

Australian/New Zealand Standard™

Pressure equipment



AS/NZS 1200:2015

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This Standard was issued in draft form for comment as DR AS/NZS 1200:2014.

Australian/New Zealand Standard™

Pressure equipment

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-001, Pressure Equipment, to supersede AS/NZS 1200:2000, *Pressure equipment*.

Changes to the 2000 edition include the following:

- (a) Continued recognition of the trend to self-regulation and the need for clear guidance to industry.
- (b) Updated information for New Zealand regulatory matters, seismic, wind and snow loading.
- (c) An informative Appendix I on the use of equivalents when referring to various internationally available pressure equipment standards.
- (d) Revision to Appendix A where 'LP Gas fuel vessels for automotive use' are now specifically mentioned as being covered by this Standard and where clarifications have been added for some equipment not covered by this Standard (regarding gas cylinders, miniature boilers and pressurized machines).
- (e) Removal of the process for requesting opinions, interpretations or rulings. Readers will now need to make contact with Standards Australia as per information provided inside the front cover of this Standard.
- (f) 'Safety requirements' changed from informative to normative.
- (g) Updated Table 2.1, Standards for pressure equipment used in Australia and New Zealand.
- (h) Detailed comparison between various equipment Standards available globally.
- (i) Replacement of Appendix G, 'Organization of Australian, New Zealand and Other Pressure Equipment Standards' with a new Appendix 'Australian Pressure Equipment Practice'.

This edition retains the role of the Standard as a major reference document and also to provide common requirements for pressure equipment that promote safety and uniformity throughout Australia and New Zealand.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are requirements of this Standard.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Pressure equipment**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard is a 'parent' document for use by the pressure equipment industry in Australia and New Zealand. It covers the design, materials, manufacture, examination, testing, installation, conformity assessment, commissioning, operation, inspection, maintenance, repair, alteration and disposal of pressure equipment (boilers, pressure vessels and pressure piping), but excluding gas cylinders and other equipment as set out in Appendix A.

This Standard specifies detailed requirements for various pressure equipment by direct reference to a range of Australian, New Zealand and other Standards.

NOTES:

- 1 Appendix F provides a comparison of pressure equipment Standards.
- 2 Appendix G provides guidance on Australian pressure equipment practice.

1.2 OBJECTIVE

The purpose of this Standard is to provide requirements and guidance expressed in specification form, suitable for use in contracts or other documentation, in order to—

- (a) achieve safe, economic and equitable supply and use of this equipment in Australia and New Zealand;
- (b) provide various means to assist in complying with basic requirements (see Clause 2.1); and
- (c) incorporate the experience and knowledge from Australia and New Zealand, and world practice.

1.3 APPLICATION

This Standard applies to the pressure equipment specified in Appendix A.

Equipment with hazard level E to AS 4343 may be covered by one or more of the following methods:

- (a) Standards referenced in this Standard.
- (b) Other applicable Standards.
- (c) Sound engineering practice that achieves a comparable level of safety.

Users of this Standard are reminded that it has no legal authority in its own right, but may acquire legal standing when—

- (i) adopted by a government or other authority having jurisdiction;
- (ii) specified in a contract; or
- (iii) a manufacturer, importer, supplier, purchaser/owner or user states that pressure equipment is in accordance with this Standard or its referenced Standards.

1.4 DEFINITIONS

For the purpose of this Standard and its referenced Standards, the definitions in Appendix B apply. Reference should be made to the particular pressure equipment Standards for definitions covering specific applications.

1.5 REFERENCED DOCUMENTS

The documents referred to in this Standard are listed in Appendix C.

Where reference is made to a Standard by its number only, the reference applies to the current edition of that Standard, including amendments, unless otherwise agreed upon by the parties concerned. Where reference is made to a Standard by number, year and (where relevant) an amendment number, the reference applies to that specific document.

1.6 NEW DESIGNS, MATERIALS AND MANUFACTURING METHODS

The Standards listed herein do not prohibit the use of materials or methods of design or manufacture that are not specifically referred to herein. Appendix D provides details on the use of materials under this Standard.

1.7 ROUNDING OF NUMERICAL VALUES

Rounding of numerical values shall be in accordance with AS 2706 and to the same significant number as in the applicable Standard.

1.8 CONVERSION OF UNITS

The international system of units is adopted in Australia and New Zealand. Conversion of units shall be in accordance with AS ISO 1000 and to the same significant number as in the applicable Standard.

1.9 TOLERANCES

Tolerances on numerical values shall be in accordance with the applicable Standard, and as specified in drawings or other documents which satisfy Clause 1.10.

1.10 CONCESSIONS

Concessions or departures from required numerical values are permitted by this Standard provided—

- (a) the parties concerned are in agreement;
- (b) the appropriate design verifying body, manufacture inspection body, or independent in-service inspection body states in writing that the concession is acceptable and gives details of the concession, the reasons justifying acceptance and any conditions applicable;
- (c) the concession relates to a specific design under specified conditions or a particular item of pressure equipment only and is not required as an on-going basis for continued concessions on new designs or each item produced;
- (d) a review of all relevant factors and risk assessment is undertaken to ensure that the concession will not result in equipment that is unsafe, unreliable or with inadequate performance (see Note);
- (e) the documented concession is made available to the owner or user, any quality system auditor and, where required, to the regulator; and

- (f) the manufacturer's data report, declaration of conformity or in-service inspection report documents such concessions.

NOTE: Normally a departure by 1% of the required value can be readily accepted if all other factors clearly comply and provide suitable compensation, e.g. 1% reduction in weld transverse strength is acceptable where ductility or Charpy values are high, or a corrosion allowance is provided.

1.11 NEW ZEALAND REQUIREMENTS

New Zealand regulatory matters and specific requirements are detailed in Appendix H.

New Zealand requirements for seismic loading for pressure equipment are detailed in Appendix H.

SECTION 2 BASIC REQUIREMENTS AND COMPLIANCE STANDARDS

2.1 BASIC REQUIREMENTS

Pressure equipment covered by this Standard and used or intended for use in Australia or New Zealand shall—

- (a) comply with the design, manufacture and use requirements specified in the Standards listed in Table 2.1 or equivalents agreed by the parties concerned; and

NOTE: See Appendix I for information on equivalent Standards.

- (b) comply with the safety requirements given in Appendix J.

NOTE: Other requirements, including those of a legislative, regulatory and contractual nature, may be relevant.

2.2 COMPLIANCE STANDARDS

Compliance with the applicable Standards listed in Table 2.1 is deemed to satisfy Clause 2.1, Items (a) and (b).

Where a Standard is used as the basis for a claim of pressure equipment compliance, that Standard and all its referenced Standards shall be as referenced in their entirety, except as provided by Clause 2.3.

NOTES:

- 1 Published application Standards should be viewed only as a starting point in the control of risks. It should not be assumed that a design that meets the Standard is without risk. This is because the Standard itself may not deal with all the matters relevant to hazard identification, risk assessment and risk control for the pressure equipment in question. Appropriate judgement needs to be exercised in such circumstances.
- 2 Designers, when designing pressure equipment to specifications in published application Standard(s), such as those listed in Table 2.1, should determine whether the Standard(s) fully deals with health, safety or environmental risks identified in the risk assessment process. This should involve a systematic assessment of whether the application Standard(s) apply to the whole pressure equipment or only certain parts of the plant and an assessment of the adequacy of the Standard(s) in controlling a particular type of risk, having regard to the state of knowledge.
- 3 If designing the pressure equipment in accordance with application Standard(s) listed in Table 2.1, or any other published application Standard, does not eliminate the risk to health or safety, the designer should reduce the risk so far as is reasonably practicable by altering the design of the pressure equipment. If the design of pressure equipment using Standards such as those listed in Table 2.1 does not adequately control the risks, then additional (identified) controls may be used to reduce the risk to an acceptable level. If this is the case, then the designer should specify the risk control measures that require implementation when the pressure equipment is used.
- 4 Before using any pressure equipment Standard that originates from outside Australia and New Zealand, the designer should carry out a comparative assessment to confirm that the proposed Standard provides equivalent specifications in terms of loadings, materials, safety factors, manufacturing quality and inspection, overpressure protection, and testing. All of the parties concerned with the pressure equipment should agree to the use of the overseas Standard.

2.3 MIXING STANDARDS

Pressure equipment shall comply with the full requirements of a nominated Standard, except when the equipment or components of the equipment, comply with the more appropriate requirements of other pressure equipment Standards, and provided—

- (a) such Standards are agreed alternatives or equivalents and are applicable to the particular pressure equipment;
- (b) the relevant requirements of the Standards apply to the components concerned;
- (c) components at interfaces between different Standards comply with all relevant Standards, as appropriate;
- (d) the design data, drawings and manufacturer's data report clearly identify and record departures from the Standard used for design;
- (e) the equipment marking includes the Standards used;
- (f) the overall equipment complies with Clause 2.1; and
- (g) the parties concerned, including the design verification and manufacture inspection bodies, agree.

NOTES:

- 1 Typical examples are the use of pressure vessel or piping Standards for some parts of boilers, the use of other Standards for materials, components, qualification and test methods, use of piping Standards for some pressure vessels (e.g. piping strainers), and different documentation or markings.
- 2 Some Standards already permit equivalent referenced Standards.
- 3 Appendix F provides a comparison of Australian and International PE Standards.
- 4 The parties concerned may agree to the use of equivalent Standards; see Appendix I for more information.

TABLE 2.1
STANDARDS FOR PRESSURE EQUIPMENT USED IN AUSTRALIA
AND NEW ZEALAND (see Note 7)

1 General		
AS/NZS 1200	Pressure equipment	
AS 4942	Pressure equipment—Glossary of terms	
AS 4343	Pressure equipment—Hazard levels	
2 Design and manufacture		
AUSTRALIAN AND JOINT AUSTRALIAN/ NEW ZEALAND STANDARDS (see Note 2)		OR INTERNATIONAL STANDARDS (see Note 2)
AS 1228	Boilers	ASME BPV-I; BS 855; BS 1113; BS 2790; EN 12952; EN 12953
AS 1210	Pressure vessels	ASME BPV-VIII (see Note 4); PD 5500; BS 853; BS 5169; BS 3970; EN 13445; GB 150; ISO 21029-1; ISO 20421-1
AMBSC Code	Miniature Boilers Parts 1–4	—
AS 2593	Boilers—Safety management and supervisory systems (see Note 5)	ASME BPV-I (see Note 5)
AS 3857—1999	Heat exchanger—Tube plate design	TEMA; ASME BPV-VIII-1-UHX; EN 13445
AS 2971	Pressure vessels—Serially produced	EN 286-1 (air or nitrogen)
AS/NZS 3509	Pressure vessels—LP Gas auto vessels	—
ADG Code	Pressure vessels—Transport of dangerous goods	NZS 5418; IMDG Code
AS 4041	Pressure piping	ASME B31.1; ASME B31.3; ASME B31.5 (see Note 6); BS 806; EN 13480
AS 2872	Atmospheric heating of vessels	—
AS 4458	PE Manufacture	ISO 14731 (see Note 1)
AS/NZS 3992	PE Welding and brazing qualification	ASME BPV-IX; EN 287; ISO 15607, ISO 9606-1
AS 1796	Certification of welders and supervisors	—
AS 4037	PE Examination and testing	ASME BPV-V (see Note 1)
AS 3998	Certification of NDT personnel	ISO 9712
AS 3892	PE Installation	NZS 5351
AS 1548	Steel plates for PE	EN 10028 (see Note 1)
AS 2556	ERW steel air heater tubes	—
AS 1271	Safety valves and fittings for PE	—
AS 1358	Bursting discs	—
AS 1732	Fusible plugs	—

(continued)

TABLE 2.1 (continued)**3 Conformity assessment**

Conformity assessment of pressure equipment covered by this Standard shall be carried out where required or where specified by the parties concerned.

NOTE: Below Standards may be used as guidance:

- (a) AS 3920 for conformity assessment of pressure equipment in Australia, and the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 in New Zealand.
- (b) AS/NZS ISO/IEC 17020 for inspection bodies.
- (c) AS/NZS 4481 for pressure equipment inspector competencies.
- (d) ASME BPV Code.
- (e) EU-PED Pressure Equipment Directive.
- (f) EU-PED for Simple Pressure vessels.

4 Use

AS 3873	PE Operation and maintenance	OR	—
NS for LPPHRW or	National Standard for Licencing Persons Performing High Risk Work		
NOHSC 1006 (see Note 3)	National Occupational Health and Safety Certification Standard Certification for users and Operators of Industrial Equipment		
AS/NZS 3788	PE In-service inspection		NBIC
AMBSC	Code for miniature boilers		

NOTES:

- 1 Where an international design Standard is applied and it provides PE manufacturing requirements and PE examination/testing requirements within the design Standard itself, then those requirements are also applicable.
- 2 Other published national Standards may be used provided they satisfy the requirements of Clause 2.1.
- 3 NOHSC 1006 has been archived by Safe Work Australia and has been replaced by NS for LPPHRW; however, NOHSC 1006 may still be referenced by authorities in some states.
- 4 For water tube boilers only in New Zealand, quality assurance, certification, marking and materials shall satisfy the requirements of the New Zealand regulatory authority.
- 5 Accepted in New Zealand only as permitted within the scope of the New Zealand Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers.
- 6 In New Zealand, inspection and testing shall be to ASME B31.1.
- 7 For additional requirements applicable to New Zealand, refer Appendix H.

APPENDIX A

EQUIPMENT COVERED BY THIS STANDARD

(Normative)

A1 PRESSURE EQUIPMENT COVERED

This Standard applies to all pressure equipment, with the exception of the equipment listed in Paragraph A3.

A2 EXAMPLES

The following are examples of pressure equipment covered specifically by this Standard:

- (a) *Boilers*—watertube, firetube, shell, miscellaneous, electric, electrode, hot water, locomotive, waste heat boilers, heat recovery steam generators, fired steam sterilizers and fired pressure cookers.
- (b) *Pressure vessels*—air receivers, reactors, digesters, pressurized storage vessels, process vessels, heat exchangers, jacketed pans, fired heaters, air-water vessels, pressurized sterilizers, deaerators, autoclaves, pressurized transportable vessels (road or rail tankers, ISO tank containers, but not gas cylinders), vessels for human occupancy, LP Gas fuel vessels for automotive use.
- (c) *Pressure piping*—steam, high and low temperature liquid, gases and mixtures (e.g. slurries and powders).

A3 EQUIPMENT OR PLANT UNDER PRESSURE NOT SPECIFICALLY COVERED

The following is a list of equipment or plant that, whilst not covered by this Standard, may be covered where required by other Standards, regulators or the parties concerned. The inclusion of other equipment into this category is the subject of agreement between the parties concerned.

- 1 Gas cylinders covered by the AS 2030 series up to a volume of 3000 L.
- 2 Equipment forming part of an aircraft, hovercraft or spacecraft.
- 3 Pressure equipment that forms a part of a sea-going ship or other marine or river craft or offshore oil or gas rig.
- 4 Blast furnaces including cold blast main, hot stoves, hot blast main, bustle main and tuyere stocks, blast furnace proper, uptakes and downcomer, dustcatcher, dirty and semi-clean gas mains, gas scrubber and outlet main, charging material hopper and integral equipment, and cooling system.
- 5 Pressure equipment that is the subject of research and development.
- 6 Pipelines, such as those covered by AS 2885, used for the transmission or distribution of water, gas, oil or other fluid between two or more premises or in public places.
- 7 Sewerage, domestic water, roof and drainage piping.
- 8 Tyres, tubes, balloons and other inflatable equipment.
- 9 Pressure equipment that is an electrical or telecommunication cable or duct subject to pressure.
- 10 Pressure equipment consisting of a liquid-filled coupling and used in power transmission.

- 11 Pressure equipment that is part of a tool or appliance to be held in the hand.
- 12 Air brake bleeding mechanisms for the removal of condensate from air brake bleeding systems (excluding the air reservoir).
- 13 Air bags used for manufacturing and retreading tyres.
- 14 Low pressure gas holders, e.g. towns and natural gas holders (once known as gasometers).
- 15 Hydraulic pressure vessels, including inert gas type ‘dampers’, shock absorbers, or accumulators in which the product of pressure (MPa) and gas volume (L) does not exceed 30 MPa.L (see Item 25 below for hydraulic actuated equipment).
- 16 Portable fire extinguishers covered by AS/NZS 1841 or equivalent Standard.
- 17 Steam cleaners in which steam is generated in the system and valves are not incorporated between the inlet and outlet.
- 18 Aerosol containers covered by AS 2278.1 or equivalent Standard.
- 19 Storage tanks or equipment designed for the storage of liquids at or near atmospheric pressure (i.e. pressure at the top of the tank does not exceed 1.4 kPa above or 0.06 kPa below atmospheric pressure) or covered by AS 1692, ANSI/API Std 650 or equivalent Standard.
- 20 Large low pressure gas storage tanks such as tanks complying with ANSI/API Std 620 or equivalent Standard (i.e. with pressure at the top of the tank not exceeding 207 kPa above nor 10 kPa below atmospheric pressure) and excluded by Figures 1.3.1 and 1.3.2 of AS 1210.
- 21 Domestic-type hot water supply heaters and tanks complying with AS/NZS 4692.1, AS 3500.4.1, AS/NZS 60335.2.21, AS/NZS 60335.2.35 or equivalent Standard.
- 22 Sterilizers covered by AS 1410, AS 2182, AS 2192, AS 2487 or equivalent Standard.
NOTE: Where AS 1210 is referenced in the above Standards, it is intended that AS/NZS 1200 is also applicable.
- 23 Domestic-type pressure cookers covered by BS 1746 or equivalent Standard, i.e. with pressure not exceeding 110 kPa and volume not exceeding 60 L.
- 24 Miniature model boilers used as toys or by model clubs and with water capacity not exceeding one litre.
- 25 Pressurized machines, e.g. steam and gas turbines, compressors, pumps, internal combustion engines, steam engines, hydraulically actuated equipment (e.g. hydraulic cylinders, rams, and shock absorbers with piston), and similar machines; except in rare cases where the designer considers the pressure-retaining parts are primarily determined by stresses comparable with AS 1210 and not by control of strain to maintain close fit to ensure performance (e.g. the external envelope of hermetic or sealed air or refrigerant compressors are covered by this Standard).

NOTE: For New Zealand, see Appendix H.

APPENDIX B

DEFINITIONS

(Normative)

B1 GENERAL

The definitions of the more important terms relating to pressure equipment, actions and personnel mentioned in this Standard and other Australian and New Zealand pressure equipment Standards are listed in Paragraph B2.

NOTES:

- 1 These definitions are aimed to align, where possible, with the Australian Work Health and Safety Act and Regulations and the New Zealand Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations. These documents or state/territory regulations should be referred to for the actual definitions that apply in the respective jurisdiction.
- 2 For the definition of terms not listed in this Appendix, refer to AS 4942.

B2 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

B2.1 Alter

To change the design of, add to or take away from the pressure equipment where the change may reduce health or safety but does not include routine maintenance, repairs or replacements.

B2.2 Boiler

A vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, and at a temperature at or above the normal atmospheric boiling temperature of the liquid, by the application of fire, the products of combustion, electrical power, or similar high temperature means. It also includes superheaters, reheaters, economizers, boiler piping, supports, mountings, valves, gauges, fittings, controls, the boiler setting and directly associated equipment. It excludes fired heaters.

NOTES:

- 1 The New Zealand, definition of hot water boiler (see Paragraph B2.11) approximates the above but applies only to the generation of steam heated by a directly applied combustion process or by heated gases.
- 2 See also 'fired heater', which may be more appropriate for some equipment in which steam or other vapour is generated.

B2.3 Commissioning

Performing the necessary adjustments, tests and inspections to ensure pressure equipment is in full working order to specified requirements before the pressure equipment is used. Commissioning includes re-commissioning.

B2.4 Competent person

A person who has acquired through education, training, qualification or experience, or a combination of these, the knowledge and skills enabling that person to perform the task required.

B2.5 Conformity assessment

Any activity concerned with determining directly or indirectly that relevant requirements are fulfilled.

NOTE: Typical examples of conformity assessment activities are sampling, testing and inspection, evaluation, verification and assurance of conformity (supplier's declaration, certification), registration, accreditation and approval, as well as other combinations.

B2.6 Designer

A body corporate, firm or person responsible for the design of the pressure equipment.
A person who designs pressure equipment.

B2.7 Equivalent

Having the same, better or acceptable outcome.

B2.8 Fired heater

A pressure vessel in which a liquid is heated below its atmospheric boiling temperature or a process fluid is heated in tubes above or below its atmospheric boiling temperature by the application of fire, the products of combustion or electric power, or similar high temperature means.

NOTE: For New Zealand, refer to the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 [PECPR Regulations].

B2.9 Gas cylinder

A particular rigid pressure vessel not exceeding 3000 L water capacity and without openings or integral attachments on the shell other than at the ends, designed for the storage and transport of gas under pressure and which is covered by AS 2030 series.

NOTE: Gas cylinders are a special type of transportable pressure vessel built using serial production to various Australian and overseas gas cylinder standards. They are used for a wide range of gases and services and are subject to periodic testing at approved gas cylinder test stations.

B2.10 Hazard

Any source of potential damage, harm or adverse health effects on someone or something under certain conditions at work.

B2.11 Hot water boiler (New Zealand)

Similar to 'boiler' except that water is heated and steam is not generated.

NOTE: For New Zealand, refer to the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 [PECPR Regulations].

B2.12 Inspection

Activities such as examining, measuring, testing, gauging, calculating, checking, verifying one or more characteristics of a product design, material, manufacture, service, process, plant or reports and determination of their conformity with specific requirements or on the basis of professional judgement with general requirements.

B2.13 Installer

A body corporate, firm or person who installs pressure equipment.

B2.14 LP gas fuel vessel for automotive use

A pressure vessel that is used to store and supply LP Gas as fuel to power a vehicle in which it is contained.

NOTE: LP Gas automotive fuel vessels are not gas cylinders but they are a special type of transportable pressure vessel, which can be designed and manufactured in accordance with Australian and overseas pressure vessel standards; e.g. AS/NZS 3509, AS 1210, ASME BPVC VIII, and equivalent Standards.