AS 3992:2020


# Pressure equipment—Welding and brazing qualification

This Australian Standard® was prepared by Committee ME-001, Pressure Equipment. It was approved on behalf of the Council of Standards Australia on 9 June 2020.
This Standard was published on 26 June 2020.

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- SafeWork SA
- Victorian WorkCover Authority (WorkSafe Victoria)
- Weld Australia
- WorkSafe Division—Department of Mines, Industry Regulation and Safety (DMIRS), WA

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This Standard was issued in draft form for comment as DR AS 3992:2019.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard®

# Pressure equipment—Welding and brazing qualification

Originated as AS 3992—1992.
Previous edition AS/NZS 3992:2015.
Revised and redesignated as AS 3992:2020.

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ISBN 978 1 76072 883 0

# PREFACE

This Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee ME-001, Pressure Equipment, to supersede AS/NZS 3992:2015, *Boilers and pressure vessels—Welding and brazing qualification*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to reduce misunderstanding, costs and delays in qualifying welding, avoid unnecessary duplication of testing, promote greater confidence in reciprocal acceptance of approved procedures, and improve safety. It also aims for greater alignment with ASME and ISO Standards, and to be consistent with the current work health and safety laws.

The inclusion of roles and responsibilities in AS 3992:2020, was approved by the Standards Development and Accreditation Committee on 2 May 2019, as a one-off exemption to the directives of Standardisation Guide 009: Preparation of Standards for Legislative Adoption.

This Standard unifies and revises the requirements for the qualification of welding and brazing procedures, welding and brazing personnel, and production test plates and welds, specified in AS 1210, *Pressure vessels*, AS 1228, *Pressure equipment—Boilers*, and AS 4041, *Pressure piping*.

This Standard is a major revision of AS/NZS 3992:2015, with due allowance for latest practices or requirements of AS 1210, AS 1228 and AS 4041.

Requirements have been formulated with a view to maximize compatibility with recognized leading International Standards including ISO 9606 (all parts) and ISO 15614 (all parts).

The main changes in this revision are as follows:

(a) The roles and responsibilities in this revision have been changed (reduced); however some level of roles and responsibilities have been retained. The inclusion of roles and responsibilities in this Standard was approved by the Standards Development and Accreditation Committee (SDAC).

(b) Revision and addition of new requirements to Sections 1, 5, 6, 7, 8 and 9 including revision of figures and tables within.

(c) Clarification of testing requirements particularly those requiring impact testing.

(d) Revision of Appendices B and D, and new Appendix G.

(e) Addition of a new Appendix I to provide guidance on oxidation colours for stainless steels and titanium.

(f) Correction of identified errors and ambiguities throughout the Standard.

(g) Revision of procedure qualification requirements for special welds and welding of service exposed materials (Section 8).

(h) Updating of referenced documents and alignment.

It is not intended that the publication of this edition will invalidate welding tests that were accepted in respect of other Standards referenced in AS/NZS 1200, *Pressure equipment*.

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

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## S E C T I O N 1 S C O P E A N D G E N E R A L

### 1.1 SCOPE AND APPLICATION

#### 1.1.1 Scope

This Standard specifies requirements for the qualification of welding and brazing procedures, welders and brazers, and requirements for production weld testing other than non-destructive examination, when used in the manufacture, alteration and repair of boilers, pressure vessels, pressure piping and their components as specified in AS/NZS 1200, AS 1210, AS 1228 and AS 4041. See Figure 1 for a summary of the welding and brazing qualification process.

This Standard is intended for use by designers, manufacturers, welders, brazers, inspection bodies, inspectors, testing authorities and all persons concerned with the welding and brazing of pressure equipment.

This Standard may apply to automotive LP Gas fuel vessels (covered by AS/NZS 3509), serially produced pressure vessels (covered by AS 2971) or welded gas cylinders (covered by AS 2030.1), where specified by these Standards. This Standard does not apply to pipelines in accordance with AS/NZS 2885.2, except where referenced.

The Standard provides specific details for the following:

(a) Manual metal-arc welding, flux cored arc welding, gas metal-arc welding, gas tungsten-arc welding, submerged arc welding, plasma arc welding, electroslag welding and oxy-acetylene welding.

(b) Torch brazing, furnace brazing, induction brazing, resistance brazing and dip brazing.

(c) The welding and brazing of carbon, carbon-manganese, and low and high alloy steels; and copper, aluminium, nickel, titanium, zirconium and alloys of these materials.

(d) Welding procedure qualification.

(e) Welder qualification.

Specific details for stud welding, electron-beam welding, explosion welding, laser beam welding, electro-gas welding, fusion welding of plastics and friction welding processes are not covered by this Standard. For these, see ASME BPVC-IX or equivalent.

The principles established in this Standard may be used in the qualification of processes, materials and applications not covered by the scope outlined above (see also Clause 1.5 and Clause 1.6).


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