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Australian Standard 2704—1984

PORTABLE CYLINDERS FOR RESUSCITATORS AND SELF-CONTAINED BREATHING APPARATUS (NON-UNDERWATER)—SAFETY GUIDE

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee ME/2:

Aluminium Development Council

Australasian Steamship Owners Federation

Australian Chamber of Commerce

Australian Liquefied Petroleum Gas Association

Australian Underwater Federation

Australian Welding Institute

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AUSTRALIAN STANDARD

PORTABLE CYLINDERS FOR RESUSCITATORS AND SELF-CONTAINED BREATHING APPARATUS (NON-UNDERWATER)—SAFETY GUIDE

AS 2704—1984

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PREFACE

This standard was prepared by the Association's Committee on Gas Cylinders. It supersedes Supplement No 4 (1974) to AS CB4, the former SAA Gas Cylinders Code, now superseded by AS 2030.

The use of privately owned breathing apparatus brings compressed gas cylinders into the hands of people not familiar with the risks involved and the care required. Inspecting authorities with responsibility in relation to pressure vessels, and many other governmental and private organizations, consider it desirable that recommendations drawing attention both to the dangers associated with compressed gas cylinders and to practices which will serve to minimize these dangers be available for guidance.

The publication of this standard setting out the dangers involved and the precautions to be observed is the result of one line of action. A second line involves the introduction of regulations covering appropriate features of the use and filling of cylinders.

Through the SAA Gas Cylinders Code (AS 2030) and related specifications for cylinders, Committee ME/2 has established standards of safety recognized by the industry. These standards are enforced by the compressed gas industry itself, and by relevant inspecting authorities.

Private persons and organizations considering using cylinders as part of breathing apparatus may not be familiar with these national standards; however, for their own safety and the safety of their members they should seek guidance in regard to acceptable practice. Furthermore, filling of cylinders with air is sometimes carried out by persons or organizations other than the normal fillers of gas cylinders, and these persons or organizations should seek guidance on the standard precautions to be observed.

While the SAA Gas Cylinders Code covers general requirements for the safe use of all types of gas cylinder, it does not cover some of the particular problems that arise through the handling of cylinders by private persons under the special conditions presented by the use of breathing apparatus. The purpose of this standard is to provide such guidance for the safe use of breathing cylinders.

This standard also provides a guide to safe practices for the filling and use of gas cylinders for resuscitators as used by ambulance authorities, and medical and paramedic personnel.

The committee decided that the subject of decant filling of extra high pressure (EHP) oxygen includes particular hazards such as to be beyond the scope of this standard. The committee considered excluding handling of gases of greater than 22 percent oxygen content from this standard, owing to what they regarded as special hazards. But it was decided, provided that the practices given are aplied only by suitably trained personnel, that the provisions already established in Supplement No 4(1974) to AS CB4 should not be discontinued.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard provides guidance on safe practices for portable gas cylinders for resuscitators and self-contained non-underwater breathing apparatus. Filling methods are provided including compressing of atmospheric air and breathing gas, and decanting breathing gases of not greater than 22 percent oxygen content, and of greater than 22 percent oxygen content.

NOTES:

1. There are special dangers associated with handling gases of greater than 22 percent oxygen content, and the practices given in this standard for those gases are intended to be applied only by suitably trained personnel.
2. AS 2705 provides for gas cylinders for self-contained underwater breathing apparatus (SCUBA).
3. The gas cylinders for resuscitators referred to above are those used by ambulance authorities, and medical and paramedic personnel, and are referred to in AS 2488.
4. AS 1716 specifies requirements for self-contained breathing apparatus for respiratory protection, and AS 1715 provides guidance on selection, use and maintenance of respiratory protective devices.

Dangers associated with such cylinders are identified, and safe practices to minimize these dangers are given. The practices are intended to be applied in conjunction with the cylinder manufacturer's instructions.

There are particular hazards associated with extra high pressure (EHP) decanting of oxygen, taken to be 20 000 kPa and greater, and that process is beyond the scope of this standard.

Guidance is given on compressor and decanting equipment, selection and storage of cylinders, and cylinder reconditioning.

1.2 REFERENCED DOCUMENTS. In addition to the cylinder specifications listed in Appendix A, the following documents are referred to in this standard:

AS 1319	Safety Signs for the Occupational Environment
AS 1349	Bourdon Tube Pressure and Vacuum Gauges
AS 1715	Selection, Use and Maintenance of Respiratory Protective Devices
AS 1716	Respiratory Protective Devices
AS 1944	Medical Gas Cylinder Identification
AS 2030	SAA Gas Cylinders Code Part 1—Cylinders for Compressed Gases Other than Acetylene
AS 2337	Gas Cylinder Test Stations
AS 2472	Valves for Medical Gas Cylinders (Pin-indexed Outlet)
AS 2473	Valves for Compressed Gas Cylinders (Threaded Outlet)
AS 2488	Resuscitators, Resuscitator Containers and Resuscitator Kits
AS 2568	Purity of Compressed Medical Breathing Air
AS 2705	Portable Cylinders for Self-contained Underwater Breathing Apparatus (SCUBA)—Safety Guide
SAA MP48	Approved Gas Cylinder Test Stations.

1.3 DANGERS ASSOCIATION WITH CYLINDERS.

1.3.1 Explosion. The main danger with a compressed breathing gas cylinder is that when filled the cylinder contains considerable energy. Misuse can result in an explosion causing serious damage, and injury or death of persons nearby.

Explosion of a filled cylinder might be caused by one or more of the following:

(a) Weakening of the cylinder wall or ends due to internal or external corrosion, abrasive wear, or other defect.

(b) Reaction between oxygen present in the contained air and contaminating oil or other hydrocarbon vapour, resulting in a rapid and large increase of internal pressure.

(c) Application of internal pressure in excess of the pressure for which the cylinder was designed, i.e. due to overfilling.

(d) Application of heavy, sudden, or concentrated loads.

(e) Application of heat resulting in an increase of internal pressure above that for which the filled cylinder was designed, or in loss of mechanical strength of the cylinder wall.

1.3.2 Other dangers. Other dangers associated with the use of a compressed breathing gas cylinder include the following:

(a) Leakage of the contents, resulting in the apparatus being useless or giving an insufficient supply of gas for the intended application.

(b) Particles of rust or scale blocking gas passages in the apparatus.

(c) The presence of water which can cause icing (and possible blockage) of reducing valves.

(d) Polluted or incorrect cylinder contents.

1.4 PRECAUTIONS IN THE USE OF CYLINDERS. The following general precautions are to be observed in the use of a cylinder:

(a) Handle with care. Do not drop on hard surfaces, throw about, strike, or use as rollers. Take care not to damage the valve.