AS 2337.3—1987
UDC 621.642.02:620.16
NEXT TIME
66-076.5:621.642.02:620.16

Australian Standard®
2337.3—1987

GAS CYLINDER TEST STATIONS

Part 3—INSPECTION AND TESTING OF FIBRE REINFORCED PLASTICS (FRP) ALUMINIUM ALLOY GAS CYLINDERS—HOOP OVERWRAPPED

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

D

This Australian standard was prepared by Committee ME/2, Gas Cylinders. It was approved on behalf of the Council of the Standards Association of Australia on 28 January 1987 and published on 2 March 1987.

The following interests are represented on Committee ME/2:

Aluminium Development Council
Australasian Steamship Owners Federation
Australian Chamber of Commerce
Australian Gas Association
Australian Liquefied Petroleum Gas Ltd
Australian Underwater Federation
Australian Welding Institute
Board of Fire Commissioners, N.S.W.
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
Department of Employment and Industrial Affairs, Qld
Department of Industrial Relations, N.S.W.
Department of Labour and Industry, Tas.
Department of Labour, S.A.
Department of Labour, Vic.
Department of Mines and Energy, N.T.
Department of Mines, Qld
Department of Occupational Health, Safety and Welfare, W.A.
Department of Territories
Fire Protection Industry Association of Australia Ltd
Insurance Council of Australia Ltd
Railways of Australia Committee

Review of Australian Standards. *To keep abreast of progress in industry, Australian standards are subject to periodic review and are kept up-to-date by the issue of amendments or new editions as necessary. It is important therefore that standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all SAA publications will be found in the Catalogue of SAA Publications; this information is supplemented each month by SAA's journal 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn standards.

Suggestions for improvements to Australian standards, addressed to the head office of the Association, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This standard was issued in draft form for comment as DR 84071.

AUSTRALIAN STANDARD

GAS CYLINDER TEST STATIONS
Part 3
INSPECTION AND TESTING OF FIBRE REINFORCED PLASTICS (FRP) ALUMINIUM ALLOY GAS CYLINDERS— HOOP OVERWRAPPED

AS 2337.3—1987

First published 1987

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.
ISBN 0 7262 4565 8

PREFACE

This standard was prepared by the Association's Committee on Gas Cylinders. It is based on draft procedures provided to the committee by The Commonwealth Industrial Gases Limited.

It is expected that certain SAA approved gas cylinder test stations will be able to extend their existing approval to cater for cylinders now entering service.

This standard provides only for hoop overwrapped gas cylinders with seamless aluminium alloy liners. Other types, such as totally overwrapped gas cylinders, and those with steel liners, have not been provided for in the absence of any proposals. For such proposals to be considered it would be necessary for the committee to receive comprehensive information on which to base appropriate requirements.

The interval of testing, and service life, are specified in AS 2030.1, SAA Gas Cylinders Code, Part 1—Cylinders for Compressed Gases Other than Acetylene.

Fibre reinforced plastics (FRP) gas cylinders are a high technology approach to the design of lightweight gas cylinders, and are highly stressed. The proper inspection and testing of these cylinders is essential to continued safe performance.

Each element of the FRP gas cylinder is important. The liner is a leak-tight membrane and provides some structural strength. The reinforcing fibres provide the major proportion of the structural strength. The resin protects the reinforcing fibres, and facilitates transfer of forces between fibres. A protective sleeve or external coating of paint may have been used for further protection from the environment or for cosmetic purposes.

CONTENTS

		Page
1	SCOPE	3
2	REFERENCED DOCUMENTS	3
3	DEFINITIONS	3
4	PREPARATION OF CYLINDER	3
5	INSPECTION AND TEST	3
6	REPAIRS	4
7	CONDEMNING	4
8	STAMPING	4
APPENDIX A.	BACKGROUND INFORMATION ON FRP GAS CYLINDERS	13

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
GAS CYLINDER TEST STATIONS

PART 3—INSPECTION AND TESTING OF FIBRE REINFORCED PLASTICS (FRP) ALUMINIUM ALLOY GAS CYLINDERS—HOOP OVERWRAPPED

1 SCOPE. This standard specifies inspection and test requirements additional to those given in AS 2337.1 for application to hoop overwrapped fibre reinforced plastics (FRP) seamless aluminium gas cylinders by specifically approved (by SAA) gas cylinder test stations.

This standard does not apply to gas cylinders manufactured outside Australia.

NOTES:

1. Provisions for other FRP gas cylinders may be added in due course.
2. Appendix A gives information on the development of FRP gas cylinders.
3. AS 2764 specifies requirements for FRP hoop overwrapped gas cylinders.

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

AS 2030.1 SAA Gas Cylinders Code, Part 1—Cylinders for Compressed Gases Other than Acetylene

AS 2337.1 Gas Cylinder Test Stations, Part 1—General Requirements, Inspections and Tests—Gas Cylinders

AS 2764 Fibre Reinforced Plastics (FRP) Aluminium Alloy Gas Cylinders—Hoop Overwrapped

3 DEFINITIONS. For the purposes of this standard, the definitions given in AS 2030.1 apply.

4 PREPARATION OF CYLINDER. In addition to the cylinder preparation requirements of AS 2337.1, the following shall apply:

(a) Any dirt, attachments or labels (other than the cylinder manufacturer's label) that would interfere with visual inspection shall be removed.

(b) Removal of paint is not recommended, but where paint removal is necessary for inspection or other reasons the following apply:

(i) Abrasive and harsh mechanical means, including shot blasting and wire brushing, shall not be used.

(ii) The means of removal of paint shall be confirmed as appropriate by the cylinder manufacturer.

NOTE: Some chemical paint removers will damage the overwrap.

(c) Removal of any protective sleeve. Any protective sleeve that would interfere with visual inspection shall be removed. The means of removal shall not cause damage to the overwrap.

5 INSPECTION AND TEST.

5.1 General. The cylinder shall be inspected and tested in accordance with Clauses 5.2, 5.3 and 5.4. The assessment criteria and action taken shall be in accordance with Table 1.

NOTES:

1. Photographs and drawings are provided (see Figs 1 to 13) for guidance.
2. The criteria are new and experience will be necessary before they can be applied with certainty. Where doubt exists, the assessor is advised to be conservative and to quarantine marginal subjects until further guidance is obtained from the cylinder manufacturer.

5.2 External examination.

5.2.1 *Exposed metal portions.* The visual external examination requirements of AS 2337.1, as appropriate, shall apply.

5.2.2 *Overwrap portion.* The overwrap portion shall be inspected for defects listed in Table 1, and assessed in accordance with Table 1.

5.3 Internal inspection. In addition to the internal examination requirements of AS 2337.1, the following shall apply:

(a) Any dent or structural damage visible on the internal surface shall be cause for the cylinder to be condemned.

(b) Particular attention shall be given to the O-ring groove to confirm that it is clean and free from damage.

(c) Particular attention shall be given to the internal shoulder and neck areas to confirm that no cracks exist.

5.4 Hydrostatic pressure test. In addition to the hydrostatic pressure testing requirements of AS 2337.1, the following shall apply:

(a) When the cylinder is tested by one of the following methods, permanent expansion exceeding the specified percentage shall be cause for the cylinder to be condemned.

(i) Water jacket method... 5 percent of total expansion.

(ii) Non-water jacket method... 0.0006 × the original internal volume.

(b) For the water jacket method, the following equipment and procedural requirements apply:

(i) Verify the accuracy of the apparatus over the required range by use of calibrated cylinders.