AS 2470—1989

Australian Standard®

Steel cylinders for compressed gases—Welded—11 kg to 150 kg

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STANDARDS AUSTRALIA

This Australian Standard was prepared by Committee ME/2, Gas Cylinders. It was approved on behalf of the Council of Standards Australia on 14 September 1988 and published on 13 February 1989.

The following interests are represented on Committee ME/2:

Aluminium Development Council
Australasian Steamship Owners Federation
Australian Chamber of Commerce
Australian Liquefied Petroleum Gas
Australian Underwater Federation
Australian Welding Institute
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This Standard was issued in draft form for comment as DR 86055.

STANDARDS AUSTRALIA

Amendment No 1
to
AS 2470—198[illegible]
Steel cylinders for compressed gases— Welded—11 kg to 150 kg

REVISED TEXT

The 1989 edition of AS 2470 is amended as follows; the amendment(s) should be inserted in the appropriate place.

SUMMARY: This Amendment applies to Clause 9.5.

Published on 15 October 1990.

Australian Standard®

Steel cylinders for compressed gases—Welded—11 kg to 150 kg

First published as part of AS B15—1950.
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PREFACE

This Standard is one of four prepared by the Standards Australia Committee on Gas Cylinders to supersede (in part) AS B115—1966, *Welded cylinders for compressed gases* and AS 2470—1981, *Steel cylinders for compressed gases—Welded—11* kg *to 150* kg. It is one of a suite of four Standards for welded and brazed cylinders for compressed gases, the other Standards being as follows:

AS 2468 *Steel cylinders for compressed gases—Brazed—0.1* kg *to 11* kg.
AS 2469 *Steel cylinders for compressed gases—Welded—0.1* kg *to 11* kg.
AS 3577 *Steel cylinders for compressed gases—Welded—150* kg *to 500* kg.

Although the first edition (1981) of this Standard was a replacement for AS B239—1970, *Welded steel cylinders for compressed gases (10 to 130 litres),* and also a replacement in part for AS B115—1966, those earlier Standards have not been withdrawn but have been declared 'obsolescent' and are being retained for reference purposes.

AS 3509, *LP gas fuel vessels for automotive use,* was used as a model for some requirements for larger welded gas cylinders, particularly for radiography requirements.

For gas cylinders that may suffer from valve damage due to impact or rough handling of small valves, a strength test has been introduced.

For cylinders sized 25 kg to 150 kg water capacity, any footing is to be [illegible]n to reduce the likelihood of injury to feet and hands.

This Standard provides for gas cylinders produced in large quanti[illegible]rs of this Standard should note that the relevant Inspecting Authority will r[illegible]uir[illegible]either quality control procedures to be employed, at the point of manufacture [illegible] Australia, or sampling and testing at the point of entry into Australia. It sh[illegible]ould also be noted that before a gas cylinder can be first filled in Australia it must be [illegible]ed with a Standards Australia Approved Gas Cylinder Test Station registe[illegible]d m[illegible]k in accordance with the relevant Standard of the AS 2030 series.

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1 SCOPE. This Standard specifies requirements for welded steel cylinders with one longitudinal and not more than two circumferential joints, of water capacity not less than 11 kg nor more than 150 kg, which have test pressures from 1750 kPa to 7000 kPa, and are intended for the storage and transport of compressed gases in accordance with AS 2030.1.

NOTES:

1. A gas cylinder manufactured by welding but which includes any brazing of or on the pressure-retaining portions is for the purpose of this Standard considered to be a brazed gas cylinder.
2. Other Australian Standards for brazed and welded gas cylinders are AS 2468, AS 2469, AS 3577
3. Appendix A lists the suggested minimum information that should be supplied by the purchaser when ordering gas cylinders to this Standard.

2 REFERENCED DOCUMENTS. A list of documents referred to in this Standard is given in Appendix B.

3 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 2030.1 and those below apply.

Inspector—a person, acceptable to the Inspecting Authority, who ensures and certifies that all the inspections specified herein have been carried out and that the cylinders comply with all the requirements of this Standard.

Attachment—any fitting attached to the pressure-retaining sections of the cylinder by welding, including bosses, pads, valve protection rings, and footrings.

4 STEEL.

4.1 Cylindrical sections and ends.

4.1.1 *Steelmaking process.* The steel shall be made by the open hearth, basic oxygen or an electric process. Rimmed steels shall not be used for arc welded components.

NOTE: Rimmed steels are considered not suitable for arc welded components because of problems associated with the welding of the slit edge due to the possibility of lamination and segregation problems.

4.1.2 *Cast analysis.* The cast analysis shall conform to Table 1, except that where resistance-welded attachments are to be added to a pressure-retaining portion of the cylinder, the maximum carbon content of both portions of the joint shall be 0.15%.

TABLE 1
CAST ANALYSIS

Elements (other than iron)	Cast analysis (max.), percent
Carbon	0.25
Manganese	1.70
Silicon	0.40
Micro-alloying elements (total)	0.15
Sulphur	0.040
Phosphorus	0.040

NOTES:

1. Grain-refining elements, i.e. titanium (up to 0.040%) and aluminium (up to 0.1%), may be added.
2. Examples of micro-alloying elements are titanium (where greater than 0.040%), niobium, and vanadium.
3. AS 1594 and equivalent overseas Standards specify some acceptable grade of steel with conforming cast analyses.
4. Residual elements up to the following individual amounts or a sum of 0.7% of all listed elements are considered to be incidental:

Chromium	0.20%
Copper	0.35%
Molybdenum	0.10%
Nickel	0.35%

4.1.3 *Residual elements.* Elements not shown in Table 1 shall not be intentionally added to the steel, other than for the purpose of finishing the heat.

All reasonable precautions shall be taken to prevent the addition of such elements during manufacture, and the quantities present shall not be detrimental to the application of steel for a welded gas cylinder.

4.1.4 *Weldability.* The steel for components to be welded shall be of a weldable quality.

4.1.5 *Mechanical properties.* When a completed gas cylinder is tested in accordance with Clause 9.3, the yield and tensile strength values obtained shall be not less than the values used in the equations in Clause 5.1.1.

When determined in accordance with Clause 9.3, the elongation shall be not less than 20% minus 1 percentage unit for each increment of 50 MPa by which the measured tensile strength exceeds 350 MPa, but in any case not less than 16%.

4.2 Attachments. Attachments shall be of steel complying with the requirements of Clause 4.1, except that for resistance-welded attachments the steel of both components of the joint shall be weldable and be subject to a maximum carbon content of 0.15%.

5 DESIGN AND CONSTRUCTION.

5.1 Minimum thickness.

5.1.1 *Cylindrical portions of shell (not including any part of the ends).* The thickness of the cylindrical portion shall be not less than 1.75 mm, nor less than the greater of those calculated from the following equations:

$$t = 2.5\left(\frac{D_i}{R_m}\right)^{1/2} \quad \ldots (1) \text{ and } t = \frac{p_h D_o}{2f_n + P_h} \quad 5.1.1(2)$$

where

t = minimum finished thickness of the cylinder, in millimetres

D_i = nominal internal diameter, in millimetres

D_o = outside diameter of cylindrical section, in millimetres

p_h = test pressure (the design test pressure specified in AS 2030.1), in megapascals