Australian/New Zealand Standard™

Structural steel welding

Part 1: Welding of steel structures

Standards Australia

STANDARDS NEW ZEALAND

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WD/3, Welding of Structures. It was approved on behalf of the Council of Standards Australia on 9 June 2000 and on behalf of the Council of Standards New Zealand on 3 July 2000. It was published on 2 September 2000.

The following interests are represented on Committee WD/3:

Association of Consulting Engineers Australia
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institution of Steel Construction
AUSTROADS
Bureau of Steel Manufacturers of Australia
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Part 1: Welding of steel structures

Originated in Australia as AS CA8—1933.
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WD/3, Welding of Structures, to supersede AS/NZS 1554.1—1995, NZS 4701:1981, *Metal-arc welding of steel structures*, and NZS 4704:1994, *Structural steel welding—Welding of steel structures*.

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 1995 edition, some of which were included in Amendment 1 to the 1995 edition:

(a) *Additions to the following clauses*:

1.6 (the Note), 1.7(c), 2.1 (the Note), 4.1.2, 4.4, 4.5.5, 4.5.5.5(c), 4.6.1.1(h), 5.2.2 (last paragraph).

(b) *Additions to the following tables:*

6.2.2 (Note 3), 7.1 (Notes 1, 2 and 4)

(c) *Amendments to the following clauses*:

4.2(c), 4.3(d), 4.5.4, 4.7.4, 4.12, 5.7.2, 5.11, 6.3.3, 6.4.1, 6.4.3, 6.7, B5, C.

(d) *Amendments to the following figures*:

B1, B2.

(e) *Amendments to the following tables:*

4.6.1(A), 4.6.1(B), 4.6.1(C), 4.6.2, 4.7.1, 4.11(A), 4.11(C), 5.3.4(A), B1.

In Tables E1 to E4, the Note on gas metal-arc now states that globular transfer mode may be used with CO_2.

In Table E1—

(i) for joint identification B–C 2d, the preparation detail position for gas metal-arc, spray transfer in Column 7 is ‘F’ (instead of ‘All’); and

(ii) for joint identifications B–C 5, T–C 5 and C-C 5, the preparation detail angle θ for flux-cored arc, self-shielded and gas-shielded in Column 6 includes an additional angle 60 for V.

(f) Deletion of Clause 3.1.2 of the 1995 edition on design requirements.

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 should 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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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, AS/NZS 4600 or NZS 3404.1. Where the proportions of 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 requirements 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 more 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, which the drafting committee could not incorporate, is given in WTIA Technical Note 11.

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