



AISI S201-07



# **AISI** STANDARD

## **North American Standard for Cold-Formed Steel Framing— Product Data**

2007 Edition

Endorsed by:



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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.

The materials set forth herein are for general purposes only. They are not a substitute for competent professional advice. Application of this information to a specific project should be reviewed by a design professional. Indeed, in many jurisdictions, such review is required by law. Anyone making use of the information set forth herein does so at their own risk and assumes any and all liability arising therefrom.

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## PREFACE

The American Iron and Steel Institute Committee on Framing Standards has developed AISI S201, the *North American Standard for Cold-Formed Steel Framing – Product Data*, to standardize requirements for *cold-formed steel* framing products. This standard is intended to establish and encourage the production and use of standardized products in the United States, Canada and Mexico.

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 Canadian Sheet Steel Building Institute.

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# NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING – PRODUCT DATA

## A. GENERAL

### A1 Scope

This standard provides criteria, including material and product requirements for *structural members* and *non-structural members* utilized in *cold-formed steel* framing applications where the specified minimum *base steel thickness* is between 18 mils (0.0179 inches) (0.455mm) and 118 mils (0.1180 inches) (2.997mm).

The components covered in this standard include *C-shape studs, joists, track, U-channels, furring channels* and angles.

This standard shall not preclude the use of other products not meeting the criteria herein, when the other products 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 D inclusive.

### A2 Definitions

Where the following terms appear in this standard in italics, such terms shall have the meaning herein indicated. Terms included in square brackets shall be specific to *LSD* terminology. Where a country is indicated in square brackets following the definition, the definition shall apply only in the country indicated. Terms not defined in Section A2 shall have ordinary accepted meaning for the context for which they are intended.

*Base Steel Thickness.* The thickness of bare steel exclusive of all coatings.

*Cold-Formed Sheet Steel.* Sheet steel or strip steel that is manufactured by (1) press braking blanks sheared from sheets or cut length of coils or plates, or by (2) continuous roll forming of cold- or hot-rolled coils of sheet steel; both forming operations are performed at ambient room temperature, that is, without any addition of heat such as would be required for hot forming.

*Cold-Formed Steel.* See *Cold-Formed Sheet Steel*.

*C-Shape.* A *cold-formed steel* shape used for *structural* and *non-structural members* consisting of a *web*, two (2) *flanges* and two (2) *lips (edge stiffeners)*.

*Design Load.* Applied *load* determined in accordance with either LRFD load combinations or ASD load combinations, whichever is applicable. [USA and Mexico]

*Design Thickness.* The steel thickness used in design.

*Designation Thickness.* The minimum *base steel thickness* expressed in mils and rounded to a whole number.

*Edge Stiffener.* See *Lip*.

*Factored Load.* Product of a specified load and appropriate load factor. [Canada]

*Flange.* For a *C-shape, U-shape* or *track*, that portion of the framing member that is perpendicular to the *web*. For a furring channel, that portion of the framing member that connects the *webs*.

*Grade.* The designation of the minimum *yield strength*.

*Joist.* A *structural member* primarily used in floor and ceiling framing.

*Lip.* That part of a framing member that extends from the *flange* as a stiffening element.

*Load.* Force or other action that results from the weight of building materials, occupants and their possessions, environmental effects, differential movement, or restrained dimensional changes.

*Mil.* A unit of measurement equal to 1/1000 inch.

*Non-Structural Member.* A member in a steel framed system which is limited to a transverse (out-of-plane) load of not more than 10 lb/ft<sup>2</sup> (480 Pa), a superimposed axial load, exclusive of sheathing materials, of not more than 100 lb/ft (1460 N/m), or a superimposed axial load of not more than 200 lbs (890 N).

*Punchout.* A hole made during the manufacturing process in the *web* of a steel framing member.

*Structural Member.* A member that resists *design loads* [*factored loads*], as required by the *applicable building code*, except when defined as a *non-structural member*.

*Stud.* A vertical framing member in a wall system or assembly.

*Track.* A framing member consisting of only a *web* and two (2) *flanges*. Track *web* depth measurements are taken to the inside of the *flanges*.

*Yield Strength.* Stress at which a material exhibits a specified limiting deviation from the proportionality of stress to strain as defined by ASTM.

*Web.* That portion of a framing member that connects the *flanges*.

### A3 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. ASTM A653/A653M-06, *Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process*, ASTM International, West Conshohocken, PA.
2. ASTM A792/A792M-06, *Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process*, ASTM International, West Conshohocken, PA.
3. ASTM A1003/A1003M-05, *Standard Specification for Sheet Steel, Carbon, Metallic and Non-Metallic Coated for Cold-Formed Framing Members*, ASTM International, West Conshohocken, PA.
4. ASTM C645-06, *Standard Specification for Nonstructural Steel Framing Members*, ASTM International, West Conshohocken, PA.
5. ASTM C955-06, *Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases*, ASTM International, West Conshohocken, PA.

## B. MATERIALS

### B1 Material Specification

*Structural members and non-structural members shall be cold-formed to shape from sheet steel in compliance with the requirements of ASTM A1003/A1003M, but limited to the following material types and grades:*

- (a) Type H (high ductility): Structural Grade 33 [230] Type H (ST33H) [ST230H] or Structural Grade 50 [340] Type H (ST50H) [ST340H]
- (b) Type L (low ductility): Structural Grade 33 [230] Type L (ST33L) [ST230L] or Structural Grade 50 [340] Type L (ST50L) [ST340H]
- (c) Type NS (nonstructural): Nonstructural Grade 33 [230] (NS33) [NS230]

### B2 Base Steel Thickness

*Structural members and non-structural members shall be cold-formed to shape from sheet steel with a minimum base steel thickness listed in Table B2-1. Member thickness shall be referenced to the corresponding designation thickness.*

**Table B2-1**  
**Standard Thickness**

Designation Thickness	Minimum Base Steel Thickness		Design Thickness	
	(inch)	(mm)	(inch)	(mm)
18	0.0179	0.455	0.0188	0.478
27	0.0269	0.683	0.0283	0.719
30	0.0296	0.752	0.0312	0.792
33	0.0329	0.836	0.0346	0.879
43	0.0428	1.087	0.0451	1.146
54	0.0538	1.367	0.0566	1.438
68	0.0677	1.720	0.0713	1.811
97	0.0966	2.454	0.1017	2.583
118	0.1180	2.997	0.1242	3.155

### B3 Corrosion Protection

*Structural members and non-structural members shall comply with the minimum metallic coating weight [mass] requirements shown in Table B3-1. Alternative coatings shall be permitted to be used if proven to be equivalent.*

**Table B3-1**  
**Coating Weight [Mass] Requirements (Metallic Coatings)**

Material Designation	Coating Designation
Type H and Type L	G60 [Z180] <sup>A</sup> AZ50 [AZM150] <sup>B</sup>
Type NS	G40 [Z120] <sup>A</sup> AZ50 [AZM150] <sup>B</sup>

<sup>A</sup> Zinc-coated steel sheet as described in ASTM Specification A653/A653M.

<sup>B</sup> 55% aluminum-zinc alloy-coated steel sheet as described in ASTM Specification A792/A792M.

## C. PRODUCTS

### C1 Product Designator

References to *structural members* and *non-structural members* shall use a four-part product designator that identifies the size (both *web* depth and *flange* width), style, and thickness. The standard designator as described (i.e. based on U.S. Customary units) shall be used for either U.S. Customary or SI Metric units. The product designator shall consist of the following sequential codes:

A three or four-digit numeral indicating member *web* depth in 1/100 inch. A letter indicating:

S = *Stud* or joist framing member which have *lips*

T = *Track* section

U = channel or *stud* framing section which do not have *lips*

F = furring channels

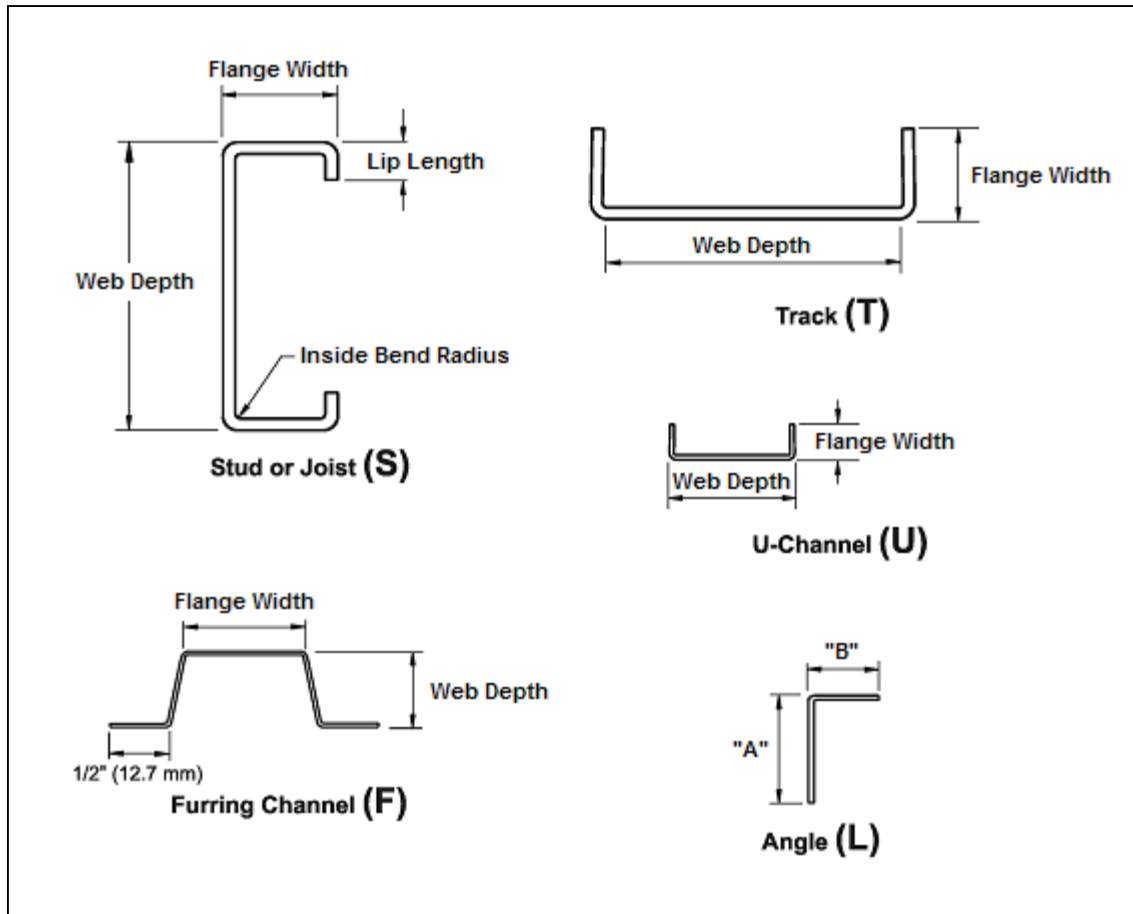
L = angle or *L-header*

A three-digit numeral indicating *flange* width in 1/100 inch, followed by a dash. A two or three-digit numeral indicating *designation thickness*.

When specifying material for use in structural applications, the material *grade* used in design shall be identified on the contract documents and when ordering the material.

### C2 Standard Shapes

The standard shapes for *structural members* and *non-structural members* shall be any combination of the basic dimensions listed in Tables C2-1 through C2-5 depending on the member type. The standard shapes are illustrated in Figure C2-1.



**Figure C2-1 Cold Formed Steel Framing Member Types**

**Table C2-1  
Standard Dimensions for C-Shape Studs and Joists (S)**

Depth Designation	Web Depth	
	Design Depth (inch)	Design Depth (mm)
162	1-5/8	41.3
250	2-1/2	63.5
350	3-1/2	88.9
362	3-5/8	92.1
400	4	102
550	5-1/2	140
600	6	152
800	8	203
1000	10	254
1200	12	305
1400	14	356

Width Designation	Flange Width	
	Design Width (inch)	Design Width (mm)
125	1-1/4	31.8
137	1-3/8	34.9
162	1-5/8	41.3
200	2	50.8
250	2-1/2	63.5
300	3	76.2
350	3-1/2	88.9

Note: Not all shapes are available in every standard thickness.

**Table C2-2**  
**Standard Dimensions for Track (T)**

Web Depth			Flange Width		
Depth Designation	Design Depth		Width Designation	Design Width	
	(inch)	(mm)		(inch)	(mm)
162	1-5/8	41.3	125	1-1/4	31.8
250	2-1/2	63.5	200	2	50.8
350	3-1/2	88.9	250	2-1/2	63.5
362	3-5/8	92.1	300	3	76.2
400	4	102			
550	5-1/2	140			
600	6	152			
800	8	203			
1000	10	254			
1200	12	305			
1400	14	356			

Note: Not all shapes are available in every standard thickness.

**Table C2-3**  
**Standard Dimensions for U-Channel (U)**

Web Depth			Flange Width		
Depth Designation	Design Depth		Width Designation	Design Width	
	(inch)	(mm)		(inch)	(mm)
75	3/4	19.1	50	1/2	12.7
150	1-1/2	38.1	75	3/4	19.1
200	2	50.8			
250	2-1/2	63.5			

Note: Not all shapes are available in every standard thickness.

**Table C2-4**  
**Standard Dimensions for Furring Channel (F)**

Web Depth			Flange Width		
Depth Designation	Design Depth		Width Designation	Design Width	
	(inch)	(mm)		(inch)	(mm)
87	7/8	22.2	125	1-1/4	31.8
150	1-1/2	38.1			

Note: Not all shapes are available in every standard thickness.

**Table C2-5**  
**Standard Dimensions for Angles (L)**

"A" Flange Width			"B" Flange Width		
Depth Designation	Design Depth		Width Designation	Design Width	
	(inch)	(mm)		(inch)	(mm)
62	5/8	15.9	62	5/8	15.9
87	7/8	22.2	87	7/8	22.2
137	1-3/8	34.9	137	1-3/8	34.9
150	1-1/2	38.1	150	1-1/2	38.1
200	2	50.8	200	2	50.8
300	3	76.2	300	3	76.2

Note: Not all shapes are available in every standard thickness.

### C3 Inside Bend Radius

The size of the inside bend radius used for design shall comply with the requirements shown in Table C3-1.

**Table C3-1**  
**Design Inside Bend Radius**

Designation Thickness	Inside Bend Radius	
	(inch)	(mm)
18	0.0843	2.141
27	0.0796	2.022
30	0.0781	1.984
33	0.0764	1.941
43	0.0712	1.808
54	0.0849	2.156
68	0.1069	2.715
97	0.1525	3.874
118	0.1863	4.732

### C4 Lip Length

The *lip* length on a *C-shape stud* or *joist structural member* or *non-structural member* shall be related to the *flange* width as listed in Table C4-1.

**Table C4-1**  
**Design Lip Length for C-Shape Studs and Joists (S)**

Section	Flange Width		Design Lip Length	
	(inch)	(mm)	(inch)	(mm)
S125	1-1/4	31.8	3/16	4.8
S137	1-3/8	34.9	3/8	9.5
S162	1-5/8	41.3	1/2	12.7
S200	2	50.8	5/8	15.9
S250	2-1/2	63.5	5/8	15.9
S300	3	76.2	5/8	15.9
S350	3-1/2	88.9	1	25.4

### C5 Punchouts

Unless specified otherwise by the manufacturer, factory *punchouts* (perforations) shall comply with the following conditions:

- (1) *Punchouts* shall be spaced along the centerline of the *web* of the framing member;
- (2) *Punchouts* shall have a center-to-center spacing of not less than 24 inches (600 mm);
- (3) *Punchouts* shall have a width not greater than half the member depth or 2-1/2 inches (63.5 mm), whichever is less;
- (4) *Punchouts* shall have a length not exceeding 4-1/2 inches (114 mm); and
- (5) The distance from the center of the last *punchout* to the end of the member shall not be less than 12 inches (305 mm), unless otherwise specified.

Any configuration or combination of holes that fits within the *punchout* width and length limitations shall be permitted.

### C6 Product Marking

#### C6.1 Structural Members

*Structural members* shall be marked legibly with the following minimum information:

- (1) manufacturer (name, logo or initials);
- (2) steel *designation thickness*;
- (3) minimum *yield strength* if other than Grade 33 [230]; and
- (4) minimum coating designation if other than G60 [Z180].

#### C6.2 Non-Structural Members

*Non-structural members* shall be marked legibly with the following minimum information:

- (1) manufacturer (name, logo or initials);
- (2) steel *designation thickness*;
- (3) minimum *yield strength* if other than Grade 33 [230].
- (4) minimum coating designation if other than G40 [Z120]; and



### C6.3 Color-Coding

Where color-coding of members or bundles of like members is employed, the standard color-coding in Table C6-1 shall be used.

**Table C6-1**  
**Standard Color Coding**

<b>Designation Thickness</b>	<b>Color</b>
18	None
27	Black
30	Pink
33	White
43	Yellow
54	Green
68	Orange
97	Red
118	Blue

### C7 Manufacturing Tolerances

*Structural members* shall comply with the manufacturing tolerances listed in ASTM C955.  
*Non-structural members* shall comply with the manufacturing tolerances listed in ASTM C645.

**D. QUALITY ASSURANCE**

*Structural members and non-structural members* shall be manufactured in accordance with a properly documented quality control program. Manufacturers shall establish filing methods that document the proper application of quality assurance procedures throughout the manufacturing process.

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**Commentary on the**  
**North American Standard for**  
**Cold-Formed Steel Framing–**  
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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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1<sup>st</sup> Printing - June 2007

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## PREFACE

This *Commentary* is intended to facilitate the use, and provide an understanding of the background, of AISI S201, the *North American Standard for Cold-Formed Steel Framing – Product Data*. The *Commentary* illustrates the substance and limitations of the various provisions of the standard.

In the *Commentary*, sections, equations, figures, and tables are identified by the same notation as used in the standard. Words that are italicized are defined in the standard. Terms included in square brackets are specific to LSD terminology.

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## **COMMENTARY ON THE NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING – PRODUCT DATA**

### **A. GENERAL**

AISI S201 (AISI, 2007c) is intended to establish and encourage the production and use of standardized products in the United States, Canada and Mexico. As such, the standard applies to *structural members* and *non-structural members* utilized in *cold-formed steel* framing applications within a practical and industry accepted range of *base steel thicknesses* and covers the most common and readily available shapes and dimensions.

The standard does not intend to stifle innovation. As such, it states, “This standard shall not preclude the use of other products not meeting the criteria herein, when the other products demonstrate equivalent performance for the intended use to those specified in this standard.”

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## B. MATERIALS

### B2 Base Steel Thickness

Gauge thickness is an obsolete method of specifying sheet and strip thickness. Gauge numbers are only a very rough approximation of steel thickness and should not be used to order, design or specify any sheet or strip product. Listed in Table B2-2 are the common thickness equivalents for gauge numbers used with *cold-formed steel* framing. Note that these thickness equivalents do not conform to gauge systems used for other *cold-formed sheet steel* products (e.g. steel deck, ductwork and cladding).

**Table B2-2**  
**Reference Gauge Numbers**

Designation Thickness	Gauge Number (for reference only)
18	25
27	22
30	20 - Drywall <sup>1</sup>
33	20 - Structural <sup>1</sup>
43	18
54	16
68	14
97	12
118	10

<sup>1</sup> Historically, 20 gauge material has been furnished in two different thicknesses for structural and drywall (non-structural) applications.

The values for metric (mm) steel thickness in Table B2-1 (minimum and design) are converted from the calculated U.S. Customary (inch) values rounded to 1/1000 inch. This means that the metric *base steel thickness* will not be exactly 95% of the metric *design thickness*.

### B3 Corrosion Protection

The minimum coating designations listed in Table B3-1 assume normal exposure and construction practices. Other types of coatings that provide equal or better corrosion protection may also be acceptable. When more severe exposure conditions are probable, consideration should be given to specifying heavier coating weight [mass].

It is noted that ASTM A1004/A1004M (ASTM, 2004) covers procedures for establishing the acceptability of steel sheet for use as *cold-formed steel* framing members. This practice is to be used to assess the corrosion resistance of different coatings on steel sheet in a laboratory test. It is not intended to be used as an application performance standard for the *cold-formed steel* framing, but is to be used to evaluate coatings under consideration for addition to ASTM A1003/A1003M (ASTM, 2005).

## C. PRODUCTS

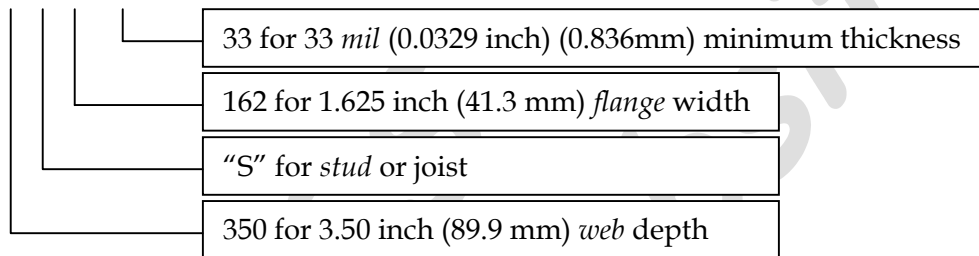
### C1 Product Designators

The standard has adopted a standard designator system for identifying *cold-formed steel* framing members. The intent for using a standard designator system was to overcome the varied designators that were produced by each individual manufacturer. In addition, the designator is used to identify not only a specific *cold-formed steel* framing member, but also in identifying the section properties of that same member through the use of the manufacturer's product technical information documents.

The following presents an example of the standard designator for a *cold-formed steel stud*:

350S162-33 represents a member with the following:

#### 350S162-33



### C3 Inside Bend Radius

The U.S. Customary (inch) values for design inside bend radius in Table C3-1 are based on standard industry practice, which is the maximum of  $3/32 - t/2$  or  $1.5t$ , truncated after the fourth decimal place ( $t = \text{design thickness}$ ). The values for metric (mm) design inside bend radius in Table C3-1 are converted from the computed U.S. Customary (inch) values.

### C5 Punchouts

Size and spacing requirements for factory *punchouts* (perforations) are included in this standard to encourage standardization and facilitate the development of load and span tables based on punched members. The manufacturer may deviate from these requirements, provided that the manufacturer specifies the *punchout* size and spacing and furnishes data to demonstrate compliance with AISI S200 (AISI, 2007b) and AISI S100 [CSA S136], (AISI, 2007a; CSA, 2007). These limitations are intended for the manufactured product, not for additional *web* holes provided by others in the field.

### C7 Manufacturing Tolerances

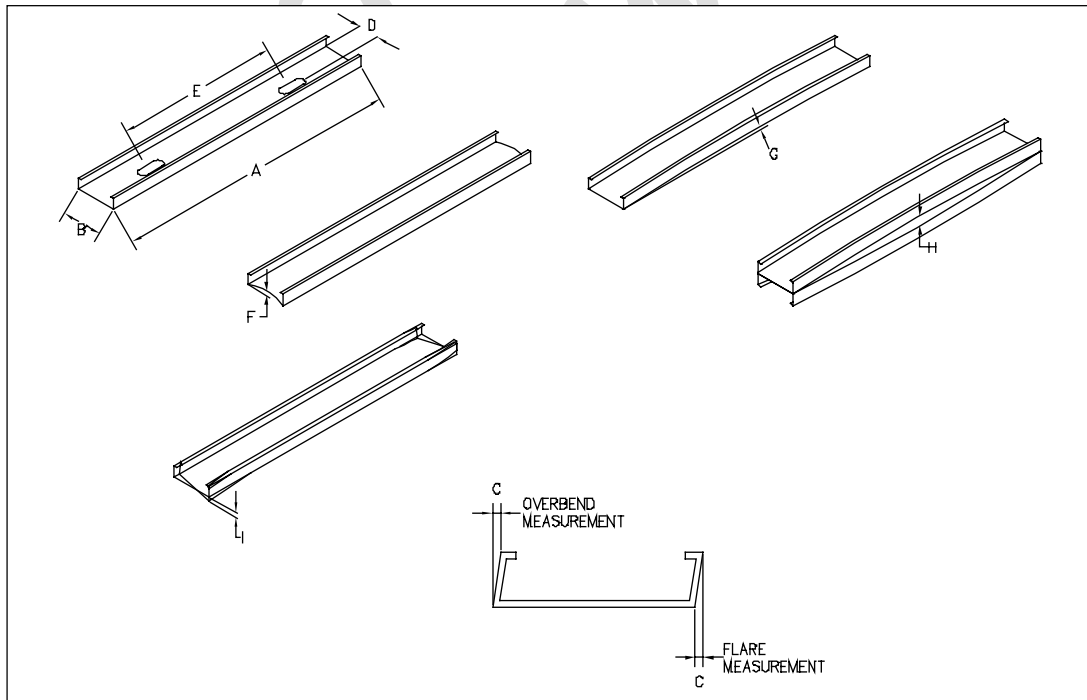
The manufacturing tolerances listed in Tables C7-1 and C7-2 are reproduced, with permission, from ASTM C955-03 (ASTM, 2006a), *Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases* and ASTM C645-03 (ASTM, 2006b), *Standard Specification for Nonstructural Steel Framing Members*, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standards may be obtained from ASTM ([www.astm.org](http://www.astm.org)).

**Table C7-1**  
**Manufacturing Tolerances for Structural Members**

Dimension <sup>1</sup>	Item Checked	Studs, in. (mm)	Tracks, in. (mm)
A	Length	+3/32 (2.38)	+ 1/2 (12.7)
		-3/32 (2.38)	-1/4 (6.35)
B <sup>2</sup>	Web Depth	+1/32 (0.79)	+1/32 (0.79)
		-1/32 (0.79)	+1/8 (3.18)
C	Flare	+1/16 (1.59)	+0 (0)
	Overbend	-1/16 (1.59)	-3/32 (2.38)
D	Hole Center Width	+1/16 (1.59)	NA
		-1/16 (1.59)	NA
E	Hole Center Length	+1/4 (6.35)	NA
		-1/4 (6.35)	NA
F	Crown	+1/16 (1.59)	+1/16 (1.59)
		-1/16 (1.59)	-1/16 (1.59)
G	Camber	1/32 per ft (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)
H	Bow	1/32 per ft (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)
I	Twist	1/32 per ft (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)

<sup>1</sup> All measurements shall be taken not less than 1 ft (305 mm) from the end.

<sup>2</sup> Outside dimension for *stud*; inside for *track*.



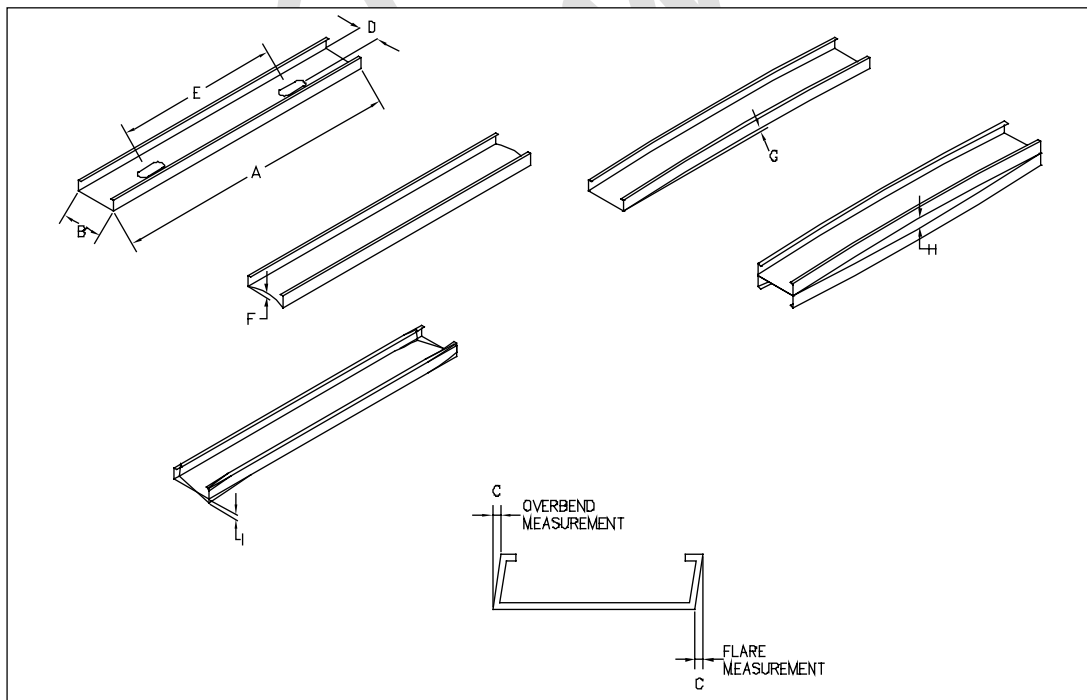
**Figure C7-1 Manufacturing Tolerances for Structural Members**

**Table C7-2**  
**Manufacturing Tolerances for Non-Structural Members**

Dimension <sup>1</sup>	Item Checked	Studs, in. (mm)	Tracks, in. (mm)
A	Length	+1/8 (3.18)	+ 1(25.40)
		-1/4 (6.35)	-1/4 (6.35)
B <sup>2</sup>	Web Depth	+1/32 (0.79)	+1/8 (3.18)
		-1/32 (0.79)	-0 (0)
C	Flare	+1/16 (1.59)	+0 (0)
	Overbend	-1/16 (1.59)	-3/16 (4.76)
D	Hole Center Width	+1/8 (3.18)	NA
		-1/8 (3.18)	NA
E	Hole Center Length	+1/4 (6.35)	NA
		-1/4 (6.35)	NA
F	Crown	+1/8 (3.18)	+ 1/8 (3.18)
		-1/8 (3.18)	- 1/8 (3.18)
G	Camber	1/32 per ft. (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)
H	Bow	1/32 per ft (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)
I	Twist	1/32 per ft (2.6 per m)	1/32 per ft (2.6 per m)
		1/2 max (12.7)	1/2 max (12.7)

<sup>1</sup> All measurements shall be taken not less than 1 ft (305 mm) from the end.

<sup>2</sup> Outside dimension for *stud*; inside for *track*.



**Figure C7-2 Manufacturing Tolerances for Non-Structural Members**

**REFERENCES**

(AISI, 2007a), *North American Specification for the Design of Cold-Formed Steel Structural Members*, AISI S100-07, American Iron and Steel Institute, Washington, D.C., 2007.

(AISI, 2007b), *North American Standard for Cold-Formed Steel Framing - General Provisions*, AISI S200-07, American Iron and Steel Institute, Washington, DC, 2007.

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(ASTM, 2004), *Standard Practice for Establishing Conformance to the Minimum Expected Corrosion Characteristics of Metallic, Painted-Metallic, and Nonmetallic-Coated Steel Sheet Intended for Use as Cold Formed Framing Members*, ASTM A1004/A1004M-04, ASTM International, West Conshohocken, PA, 2004.

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(ASTM, 2006a), *Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases* (2000), ASTM C955-06, ASTM International, West Conshohocken, PA, 2003.

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