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Australian Standard 2468—1981

K/C
Cylinders

AS 2468

STEEL CYLINDERS FOR COMPRESSED GASES— BRAZED—0.1 kg TO 11 kg



STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter



THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Aluminium Development Council
Australasian Steamship Owners Federation
Australian Chamber of Commerce
Australian Liquefied Petroleum Gas Association
Australian Underwater Federation
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of the Capital Territory
Department of Defence
Department of Industrial Affairs and Employment, S.A.
Department of Industrial Relations, N.S.W.
Department of Labour and Industry, Vic.
Department of Labour and Industry, W.A.
Department of Labour and Industry, Tas.
Department of Labour Relations, Qld
Department of Mines, Qld
Department of Mines and Energy, N.T.
Insurance Council of Australia
Railways of Australia Committee

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STANDARDS ASSOCIATION OF AUSTRALIA

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Amendment No 1

to

AS 2468—1981

**STEEL CYLINDERS FOR COMPRESSED GASES—BRAZED—
0.1 kg to 11 kg**

CORRECTION

SUMMARY: This amendment applies to Clause 4.1.1.

Published on 7 February 1983.

AUSTRALIAN STANDARD

**STEEL CYLINDERS FOR
COMPRESSED GASES—
BRAZED—0.1 kg TO 11 kg**

AS 2468—1981

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PREFACE

This standard is one of three prepared by the Association's Committee on Gas Cylinders to provide (in part) metric standards for gas cylinders previously covered by AS B115 and AS B239. The other two are AS 2469, Steel Cylinders for Compressed Gases—Welded—0.1 kg to 11 kg (part revision of AS B115—1966), and AS 2470, Steel Cylinders for Compressed Gases—Welded—11 kg to 150 kg (revision of AS B239—1970).

Welded cylinders of greater than 150 kg are not yet catered for by these standards, and AS B115 will be retained for this purpose. In any case, AS B115 and AS B239 will be retained for reference purposes for cylinders already manufactured and in use, until such time as that requirement no longer exists.

A significant change is that specific grades of steel are not listed, but instead the design is based on a relationship of permissible stress to yield strength, with a maximum permissible stress being set for calculation purposes. The minimum elongation has been specified as nominally 20 percent, but this may be reduced to a minimum of 16 percent for materials of certain higher tensile strengths.

Another departure from AS B239 and AS B115 is to acknowledge that welding of gas cylinders is now normally a mechanized operation, and so the previous qualification and inspection applicable to manual welding do not apply unless manual welding is employed.

Pressure testing requirements differ from those specified in AS B239 and AS B115 in that, although a proof test is required for every cylinder, a stretch test is required only for 1 per 200, or batch if less than 200.

The proportions of bosses used for threaded attachments have been made less conservative and follow more closely the proportions given in BS 3799, Steel Pipe Fittings, Screwed and Socket-welding for the Petroleum Industry.

This standard makes reference to the following standards:

AS 1210	SAA Unfired Pressure Vessels Code
AS 1391	Methods for Tensile Testing of Metals
AS 1425	The Use of LP Gas in Internal Combustion Engines
AS 1442	Carbon Steels and Carbon-manganese Steels—Hot-rolled and Semi-finished Products
AS 1443	Carbon Steels and Carbon-manganese Steels—Bright Bars

AS 1594*	Hot-rolled Unalloyed Low Carbon Steel Sheet and Strip (see DR 80171)
AS 1595*	Cold-rolled Unalloyed Low Carbon Steel Sheet and Strip (see DR 80172)
AS 1596	SAA LP Gas Code
AS 1627	Code of Practice for Preparation and Pretreatment of Metal Surfaces Prior to Protective Coating Part 4—Abrasive Blast Cleaning of Steel Surfaces
AS 1721	General Purpose Metric Screw Threads
AS 1722	Pipe Threads of Whitworth Form Part 1—Sealing Pipe Threads
AS 1750	Steel Sections and Bars for Boilers and Unfired Pressure Vessels (Other Than Bolting Material)
AS 2030	SAA Gas Cylinders Code
AS 2105	Inorganic Zinc Silicate Paint
AS 2205	Methods of Destructive Testing of Welds in Metal Part 2.3—Tensile Tests—Transverse Joggle-butt Tensile Test Part 3.1—Bend Tests—Transverse Guided Bend Test Part 3.4—Bend Tests—Transverse Joggle-butt Wrap-around Bend Test
AS 2337	Gas Cylinder Test Stations
BS 1723	Brazing
BS 2569	Sprayed Metal Coatings Part 1—Protection of Iron and Steel by Aluminium and Zinc Against Atmospheric Corrosion
BS 2937	General Requirements for Seam Welding in Mild Steel
ANSI B57.1	Compressed Gas Cylinder Valve Outlet and Inlet Connections

*In course of revision.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

STEEL CYLINDERS FOR COMPRESSED GASES—BRAZED—0.1 kg TO 11 kg

1 SCOPE. This standard specifies requirements for brazed steel cylinders having no longitudinal joint, and of water capacity greater than 0.1 kg and less than 11 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.

Cylinders manufactured by welding but which include some brazing of pressure retaining joints, or attachments, are considered as brazed cylinders for the purposes of this standard.

NOTE: Appendix B lists the suggested minimum information that should be supplied by the purchaser when ordering gas cylinders to this standard.

2 DEFINITIONS. For the purpose of this standard the definitions in AS 2030 and the following definition 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.

3 STEEL.

3.1 Cylindrical Section and Ends. The steel for the cylindrical section and ends shall be manufactured by an open hearth, basic oxygen, or electric process, and shall be of weldable quality. The chemical composition shall comply with Table 1.

TABLE 1
CHEMICAL COMPOSITION

1 Element	2 Ladle analysis percent max.
Carbon	0.25
Manganese	1.70
Silicon	0.40
Micro-alloying elements	0.15
Sulphur	0.050
Phosphorus	0.050
Iron	Remainder

Steel to AS 1594 and AS 1595 may be suitable, but rimmed steels shall not be used for this application if welded.

NOTE: AS 1594 and AS 1595 include rimmed steels, but such steels are not suitable for welding because of problems associated with welding of the slit edge.

The steel shall achieve the strength values used in the formulas in Clause 4 and determined in accordance with Clause 7.

When determined in accordance with Clause 7.1.2, the elongation shall be not less than 20 percent minus 1 percentage unit for each increment of 50 MPa by which the measured tensile strength exceeds 350 MPa, but shall in any case be not less than 16 percent.

If resistance welded attachments are to be added to the cylinder, the maximum carbon content of the steel shall not be greater than 0.15 percent.

3.2 Attachments.

3.2.1 Pressure-retaining attachments. Pressure-retaining attachments shall be of steel complying with Clause 3.1 or AS 1750.

3.2.2 Non-pressure-retaining attachments. Non-pressure-retaining attachments shall be of steel complying with Clause 3.1 or the following, as appropriate:

- For arc welded attachments, steel shall be weldable and with a maximum carbon content of 0.25 percent.
- For resistance welded attachments, steel shall be weldable and with a maximum carbon content of 0.15 percent.
- For brazed attachments, steel may be selected from AS 1442 or AS 1443, but shall have a maximum carbon content of 0.25 percent.

4 DESIGN AND CONSTRUCTION.

4.1 Minimum Thickness of Cylindrical Section.

4.1.1 Cylinders of 150 mm and greater outside diameter. ~~The thickness shall be not less than the greater of those calculated from the following formulas: SEE AMENDMENTS No 1~~

$$t = 2.5 \sqrt{\frac{D_i}{T}} \quad \text{and} \quad t = \frac{P_h D}{2000f + P_h}$$

where

t = minimum finished thickness of the cylinder, in millimetres

D = external diameter, in millimetres

D_i = nominal internal diameter, in millimetres

P_h = test pressure (see Rule 1.9.6 of AS 2030), in kilopascals

f = maximum permissible stress, to be taken as 90 percent of the specified minimum yield strength of the steel, but not exceeding 60 percent of the minimum specified tensile strength of the steel, in megapascals. For calculation purposes, a maximum value for f of 320 MPa shall apply

T = specified minimum tensile strength of the steel, in megapascals.

NOTE: T refers to minimum tensile strength verified by tests in Clause 7, i.e. following heat treatment.

4.1.2 Cylinders of less than 150 mm outside diameter. The thickness shall be not less than the greatest of those determined by the formulas given in Clause 4.1.1 and—

- for cylinders up to and including 75 mm outside diameter 1 mm; or