AS/NZS 4600:2018

Australian/New Zealand Standard™

Cold-formed steel structures

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee BD-082, Cold-formed Steel Structures. It was approved on behalf of the Council of Standards Australia on 27 April 2018 and by the New Zealand Standards Approval Board on 2 May 2018.
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The following are represented on Committee BD-082:

Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Association
Australian Steel Institute
Bureau of Steel Manufacturers of Australia
Engineers Australia
National Association of Steel Framed Housing, Australia
National Association of Steel Framed Housing. New Zealand
Queensland University of Technology
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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 4600:2017.

Australian/New Zealand Standard™

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Originated in Australia as AS 1538—1974.

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Previous edition 2005.

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee BD-082, Cold-formed Steel Structures. AS/NZS 4600:2005 will also remain current for 12 months after the date of publication of this Standard and after this time it will be superseded by AS/NZS 4600:2018. Regulatory authorities that reference this Standard in regulation may apply these requirements at a different time. Users of this Standard are advised to consult with these authorities to confirm their requirements.

The objective of this Standard is to provide designers of cold-formed steel structures with specifications for cold-formed steel structural members used for load-carrying purposes in buildings and other structures.

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

(a) Inclusion of G500 and G550 steels in Clause 1.5.1.3 for steels where the effects of welding do not need to be tested.

(b) Inclusion of reference to first order elastic, second order elastic and advanced analyses in Clause 1.6.2.

(c) Earthquake design for Australia in Clause 1.6.4.1 based on structural ductility index and structural performance factor to align with latest edition of AS 1170.4.

(d) Earthquake design for New Zealand in Clause 1.6.4.2 allows structural ductility factors up to 6.

(e) Non-circular holes added to uniformly compressed stiffened elements in Clause 2.2.2.

(f) New Clause 2.2.5 on intermittent connections in uniformly compressed elements.

(g) Elastic buckling moments in Clause 3.3 moved to Paragraph D2.1, Appendix D, for members subject to bending.

(h) Elastic buckling stresses in Clause 3.4 moved to Paragraph D1.1, Appendix D, for concentrically loaded compression members.

(i) New Clause 3.7 for sections subject to combined bending and torsional loading.

(j) New Clause 4.1.2 for compression members composed of two sections in contact.

(k) Old Clause 4.3.3.3 for bracing of cleatless roof systems under gravity load deleted.

(l) Revised Clause 4.3.3.3 (old Clause 4.3.3.4) for neither flange connected to sheeting has improved equations and a new diagram.

(m) New equation for net section tension in Clause 5.3.3 has improved shear lag factor.

(n) Bolted connections in bearing in Clause 5.3.4 now includes oversize and short-slotted holes.

(o) Screws in shear and tension now allow the limit state based on testing of the screws.

(p) Screwed connections in tension in Clause 5.4.3.2 now include round head, hex head, pancake screw washer head, hex washer head and domed head.

(q) New rules in Clause 5.4.3.2 for screwed connections attaching roof battens.

(r) New rules for screwed connections in combined bending and tension.

(s) Design of power-actuated fasteners (PAFs) now included in Clause 5.5.

(t) Revised equations for block shear rupture in Clause 5.7.3 based on active shear planes.

(u) Range of prequalified members in Clause 7.1.1 (Table 7.1) for the direct strength method (DSM) extended to a wider range of sections with multiple intermediate stiffeners and return lips.

(v) Compression and flexural members with holes and flexural members with inelastic reserve capacity now included in the DSM Clauses 7.2.1 and 7.2.2.

(w) Shear and combined bending and shear added to the DSM in Clause 7.2.3.

(x) Combined compression/tension and bending added to the DSM in Clause 7.2.4.5 respectively.

(y) Design values based on prototype testing in Clause 8.4.1 can now use the average test value.

(z) Strength prediction model from testing based on verification model BV1 of National Construction Code (NCC).

(aa) New Section 9, Fire design, added for steel sections made from AS 1397, steel and with a fire resistant barrier.

(bb) New Appendix B, Paragraph B2, First order elastic analysis, Paragraph B3, Second order elastic analysis and Paragraph B4, Advanced analysis, added.

(cc) Appendix D extended to buckling stresses and actions for sections in compression, bending and shear including sections with holes.

(dd) Informative Appendix G added for members subject to non-uniform temperature distribution.

Notes to the text contain information and guidance. They are not an integral part of the Standard.

Sections of this Standard have been reproduced from AISI S100, *North American Specification for the Design of Cold-Formed Steel Structural Members*, with permission from the American Iron and Steel Institute.

Standards Australia thanks NASH (National Association of Steel-framed Housing) for permission to reproduce sections of NASH Standard—*Residential and Low-rise Steel Framing, Part 1: Design Criteria* in Clause 1.6 and Clause 8.4 of this Standard.

A statement expressed in mandatory terms in a note to a table is deemed to be a requirement 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 sets out minimum requirements for the design of structural members cold-formed to shape from carbon or low-alloy steel sheet, strip, plate or bar not more than 25 mm in thickness and used for load-carrying purposes in buildings. It is also applicable for structures other than buildings, provided appropriate allowances are made for dynamic effects.

This Standard does not apply to the design of structures subject to brittle fracture.

1.2 NORMATIVE REFERENCES

Normative documents referenced in this Standard are listed in Appendix A.

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply. Definitions peculiar to a particular clause or section are also given in that clause or section.

1.3.1 Action

Set of concentrated or distributed forces acting on a structure (direct action), or deformation imposed on a structure or constrained within it (indirect action).

1.3.2 Action effect (internal effects of actions, load effects)

Internal forces and bending moments due to actions (stress resultants).

1.3.3 Arched compression element

A circular or parabolic arch-shaped compression element having an inside radius-to-thickness ratio greater than 8, stiffened at both ends by edge stiffeners. See Figure 1.3(C).

1.3.4 Assemblage of elements

A system of interconnected cold-formed steel elements that act together to resist earthquake action in such a way that the strength and deformation capacity of the system is not adversely affected by the buckling or crippling of any one element of the assemblage.

1.3.5 Bend

Portion adjacent to flat elements and having a maximum inside radius-to-thickness ratio (r_i/t) of 8. See Figure 1.3(A).

1.3.6 Braced member

Member for which the transverse displacement of one end of the member relative to the other is effectively prevented.