AS/NZS 1554.1:2011

Australian/New Zealand Standard™

Structural steel welding

Part 1: Welding of steel structures

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WD-003, Welding of Structures. It was approved on behalf of the Council of Standards Australia on 18 May 2011 and on behalf of the Council of Standards New Zealand on 1 June 2011.
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The following are represented on Committee WD-003:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Institute
AUSTROADS
Bureau of Steel Manufacturers of Australia
New Zealand Heavy Engineering Research Association
New Zealand Non-destructive Testing Association
Steel Reinforcement Institute of Australia
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Australian/New Zealand Standard™

Structural steel welding

Part 1: Welding of steel structures

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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 1554.1:2004.

The objective of this Standard is to provide rules for the welding of a wide range of steel constructions and while it is expected that its main use will be for statically loaded welds, it applies also to some welds subject to fatigue. Although this Standard has been specifically prepared for steel structures, it may be usefully applied to machine frames and other types of steel constructions.

This edition incorporates the following major changes to the 2004 edition:

(a) *Amendments to the following Clauses*:

1.2, 1.7 (new title), 1.7.1 (new), 2.1(c), 2.3.1, 3.2.5 (new paragraph), 4.1.2(d)(f)(h)(j)(k) (new sub clauses), 4.1.2 (k), 4.2 (b), 4.6.1.1, 4.6.1.3 (new), 4.10 (new note), 4.12.2, 5.1.1 (new note), 5.1.2 (note added), 5.3.3 (second paragraph–new), 5.3.4 (note added), 5.3.5 (new), 5.7.1 (note added), 6.4.3 (note added), 7.2(a) (new), 7.3 (first paragraph–new), Appendix F (new), Appendix G (new).

(b) *Amendments to the following Tables*:

4.6.1(A), 4.6.1(B), 4.6.1(C), 4.6.2, 4.7.1 (new notes, notes 1 and 3 amended), 4.11(D) (new), 4.11(A) (items b, e, o, u), 4.11(C) item (d), 4.12.2.3 (A), 4.12.2.3(B) (new), 5.3.4(A), B1 (new steel types added), E4 (items deleted).

(c) *Amendments to the following Figure*:

3.2.5(c) (new).

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 two categories of welds with two 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 select the category suited to the severity of the service and nominate this on the drawings. Where a structure contains both categories, 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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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

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 or MIG), including pulsed mode.

(d) Gas tungsten-arc welding (GTAW or TIG).

(e) Flux-cored arc welding (FCAW).

(f) Electroslag (including consumable guide) welding (ESW).

(g) Electrogas welding (EGW).

The Standard is limited to the welding of steel parent material with a specified minimum yield strength not exceeding 500 MPa.

The Standard applies to the welding of steelwork in structures complying with AS 3990, AS 4100, AS/NZS 4600 or NZS 3404.1. Where welded joints in these structures are governed by dynamic loading conditions, the 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 the directly equivalent fatigue provisions of other application Standards.

Welded joints complying with the above are those that are —

(i) not subject to fatigue conditions; or

(ii) subject to fatigue conditions, where—

  (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; or

  (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.

In addition to the abovementioned structures, the Standard applies to the welding of cranes, hoists and other dynamically loaded structures, the welding of road and pedestrian bridges and the welding of steelwork in applications other than structural.

NOTE: Further information on this Standard, is given in WTIA Technical Note 11.