

Australian/New Zealand Standard™

Structural steel welding

**Part 4: Welding of high strength
quenched and tempered steels**



AS/NZS 1554.4:2014

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WD-003, Welding of Structures, to supersede AS/NZS 1554.4:2010.

This Standard incorporates Amendment No. 1 (September 2017). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide rules for the welding of a wide range of steel constructions, using high strength quenched and tempered steel parent material.

The objective of this revision is to update the Standard and bring it in line with the latest edition of AS/NZS 1554.1, *Structural steel welding, Part 1: Welding of steel structures*.

This edition incorporates the following major changes to the 2010 edition:

(a) *Revision of the following Clauses:*

1.1, 2.3.1, 2.3.3, 3.1.2 (new), 3.1.3, 4.1.1 (Note 2), 4.1.4, 4.2(b), 4.3.2 (new clause), 4.5.5.1, 4.6.1.1 (new sub clause), 4.7.1, 4.7.7, 4.12.1, 4.12.2.3, 5.1.1 (new note), 5.2.2, 7.2(a) (new), 6.2.2, 6.3.3, 6.4.3 (new), 6.7 (Note 2), 6.8 (new note), 7.2 (new), 7.4, F2.2, F4.

(b) *Revision of the following Tables:*

4.1.3, 4.5.5.1 (Title and Note 2, 4.5.5.4 (Title), 4.6.1(A), 4.6.1(B), 4.6.2, 4.7.1 (Notes 1 and 3 revised), Table 4.11(A) Item (u) deleted, 4.11(D) (new), 4.12.2(B) (Note 1), 5.3.4, 6.2, E4 (items renumbered and revised).

(c) *Revision of the following Figures:*

5.2.2 (new), 6.2(a) and (b).

The Standard requires that weld preparations, welding consumables and welding procedures be qualified before commencement of welding. Prequalified joint preparations, welding consumables and welding procedures are also given in the Standard.

The Standard, in catering for structures subject to fatigue conditions as well as statically loaded structures, provides three categories of welds with three differing levels of weld quality assurance associated with the different types of service to which the welds are subjected. The intention is that the designer should select the category suited to the severity of the service and nominate this on the drawings. Where a structure contains more than one category, this nomination of appropriate categories will ensure that appropriate levels of supervision and inspection will be applied to the relevant parts of the structure.

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

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.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the welding of steel structures made up of combinations of steel plate, sheet or sections, including hollow sections and built-up sections, or castings and forgings, by the following processes:

- (a) Manual metal-arc welding (MMAW).
- (b) Submerged arc welding (SAW).
- (c) Gas metal-arc welding (GMAW), including pulsed mode.
- (d) Gas tungsten-arc welding (GTAW or TIG).
- (e) Flux-cored arc welding (FCAW).
- (f) Electroslag (including consumable guide) welding (ESW) (see Note).
- (g) Electrogas welding (EGW) (see Note).

NOTE: These processes may not be suitable for welding quenched and tempered steels in all cases (see WTIA Technical Note 15).

This Standard is limited to the welding of quenched and tempered steel parent material complying with Clause 2.1.

This Standard applies to the welding of steelwork in structures complying with AS 4100 or NZS 3404.1. Where welded joints in these structures are governed by dynamic loading conditions, this Standard applies only to those welded joints that comply with the fatigue provisions of AS 3990, AS 4100 or NZS 3404.1, as limited by Item (ii) below, or with the directly equivalent fatigue provisions of other application Standards.

This Standard applies to welded joints that are—

- (i) not subject to fatigue conditions; or
- (ii) subject to fatigue conditions; and—
 - (A) the stress range in the welded joint complies with the permissible stress range of stress Categories C, D, E or F of AS 3990, or weld categories lower than or equal to detail Category 112 of AS 4100 or NZS 3404.1;
 - (B) the stress range in the welded joint is not greater than 80% of the permissible stress range of stress Category B of AS 3990 (Category SP weld, see Clause 1.5.2); or
 - (C) the stress range in the welded joint is greater than 80% of the permissible stress range for stress Category B of AS 3990, or exceeds the stress range permitted for detail Category 112 of AS 4100 or NZS 3404.1 (Category FP weld, see Clause 1.6), but does not exceed the maximum stress ranges permitted for these categories.