

AS 1210 Supp1—1990

Australian Standard[®]

**Unfired pressure vessels —
Advanced design and
construction**

(Supplement to AS 1210—1989)

This Australian Standard was prepared by Committee ME/1, Boilers and Unfired Pressure Vessels. It was approved on behalf of the Council of Standards Australia on 20 October 1989 and published on 2 April 1990.

The following interests are represented on Committee ME/1:

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Australian Compressed Air Institute
Australian Institute for Non-destructive Testing
Australian Institute of Energy
Australian Institute of Petroleum
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Australian Valve Manufacturers Association
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PREFACE

This edition of this Supplement was prepared by the Standards Australia Committee on Boilers and Unfired Pressure Vessels to supersede Supplement No 1 (June 1984) to AS 1210, *SAA Unfired Pressure Vessel Code, Class 1H Pressure Vessels of Advanced Design and Construction*. It forms part of the *SAA Boiler Code* (AS 1200) which is referred to in Statutory Regulations in Australia, and which covers requirements for land installations of shell boilers, water-tube boilers, unfired pressure vessels, pressure piping, welder certification, and related matters.

The Supplement provides for additional classes of vessels which require more precise design procedures to ensure that the higher design stresses can be tolerated for the particular design and that fatigue will be avoided.

Revisions and additions have been made throughout the Supplement.

A major revision in this edition is the introduction of a new classification of welded vessel (Class 2H) which permits the use of the higher design strengths applicable to Class 1H vessels with reduced levels of non-destructive examination but with the restrictions on the range and the thickness of materials used and the fatigue criteria under which the Class 2H vessels may be used. The introduction of requirements for Class 2H vessels was delayed until a full review of the material requirements in AS 1210, *SAA Unfired Pressure Vessels Code*, for low temperature service had been carried out.

An alternative method for assessing the need for a detailed fatigue analysis of the vessel and its components has been introduced.

Other revisions in this edition include a change of the membrane stress intensity limits for the test condition, clarification of the design strengths to be used in the design of flanges, changes in the requirements for clad plate and for low temperature service and clarification of coverage of cast and forged vessels.

The Supplement deals only with stationary vessels for a specific service where operation and maintenance control is fully exercised during the useful life of the vessel by the users in accordance with specified operating requirements for the vessel.

This Supplement lists only those requirements which differ from or are additional to those for Class 1 vessels in AS 1210. Together with AS 1210 it will directly satisfy the needs of most vessels. For complicated vessels or for vessels that are subject to unusual loads or fatigue, a comprehensive stress/load analysis is required.

This Supplement requires that all vessels be reviewed to ensure that unusual and excessive loads and fatigue cycling are maintained within safe limits. It prescribes detailed fatigue analysis where and when necessary. For vessels that are cleared from such a detailed investigation, the same design formulas as given in AS 1210 are used, except where otherwise specified.

Where fatigue, vessel configuration or loading is such that detailed stress analysis is required, the degree of such analysis can be determined only by a competent designer. The designer will need to refer to recognized engineering texts and techniques. Some authoritative national standards such as ANSI/ASME BPV-VIII-2, *Boiler and Pressure Vessel Code: Section VIII — Rules for construction of pressure vessels: Division 2 — Alternative rules*, and BS 5500, *Specification for unfired fusion welded pressure vessels*, provide tested shortcuts to many solutions encountered in advanced vessel design. These may be used, where appropriate by the designer as substitutes for fundamental stress analysis.

Acknowledgement is gratefully made to the American Society of Mechanical Engineers for permission to reproduce certain extracts from the ASME Boiler and Pressure Vessel Code. In addition, acknowledgement is made of the considerable assistance provided by British and other national Standards.

The International Organization for Standardization (ISO) Technical Committee ISO/TC 11 — Boilers and Pressure Vessels, has prepared a draft International Standard, ISO/DIS 2694, *ISO draft recommendation for pressure Vessels*, with the object of achieving agreement regarding uniformity of approach in national standards covering this subject. At this time, significant differences between the various national standards and ISO/DIS 2694 remain and these differences are still to be resolved.

With the changes introduced by Amendment No. 2, this 1990 edition of AS 1210 Supplement 1 is suitable for use with the 1997 edition of AS 1210, *Pressure vessels*.

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