

ISO 7396-1:2007-04 (E)

Medical gas pipeline systems - Part 1: Pipeline systems for compressed medical gases and vacuum

| Contents | | Page |
|--------------------|---|-------------|
| Foreword | | v |
| Introduction | | vi |
| 1 | Scope | 1 |
| 2 | Normative references | 2 |
| 3 | Terms and definitions | 2 |
| 4 | General requirements | 7 |
| 4.1 | (*) Safety | 7 |
| 4.2 | (*) Alternative construction | 7 |
| 4.3 | Materials | 8 |
| 4.4 | System design | 9 |
| 5 | Supply systems | 10 |
| 5.1 | System components | 10 |
| 5.2 | General requirements | 10 |
| 5.3 | Supply systems with cylinders or cylinder bundles | 12 |
| 5.4 | Supply systems with mobile or stationary cryogenic or non-cryogenic vessels | 13 |
| 5.5 | Supply systems for air | 13 |
| 5.6 | Supply systems with oxygen concentrator(s) | 17 |
| 5.7 | Supply systems for vacuum | 18 |
| 5.8 | Location of supply systems | 18 |
| 5.9 | Location of cylinder manifolds | 19 |
| 5.10 | Location of stationary cryogenic vessels | 19 |
| 6 | Monitoring and alarm systems | 19 |
| 6.1 | General | 19 |
| 6.2 | Installation requirements | 19 |
| 6.3 | Monitoring and alarm signals | 20 |
| 6.4 | Provision of operating alarms | 21 |
| 6.5 | Provision of emergency clinical alarms | 22 |
| 6.6 | (*) Provision of emergency operating alarms | 22 |
| 7 | Pipeline distribution systems | 22 |
| 7.1 | Mechanical resistance | 22 |
| 7.2 | Distribution pressure | 22 |
| 7.3 | Low-pressure hose assemblies and low-pressure flexible connections | 23 |
| 7.4 | Double-stage pipeline distribution systems | 24 |
| 8 | Shut-off valves | 24 |
| 8.1 | General | 24 |
| 8.2 | Service shut-off valves | 25 |
| 8.3 | Area shut-off valves | 25 |
| 9 | Terminal units, gas-specific connectors, medical supply units, pressure regulators and pressure gauges | 26 |
| 10 | Marking and colour coding | 27 |

| | | |
|--------------|---|-----|
| 10.1 | Marking | 27 |
| 10.2 | Colour coding | 27 |
| 11 | Pipeline installation | 27 |
| 11.1 | General | 27 |
| 11.2 | Pipeline supports | 28 |
| 11.3 | Pipeline joints | 29 |
| 11.4 | Extensions and modifications of existing pipeline systems | 29 |
| 12 | Testing, commissioning and certification | 29 |
| 12.1 | General | 29 |
| 12.2 | General requirements for tests | 30 |
| 12.3 | Inspections and checks before concealment | 30 |
| 12.4 | Tests, checks and procedures before use of the system | 30 |
| 12.5 | Requirements for inspections and checks before concealment | 31 |
| 12.6 | Requirements for tests, checks and procedures before use of the system | 31 |
| 12.7 | Certification of the systems | 36 |
| 13 | Information to be supplied by the manufacturer | 37 |
| 13.1 | General | 37 |
| 13.2 | Instructions for use | 37 |
| 13.3 | Operational management information | 38 |
| 13.4 | "As-installed" drawings | 38 |
| 13.5 | Electrical diagrams | 38 |
| Annex A | (informative) Schematic representations of typical supply systems and area distribution systems | 39 |
| Annex B | (informative) Guidelines for location of cylinder manifolds, cylinder storage areas and stationary vessels for cryogenic or non-cryogenic liquids | 62 |
| Annex C | (informative) Example of procedure for testing and commissioning | 63 |
| Annex D | (informative) Typical forms for certification of the medical gas pipeline system | 75 |
| Annex E | (informative) Temperature and pressure relationships | 105 |
| Annex F | (informative) Risk management checklist | 107 |
| Annex G | (informative) Operational management | 120 |
| Annex H | (informative) Rationale | 138 |
| Bibliography | | 140 |