

Australian Standard 2568—1982

PURITY OF COMPRESSED MEDICAL BREATHING AIR

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Association of Consulting Engineers of Australia
Australian Society of Anaesthetists
Commonwealth Department of Health
Confederation of Australian Industry
Consultant Architects
Department of Housing and Construction
Department of Public Works, N.S.W.
Department of Public Works, W.A.
Health Commission of New South Wales
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AUSTRALIAN STANDARD

PURITY OF COMPRESSED MEDICAL BREATHING AIR

AS 2568—1982

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PREFACE

This standard was prepared by the Association's Committee on Medical Gases and Pipeline Services under the authority of the Medical Materials and Equipment Standards Committee.

The standard specifies the levels of purity of compressed breathing air supplied for medical use. The maximum allowable concentration of contaminants is related to the end use of the compressed breathing air. The health and safety of the user may be safeguarded in certain environments by reducing the concentration of a contaminant in the respirable air and so preventing physiological or toxic effects upon the user, or preventing malfunction of equipment.

To assist in achieving the specified purity, due consideration must be given to the siting of the air intake of compressors with regard to various possible sources of contamination, e.g. boilers, laundries, refrigeration systems, gas cylinder and other storage areas and main roads.

In the preparation of this standard cognizance was taken of the following documents:

CSA Z180.1 Compressed Breathing Air
 ISO/TC 121/SC 6 Draft Standard for Non-flammable Medical Gas Pipeline Systems (DP 7396)

696.2 : 615.478

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

PURITY OF COMPRESSED MEDICAL BREATHING AIR

1 SCOPE. This standard specifies requirements for compressed medical breathing air as supplied from cylinders or air compressors. The standard does not apply to compressed air for laboratory use, driving of suction venturis, process control, surgical tools for dental purposes and other purposes not involving respiration.

2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS XXXX Non-flammable Medical Gas Pipeline Systems*

BS 1701 Air Filters for Air Supply to Internal Combustion Engines and Compressors Other Than for Aircraft

3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

3.1 Breathing air—normal air of the lower atmosphere, entering a breathing air system, and delivered directly to the respiratory tract, to the breathing apparatus or to storage containers.

NOTE: Air from the lower atmosphere and compressed air processed from it may be expected to contain certain natural constituents in a reasonably constant concentration, as shown in Table 1.

3.2 Contaminant—material not usually present in normal air of the lower atmosphere, such as scale or oil; or a material that, though often found in normal air of the lower atmosphere, has known toxic properties, e.g. carbon monoxide or a material that, though usually present in air of the lower atmosphere and not toxic, may interfere with the operation of breathing apparatus; or any material listed in Table 1, but exceeding the limits laid down in this standard; or any material not listed in Table 1.

3.3 Threshold limit value-time weighted average (TLV-TWA)—the time-weighted average concentration for a normal 8-hour workday or 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

3.4 Source—includes the compressors and/or cylinders and all subsequent air-processing devices used to achieve the specified level of purity.

4 PURITY OF AIR.

4.1 Composition of Ambient Air at Sea Level. The composition of normal atmospheric air at sea level is shown in Table 1.

4.2 Medical Breathing Air. The maximum allowable concentration of gaseous trace constituents which are regarded as contaminants of air for medical breathing purposes shall be as shown in Table 2. The limit for nitrogen shall be 77 percent to 79 percent by volume, and the limit for oxygen shall be 20 percent to 22 percent by volume.

TABLE 1
NORMAL COMPOSITION OF ATMOSPHERIC AIR
(Exclusive of water vapour)

Gas component	Content	
	percent V/V	mL/m ³
N ₂	78.084	
O ₂	20.946	
CO ₂	0.033	330
Ar	0.934	
Ne		18.18
He		5.24
Kr		1.14
Xe		0.087
H ₂		0.5
CH ₄		2
N ₂ O		0.5

5 SAMPLING AND SAMPLE CONTAINERS.

5.1 Sample Containers. Sample containers shall not react with the sample gases and shall be adequately dried. For safety, the sample container shall have a rated service pressure at least equal to the source pressure.

5.2 Sampling Procedure. Care shall be taken to ensure that all valves used will not contaminate or react with the constituents being determined. No regulator shall be used between the supply and the sample containers and any valves used shall be oil-free and of the all-metal type.

6 ANALYSIS OF COMPRESSED MEDICAL BREATHING AIR.

NOTES:

- The methods of testing detailed in this Clause are considered the best available at this time. However, any method that gives results as accurate or better than those specified herein may be used.
- Analysing for nitrogen is a complex procedure which is considered unwarranted, provided that tests of other constituent gases are performed.

6.1 Oxygen. The oxygen percentage shall be determined to an accuracy of at least 0.5 percentage unit. One of the following procedures may be used:

- By a volumetric (Orsat type) or manometric gas analysis apparatus using a suitable oxygen absorbing reagent.
- By a paramagnetic analyser.
- By mass spectrometry.
- By an electrochemical analyser containing a solid or aqueous electrolyte.
- By a gas chromatograph. The technique used shall be specific for oxygen.

*In course of preparation.