

# Medical gas pipeline systems — Part 1: Pipelines for medical gases and vacuum



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# Preface

This is the second edition of CSA Z7396.1, *Medical gas pipeline systems — Part 1: Pipelines for medical gases and vacuum*. It is based on ISO 7396-1, but contains revisions and additional requirements to reflect Canadian practices and safety considerations. It supersedes the previous edition published in 2006.

This Standard is primarily intended to address new installations and does not require the retrofitting of existing systems. [Clause 11.5](#) deals with repairs, additions, and modifications to existing pipeline systems. The Subcommittee recommends, for existing systems, that health care facilities document and survey their installations to determine the adequacy of the pipeline distribution system and to properly identify components for emergency and/or maintenance procedures. Explanatory material has been added to clarify the content of this Standard. An asterisk (\*) beside a clause number identifies a clause for which further information is provided in [Annex A](#).

This Standard was prepared by the Subcommittee on Medical Gas Systems, under the jurisdiction of the Technical Committee on Anaesthetic Equipment, Respiratory Technology, and Critical Care Equipment and the Strategic Steering Committee on Health Care Technology, and has been formally approved by the Technical Committee.

August 2009

## Notes:

- (1) Use of the singular does not exclude the plural (and vice versa) when the sense allows.
- (2) Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.
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# Z7396.1-09

## **Medical gas pipeline systems — Part 1: Pipelines for medical gases and vacuum**

### **1 Scope**

#### **1.1\***

This Standard specifies safety requirements for medical gas pipeline systems in health care facilities. It is intended for use by anyone involved in the design, construction, inspection, and operation of medical gas systems.

#### **1.2**

The provisions of this Standard are intended to

- (a) ensure that each medical gas pipeline provides the correct gas or vacuum to the corresponding terminal unit;
- (b) specify the use of gas-specific components for terminal units and for other connectors that are normally accessible to the user;
- (c) ensure a continuous supply of each medical gas or medical vacuum;
- (d) specify multiple sources complete with redundant components sufficient to ensure an uninterrupted supply in normal condition or in single fault condition;
- (e) provide general guidance for source and pipeline sizing;
- (f) ensure that medical gases are not contaminated by the pipeline;
- (g) specify materials of construction of sources and pipelines, installation methods, allowable minor components, and testing required to ensure the pipeline system does not contaminate medical gases; and
- (h) confirm, through testing, that each medical gas pipeline contains only the specified gas prior to its use in patient care.

#### **1.3**

This Standard applies to pipeline systems for

- (a) medical gases or medical gas mixtures, intended for patient care, including
  - (i) oxygen;
  - (ii) medical air;
  - (iii) nitrous oxide;
  - (iv) carbon dioxide;
  - (v) oxygen 93;
  - (vi) helium;
  - (vii) oxygen/nitrous oxide mixtures; and
  - (viii) helium/oxygen mixtures;
- (b) the following gases for powering devices unrelated to human respiration:
  - (i) instrument air; and
  - (ii) nitrogen; and
- (c) medical vacuum.

## 1.4

This Standard includes requirements for the installation, performance, documentation, testing, commissioning, and maintenance of medical gas pipeline systems. Specifically, these requirements relate to the

- (a) design of systems to ensure the continuous supply of gas or vacuum;
- (b) selection of materials and components;
- (c) non-interchangeability of equipment between different gas systems and services;
- (d) cleanliness of materials and components and of the completed system;
- (e) configuration of system components;
- (f) control, monitoring, and alarm systems;
- (g) markings and information to be supplied by the manufacturer or installer;
- (h) contaminant testing of pipelines;
- (i) final testing; and
- (j) maintenance and ongoing verification.

## 1.5

This Standard does not apply to medical gas pipeline systems supplying hyperbaric chambers.

**Note:** See CSA Z275.1.

## 1.6

This Standard does not provide specific requirements for oxygen concentrator supply systems for connection to the oxygen pipeline distribution systems.

**Note:** Requirements for oxygen concentrator supply systems for connection to the oxygen pipeline distribution systems described in this Standard are provided in CAN/CSA-Z10083.

## 1.7

This Standard does not apply to veterinary and animal research facilities.

**Note:** The relevant requirements of this Standard, particularly those regarding safety, should be incorporated in the design, construction, and installation of piping systems in these facilities. These systems should be inspected and tested by qualified testing agencies.

## 1.8

In CSA Standards, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; “may” is used to express an option or that which is permissible within the limits of the standard; and “can” is used to express possibility or capability. Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material. Notes to tables and figures are considered part of the table or figure and may be written as requirements. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

## 1.9

The values given in SI (metric) units are the standard. The values given in parentheses are for information only. Unless otherwise specified, pressures in this Standard are expressed as gauge pressure (i.e., atmospheric pressure is defined as 0).