



AISI S212–07 (2012)



**American
Iron and Steel
Institute**

AISI STANDARD

North American Standard for Cold-Formed Steel Framing— Header Design

2007 Edition (Reaffirmed 2012)

Revision of AISI/COFS/HD - 2004

Endorsed by



Steel Framing Alliance™



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DISCLAIMER

The material contained herein has been developed by the American Iron and Steel Institute Committee on Framing Standards. The Committee has made a diligent effort to present accurate, reliable, and useful information on cold-formed steel framing design and installation. The Committee acknowledges and is grateful for the contributions of the numerous researchers, engineers, and others who have contributed to the body of knowledge on the subject. Specific references are included in the *Commentary*.

With anticipated improvements in understanding of the behavior of cold-formed steel framing and the continuing development of new technology, this material will become dated. It is anticipated that AISI will publish updates of this material as new information becomes available, but this cannot be guaranteed.

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PREFACE

The American Iron and Steel Institute Committee on Framing Standards has developed AISI S212, the *North American Standard for Cold-Formed Steel Framing – Header Design*, to provide technical information and specifications for designing headers made from cold-formed steel. This standard is intended for adoption and use in the United States, Canada and Mexico.

This standard provides an integrated treatment of Allowable Strength Design (ASD), Load and Resistance Factor Design (LRFD), and Limit States Design (LSD). This is accomplished by including the appropriate resistance factors (ϕ) for use with LRFD and LSD, and the appropriate factors of safety (Ω) for use with ASD. It should be noted that LSD is limited to Canada and LRFD and ASD are limited to Mexico and the United States.

The Committee acknowledges and is grateful for the contributions of the numerous engineers, researchers, producers and others who have contributed to the body of knowledge on the subjects. The Committee wishes to also express their appreciation for the support of the Steel Framing Alliance and the Canadian Sheet Steel Building Institute.

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NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING – HEADER DESIGN

A. GENERAL

A1 Scope

The design and installation of *cold-formed steel* box and back-to-back *headers*, and double and single *L-headers* for load carrying purposes in buildings shall be in accordance with AISI S100 [CSA S136] and AISI S200, except as modified by the provisions of this standard. Alternatively *headers* shall be permitted to be designed solely in accordance with the AISI S100 [CSA S136].

This standard shall not preclude the use of other materials, assemblies, structures or designs not meeting the criteria herein, when the other materials, assemblies, structures or designs demonstrate equivalent performance for the intended use to those specified in this standard. Where there is a conflict between this standard and other reference documents the requirements contained within this standard shall govern.

This standard shall include Sections A through C inclusive.

A2 Definitions

Where terms appear in this standard in italics, such terms shall have meaning as defined in AISI S200. Terms included in square brackets are specific to *LSD* terminology. Terms not italicized shall have the ordinary accepted meaning in the context for which they are intended.

A3 Loads and Load Combinations

Buildings or other structures, and all parts therein, shall be designed to safely support all loads that are expected to affect the structure during its life in accordance with the *applicable building code*. In the absence of an *applicable building code*, the loads, forces, and combinations of loads shall be in accordance with accepted engineering practice for the geographical area under consideration as specified by the applicable sections of *Minimum Design Loads for Buildings and Other Structures* (ASCE 7) in the United States and Mexico, and the *National Building Code of Canada* (NBCC) in Canada.

A4 Referenced Documents

The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document.

1. AISI S100-07, *North American Specification for the Design of Cold-Formed Steel Structural Members*, American Iron and Steel Institute, Washington, DC.
2. AISI S200-07, *North American Standard for Cold-Formed Steel Framing—General Provisions*, American Iron and Steel Institute, Washington, DC.
3. ASCE 7-05 Including Supplement No. 1, *Minimum Design Loads for Buildings and Other Structures*, American Society of Civil Engineers, Reston, VA.
4. CAN/CSA S136-07, *North American Specification for the Design of Cold-Formed Steel Structural Members*, Canadian Standards Association, Mississauga, Ontario, Canada.
5. NBCC 2005, *National Building Code of Canada*, 2005 Edition, National Research Council of Canada, Ottawa, Ontario, Canada.

B. DESIGN

B1 Back-to-Back Headers

The provisions of this section shall be limited to back-to-back *header* beams that are installed using *cold-formed steel C-shape* sections in accordance with Section C1.

B1.1 Bending

Bending alone shall be evaluated by using Section C3.1.1 of AISI S100 [CSA S136].

B1.2 Shear

Shear alone shall be evaluated by using Section C3.2 of AISI S100 [CSA S136].

B1.3 Web Crippling

Web crippling alone shall be evaluated by using Section C3.4 of AISI S100 [CSA S136]. For back-to-back *header* beams, the equations for built-up sections shall be used.

B1.4 Bending and Shear

The combination of bending and shear shall be evaluated by using Section C3.3 of AISI S100 [CSA S136].

B1.5 Bending and Web Crippling

Webs of back-to-back *header* beams subjected to a combination of bending and web crippling shall be designed using Section C3.5 of AISI S100 [CSA S136]. For back-to-back *header* beams, the equations for built-up sections shall be used.

B2 Box Headers

The provisions of this section shall be limited to box *header* beams that are installed using *cold-formed steel C-shape* sections in accordance with Section C1.

B2.1 Bending

Bending alone shall be evaluated by using Section C3.1.1 of AISI S100 [CSA S136].

B2.2 Shear

Shear alone shall be evaluated by using Section C3.2 of AISI S100 [CSA S136].

B2.3 Web Crippling

Web crippling alone shall be evaluated by using Section C3.4 of AISI S100 [CSA S136]. For box *header* beams the equations for shapes having single *webs* shall be used. P_n for an interior-one-flange loading condition, with the applicable Ω or ϕ factor defined below, shall be permitted to be multiplied by α , where α accounts for the increased strength due to the *track* and is defined as follows:

- α = parameter defined by equation B2.3-1 or B2.3-2
- Ω = 1.80 for ASD
- ϕ = 0.85 for LRFD
- ϕ = 0.80 for LSD