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PREVIEW OF THE AISI SUPPLEMENT TO THE 1996 EDITION OF THE SPECIFICATION

Since 1997, the AISI Committee on Specifications for the Design of Cold-Formed Steel Structural Members has approved a number of new and/or revised design provisions to reflect the results of continuing research. These approved revisions will be published by AISI in a Supplement following the public review. Changes to the AISI Specification are briefly discussed in the following sections:

Section A3.1 - Applicable Steels

References for all ASTM standards were updated. Standard specifications for A847 and A875 steels were added to the list.

Section A3.3 - Ductility

Editorial changes were made in Section A3.3.2. Design equations were added for determining the reduced yield point for computing the section strength of multiple-web sections.

Section A5.1.3 - Wind or Earthquake Loads

The exception clause for evaluating diaphragms was deleted from this Section.

Section A9 - Reference Documents

References to all documents were updated. Specifications for A847 and A875 steels were added to the listed ASTM Standards.

Section B1.1 - Flange Flat-Width-to-Thickness Considerations

The conditions for some w/t limits for stiffened and unstiffened compression elements were revised.

Section B2.4 - C-Section Webs with Holes Under Stress Gradient

This is a new section dealing with C-sections having webs with openings. These provisions can be used within the given limits.

Section B6.1 - Transverse Stiffeners

The limiting w/t ratio for the unstiffened elements of cold-formed steel transverse stiffeners was revised from $0.37\sqrt{E/F_{ys}}$ to $0.42\sqrt{E/F_{ys}}$.

Section C2 - Tension Members

The nominal tensile strength equation for axially loaded tension members was revised. The limit states for determining the nominal tensile strength include (a) yielding in the gross section, (b) fracture in the net section away from connections, and (c) fracture in the effective net section at the connection.

Section C3.1 - Strength for Bending Only

A footnote was added to Section C3.1 to clearly state that the provisions of this Section do not consider torsional effects.

Section C3.1.2.1 - Lateral-Torsional Buckling Strength

The section number was changed from C3.1.2 to C3.1.2.1 with a title change to "Lateral-Torsional Buckling Strength." The design equations for critical moments were changed to critical stress equations with some editorial revisions.

Section C3.1.2.2 - Closed Box Members

This is a new section for determining the lateral-torsional buckling strength of closed box members. This section replaces Section D3.3 on Laterally Unbraced Box Beams.

Section C3.1.3 - Beams Having One Flange Through-Fastened to Deck or Sheathing

The R values used for determining the nominal flexural strength of simple span C- and Z- sections were replaced by tabulated values (new Table 3.1-1) according to the depth and profile of the section.

Section C3.1.4 - Beams Having One Flange Fastened to a Standing Seam Roof System

This Section was revised to permit the use of the reduction factor to be determined by the Base Test Method for purlins under gravity load or uplift load.

Section C3.1.5 - Strength of Standing Seam Roof Panel Systems

This is a new section specifying a methodology of interpreting the test results obtained by using ASTM E1592-95 procedure.

Section C3.2.1 - Shear Strength of Webs without Holes

This is a new subsection containing the same design provisions included in Section C3.2 of the 1996 Edition of the Specification.

Section C3.2.2 - Shear Strength of C-Section Webs with Holes

This is a new section dealing with the nominal shear strength of C-section beam webs with holes. Design equations are given for computing the reduction factor on the basis of the web depth and the depth of web hole.

Section C3.4.1 - Web Crippling Strength of Webs without Holes

This subsection contains the same design provisions included in Section C3.4 of the 1996 Edition of the Specification. In Equations C3.4-1, C3.4-2, and C3.4-6, the constant C_3 was replaced by C_1 . The footnote was deleted.

Section C3.4.2 - Web Crippling Strength of C-Section Webs with Holes

This is a new section dealing with the nominal web crippling strength of C-section beam webs with holes. Design equations are given for computing reduction factors.

Section C4 - Concentrically Loaded Compression Members

Item (c) of Section C4 for the limit of slenderness ratio, Kl/r , was moved from the Specification to the Commentary with additional discussions.

Section C6.1 - Bending

The D/t limits for Specification Equations C6.1-1 and C6.1-2 were revised slightly to provide better continuity.

Section C6.2 - Compression

The coefficient R was limited to be less than or equal to unity so that the effective area will not exceed the unreduced cross section area.

Section D3.2.1 - Anchorage of Bracing for Roof Systems Under Gravity Load with Top Flange Connected to Sheathing

For C-sections, a new equation was added to determine the restraint force P_L for purlins with all compression flanges facing in the same direction. For Z-sections, a " $\cos \theta$ " term was added to the first term of all equations for computing the force P_L .

Section E2.6 - Resistance Welds

A design equation was added for determining the nominal shear strength of resistance welds. This equation replaces the tabulated values given in previous specifications.

Section E2.7 - Shear Lag Effect in Welded Connections of Members Other Than Flat Sheets

This is a new section for considering the shear lag effect in welded connections of structural members. Design equations are given for fracture and/or yielding in the effective net section of the connected parts.

Section E3.2 - Shear Lag Effect in Bolted Connections

The section title was revised to reflect the shear lag effect in bolted connections. Design equations were added for determining the effective net area and for considering the effect of staggered holes.

Section E3.3 - Bearing

New equations were added for determining the nominal bearing strength of bolted connections when deformation around the bolt holes is a design consideration.

In Tables E3.3-1 and E3.3-2, the lower thickness limit was revised from 0.024 in. (061 mm) to 0.036 in. (0.91 mm).

Section E5 - Rupture

The section title was revised to deal with shear rupture, tension rupture, and block shear rupture. Design provisions and equations were added for tension rupture (new Section E5.2) and block shear rupture (new Section E5.3).

Section E6.1 - Bearing

This section was simplified by deleting all design equations for determining the nominal bearing strength in the contact area with a concrete support.

Section F1 - Tests for Determining Structural Performance

Statistical data were added to Table F1 for structural members and connections not listed in the previous table.

NASFA ANNOUNCES “THE RIGHT STUF”

The North American Steel Framing Alliance (NASFA) recently announced the new universal designator system, “The Right STUF,” that easily identifies any common cold-formed steel framing member and its implementation by several prominent steel stud manufacturing companies.

“This new labeling system will directly address and help eliminate the problems associated with a lack of standards among steel stud producers,” said Don Moody, President of NASFA.

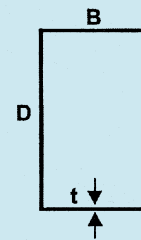
Universal Designator System for Cold-Formed Steel Framing Members

The Right STUF !!

How the New Designator System Works

To identify any common cold-formed steel framing member, the new designator system uses the web depth, flange width and minimum base metal thickness of the framing member, in conjunction with the following designators:

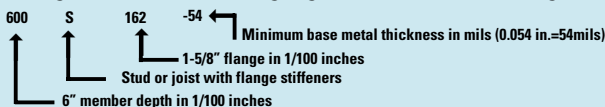
- S = Stud or Joist Sections with Flange Stiffeners (Cee Shapes)
- T = Track Sections
- U = Cold Rolled Channel or Channel Studs (without flange stiffeners)
- F = Furring Channels



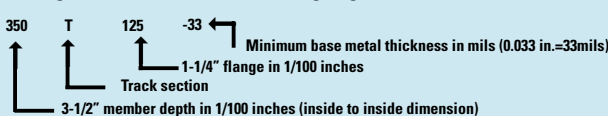
The flange width and web depth are expressed in 1/100th inches, and the minimum base metal thickness is expressed in mils (1 /1000th inches).

Examples

Designation for a 6" - 16 gauge Cee with 1-5/8" flanges: **600S162-54**



Designation for a 3-1/2" - 20 gauge Track with 1-1/4" flanges: **350T125-33**



The Logic Behind the New Designator System

It was decided to use the dimensions of the webs and flanges in the designators because they convey an intuitive picture of the shape in questions, kind of like a 2 X 4 describes a wood stud, for example. The web depth was put first, instead of the flange width (the 2 in 2 X 4) because for steel studs the strength-to-weight ratio is usually optimized by increasing depth instead of flange width, all else being equal.

The web depth and flange width are expressed in 1 /100th inches because fractions are messy and there is such a variety of depths and widths available that rounding to the nearest fraction of an inch is not sufficiently descriptive. Also, one day the metric system may become universal, in which case the depths and widths would probably be expressed in millimeters, which in most cases, would result in the same three digit format.

The logic behind the alpha designators (S for Stud, T for Track, etc.) should be obvious.

Minimum Base Metal Thicknesses

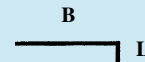
The minimum allowable base metal thickness designators were also agreed upon and are based on ICBO’s minimum prescribed thicknesses and expressed in mils. These minimum thicknesses have rapidly become the industry standards. The minimum allowable bare steel thicknesses and their mill designators are as follows:

25 gauge -0.0179" = 18 mil	16 gauge -0.0538" = 54 mil
22 gauge -0.0269" = 27 mil	14 gauge -0.0677" = 68 mil
20 gauge -0.0329" = 33 mil	12 gauge -0.0966" = 97 mil
18 gauge -0.0428" = 43 mil	10 gauge -0.1180" = 118 mil

Stiffening Lips on Cee Sections

The dimension of the stiffening lip by flange width and material thickness was also agreed upon. The dimensions agreed upon are as follows:

Material Thickness	Flange Width, B	Stiffening Lip, L
0.0179"-0.0329"	1-1/4"	3/16"
All thicknesses	1-3/8"	3/8"
All thicknesses	1-5/8"	1/2"
All thicknesses	2"	5/8"
All thicknesses	2-1/2"	5/8"



What’s Next?

With the new standard designator system and the agreed upon minimum thicknesses and stiffening lip dimensions, the section properties and load carrying abilities of any given profile can be calculated and standardized. Regardless of the manufacturer, not only will the designation be identical for a standard framing member, but also the section properties and load carrying abilities of that standard member will be uniform throughout the country. In addition to helping eliminate the confusion in the market stemming from the widely varying properties and loads published by manufacturers making essentially identical shapes, these standards should greatly facilitate submittals for plan check, code approvals, prescriptive standards, software development, etc. The intent is to make the products easier to use in existing markets and to accelerate their acceptance in new markets.

For more information please visit the NASFA website: www.steel framingalliance.com

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