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AS 2971—1987

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SERIALLY PRODUCED PRESSURE VESSELS

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This Australian Standard was prepared by Committee ME/1, Boilers and Unfired Pressure Vessels. It was approved on behalf of the Council of the Standards Association of Australia on 27 April 1987 and published on 6 July 1987.

The following interests are represented on Committee ME/1:

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Australasian Institute of Metals
Australian Compressed Air Institute
Australian Institute of Energy
Australian Institute for Non-destructive Testing
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PREFACE

This Standard was prepared by the Association's Committee on Boilers and Unfired Pressure Vessels in accordance with the recommendations of a special Working Group for Serially Produced Pressure Vessels.

The reason for this Standard is the long-felt need for a clear set of requirements to cover a wide range of small, usually low-hazard, pressure vessels whose design and construction are based on satisfactory burst and other performance tests of a significant number of representative samples. The main types of vessels falling into this group are small, serially produced refrigeration type vessels, air brake reservoirs, drink dispensers, and consumer items such as pressurized cream dispensers, etc. Recent additions to this group have been a special type of pressurized fire extinguisher body not covered by Australian Standards, and beer kegs.

Almost invariably these types of vessels do not comply with AS 1210, SAA Unfired Pressure Vessels Code, which has been prepared primarily on the basis of one-off vessels where the design is based on proven formulas, and construction is based on proven materials, fabrication procedures, personnel, and tests which are predominantly non-destructive. AS 1210 does permit burst testing as a basis for acceptance of design of parts or vessels, but only when they cannot be calculated. Thus, there is a need to cover this alternative method of achieving safe vessels where it is frequently equally sound and more economic to use burst and other performance tests to validate design, materials, and fabrication all simultaneously.

This method of assuring safe vessels is adopted extensively overseas through the use of various special specifications and in Australia under special approvals. Therefore, this Standard has been based extensively on such practices including the following:

(a) ANSI Z263.1—1975 (originally UL 207—1975), Refrigerant-containing Components and Accessories, Non-electrical (now ANSI/UL 207—1981).

(b) SAE Standard J10b, Automotive and Off-highway Air Brake Reservoir—Performance and Identification Requirements.

(c) AS 1843 to AS 1848 (fire extinguishers).

(d) Gas cylinder Standards listed in AS 2030, SAA Gas Cylinders Code.*

(e) AS 1056, AS 1361, and AS 3142 (domestic water heaters).

(f) AS B122—1962, Small Fusion Welded Steel Air Receivers (superseded by AS 1210).

(g) DOT 39, Non-reusable Gas Cylinders.

(h) AS 2278, Metal Aerosol Containers—Classification, Fitting and Testing.

(j) SAA Doc. AU/2/77-21, Draft Australian Standard for Arc Welded Steel Air Brake Reservoirs for Motor Vehicles (Maximum Capacity 80 L).

This last document had been developed by the Association's Committee on Pneumatic Energy Reservoirs using initially Public Comment Doc. 1820 September 1971, as a result of requests from the Chief Safety Engineer, Department of Employment and Labour Relations, Queensland in 1968 and from the Department of Transport in 1969. That document was not finalized for many reasons—one being the apparent clash of principle with AS 1210. Since then the size and pressure of air brake reservoirs have increased, and such vessels are now sometimes used as air-start vessels for large earthmoving equipment.

In the last few years there has been a growing demand from the refrigeration industry for acceptance of this alternative approach to AS 1210. Thus, the Association's Committee on Refrigeration, at its June 1982 meeting fully supported the general proposals to develop alternative requirements along the above lines. They also felt that this alternative approach may usefully be extended to vessels produced in small numbers.

The economy and proven safety record of this alternative approach, which essentially results in specification of 'performance' type requirements was recognized during the preparation of this Standard as was the need for consistency with the principles of AS 1210.

The wide coverage of this Standard is expected to provide a consistent approach for a large range of vessels and forms a logical extension to AS 1210. For this reason

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* See Clause 1.2 for titles in the AS 2030 series.

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there was an incentive to add it as a new section or as Supplement No 2 to AS 1210. However, this Standard has been prepared as a separate Standard in order to—

(i) avoid possible confusion between the various classes of AS 1210 vessels and the proposed four classes of these alternative vessels; and

(ii) permit coverage of non-metallic vessels or pressure parts, e.g. plastics covers on cream dispensers or rubber protectors for thin bases of some vessels.

The adoption of various classes approximates to the principle established in AS 1210, the classification being based primarily on the minimum safety factor as in AS 1210. In this way, a variety of vessels can be covered in a systematic manner in one document. The basis of these classes is discussed in the Commentary (which follows the appendices to this Standard).

While the Standard primarily considers mass-produced or serially produced vessels, provision has been made for the production of vessels in very small numbers to meet the special needs of the refrigeration industry and the limited production runs in Australia.

Limits have been placed on size and pressure for these vessels to ensure reasonable harmonization with AS 1210 and to cover virtually all vessels currently produced to satisfactory standards by this approach.

It should be noted that the Standard has been written primarily to suit conditions in Australia where there is a strong relationship between the manufacturer (and designer) and the Inspecting Authority. However, it is not intended to weaken the important link between these parties and the purchaser, who will be concerned with many other aspects beyond the scope of this Standard and who may require additional or alternative requirements, but such requirements must not be less than those already specified in the Standard and must comply with the requirements of the Inspecting Authority in the State where the vessel is to be operated. Statements of above requirements should form part of the contract documents between the purchaser and manufacturer.

Users of this Standard are reminded that it has no legal authority in its own right, but may acquire legal standing in one or more of the following circumstances:

A. Adoption by a government or other authority having jurisdiction.

B. Adoption by a purchaser as the required standard of construction when placing a contract.

C. Adoption where a manufacturer states that a vessel is in accordance with this Standard.

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