Regulation

- Pipeline routing strategies: above ceiling, ductwork, risers
- Avoiding pressure drops and ensuring even distribution
- Designing for scalability and future expansion
- Pressure zone planning and regulation best practices
- Zoning for departments and isolation protocols

DAY 2 — Maintenance, Fault-Finding, Testing & Compliance

Sessions 6–13

6 Installation Best Practice — Common Pitfalls and Solutions

- Examples of common installation mistakes (dead legs, poor brazing, cross-connections)
- Cleaning, purging and pressure testing protocols
- Correct installation procedures and quality control methods
- Installer responsibilities during handover and commissioning

7 Maintenance Protocols & Fault-Finding

- Creating preventive maintenance schedules
- Troubleshooting terminal units, alarms, regulators
- Tools and test equipment for medical gas systems
- Detecting leaks, pressure irregularities and contamination
- Documenting faults and system history

8 Functional Testing, Commissioning & Certification

- Step-by-step testing before commissioning
- Gas purity and cross-connection checks
- Final handover documentation and client sign-off
- Pressure, flow and alarm verification procedures
- SAQCC Gas and SABS certification requirements

9 Emergency Preparedness & Incident Response

- Identifying risks: leaks, system failures, gas contamination
- SOPs for hospital staff during failures
- Safety signage and alarm systems overview
- Emergency supply protocols and switching to backup systems
- Incident documentation and root cause investigation

10 Retrofitting Case Study

- Review of a real hospital pipeline retrofit project
- Temporary bypassing and zone decanting strategies
- Lessons learned and practical tips
- Challenges of working in live hospital environments
- Coordination with clinical staff, patients and contractors

11 Sustainability and Energy Efficiency in Medical Gas Systems

- Impact of continuous gas production systems (e.g. PSA oxygen) on energy consumption
- Environmental and economic benefits of modernising gas infrastructure
- Role of energy-efficient compressors, alarms and controls
- Comparison of gas supply models: cylinders vs bulk vs on-site generation
- Strategies for reducing waste (leaks, overproduction, unnecessary use)
- Lifecycle cost considerations in pipeline and plant design

12 Stakeholder Roles & Coordination in Project Delivery

- Defining roles: consultant, contractor, hospital FM, OEM, inspector
- Managing tender documents and scope alignment
- Dealing with disputes or defects post-installation
- Collaboration across design, installation, commissioning and handover
- Clear documentation, handover checklists and sign-offs
- Tips for successful project execution in live hospital environments

13 Final Session: Key Elements of SANS 7396-1:2009

- Pipeline systems for compressed medical gases and vacuum — based on ISO 7396-1

Registration Form

Medical Gas Pipeline Systems: Design, Installation, Maintenance & Repair | 29–30 September 2026 | Live Online Training

R 8 999
per delegate

BOOKING CONTACT (APPROVING OFFICIAL)

FULL NAME (MR / MRS / MS)

POSITION

COMPANY NAME

VAT NUMBER

TELEPHONE

EMAIL

ADDRESS

SIGNATURE

DATE

FINANCE & PAYMENT

PERSON RESPONSIBLE FOR FINANCE

DIRECT TEL NO.

DATE OF PAYMENT

PURCHASE ORDER / REFERENCE NO.

ACCOUNT HOLDER	BANK	BRANCH	ACCOUNT NO.
Independent Training Management (Pty) Ltd	FNB South Africa	Randburg (251650)	62685879276

DELEGATES ATTENDING THIS WORKSHOP

#	FULL NAME	POSITION	EMAIL
1			
2			
3			
4			
5			

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