

Australian/New Zealand Standard™

## Structural steel welding

### Part 5: Welding of steel structures subject to high levels of fatigue loading



## **AS/NZS 1554.5:2011**

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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Bureau of Steel Manufacturers of Australia  
Engineers Australia  
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### Part 5: Welding of steel structures subject to high levels of fatigue loading

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## PREFACE

This Standard was prepared by the Joint Australian/New Zealand Committee WD-003, Welding of Structures, to supersede AS/NZS 1554.5:2004.

The objective of this Standard is to provide rules for the welding of steel structures subject to high levels of fatigue loading.

The objective of this edition 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 2004 edition:

(a) *Amendments to the following Clauses:*

1.2, 1.6 (new title), 1.6.1 (new), 2.1(c), 2.3.1, 3.2.5 (new paragraph), 4.1.2(d)(f)(h)(j)(k)(iii) (new sub clauses), 4.6.1.2 (d), 4.2 (b), 4.10 (new note), 4.12.2, 5.1.1 (new note), 5.1.2 (note added), 5.3.3 (second paragraph), 5.3.5 (new), 5.7.1 (note added), 6.3.3 (noted added), 7.2(a) (new), 7.3 (first paragraph – new), Appendix F (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) (note added), 4.12.2.3(A), 4.12.2.3(B) (new), 5.3.4(A), B1 (new steel types added).

(c) *Amendments to the following Figure:*

3.2.5(c) (new).

This Standard specifically applies to welds subject to fatigue loading in excess of the range covered by AS/NZS 1554.1, *Structural steel welding, Part 1: Welding of steel structures* and hence, it should not be specified where AS/NZS 1554.1 is acceptable.

It is expected that welds covered by this Standard will not normally occur with structures such as buildings, tanks or silos, but only in certain classes of machinery and transport equipment.

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.

Statements expressed in mandatory terms in notes to Tables and Figures are deemed to be requirements to 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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## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

### Australian/New Zealand Standard Structural steel welding

#### Part 5: Welding of steel structures subject to high levels of fatigue loading

## 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 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 specifically to the welding of steelwork in structures complying with AS 3990, AS 4100 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, where the stress range in the welded joint is greater than 80% of the permissible stress range for Category B of AS 3990, or exceeds the stress range permitted for detail Category 112 of AS 4100 or NZS 3404.1, but does not exceed the maximum stress ranges permitted for these categories.

NOTE: Fillet welds and incomplete penetration butt welds may be used in AS 4100 or NZS 3404.1 detail Category 125, and in Category B fatigue applications of AS 3990 when the direction of the weld is parallel to the direction of the applied stress.

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

#### NOTES:

- 1 Further information on this Standard is given in WTIA Technical Note 11.
- 2 The Standard is basically in line with AS/NZS 1554.1; however, it specifically applies to welds subject to fatigue loading in excess of the range covered by AS/NZS 1554.1 and hence it should not be specified where AS/NZS 1554.1 is acceptable.
- 3 It is expected that welds covered by this Standard will not normally occur with structures such as buildings, tanks or silos, but only in certain classes of machinery and transport equipment.
- 4 The Standard requires that weld preparation, 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.