

## LIGHTWEIGHT STEEL FRAMING MEMBER SECTION TABLES

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CSSBI is Canada's foremost authority on sheet steel, its products, and its many applications. They are an industry association responsible for the development and dissemination of industry standards. A source for technical information and resources, they provide expert guidance to the general public and sheet steel manufacturers alike.

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## GENERAL NOTES

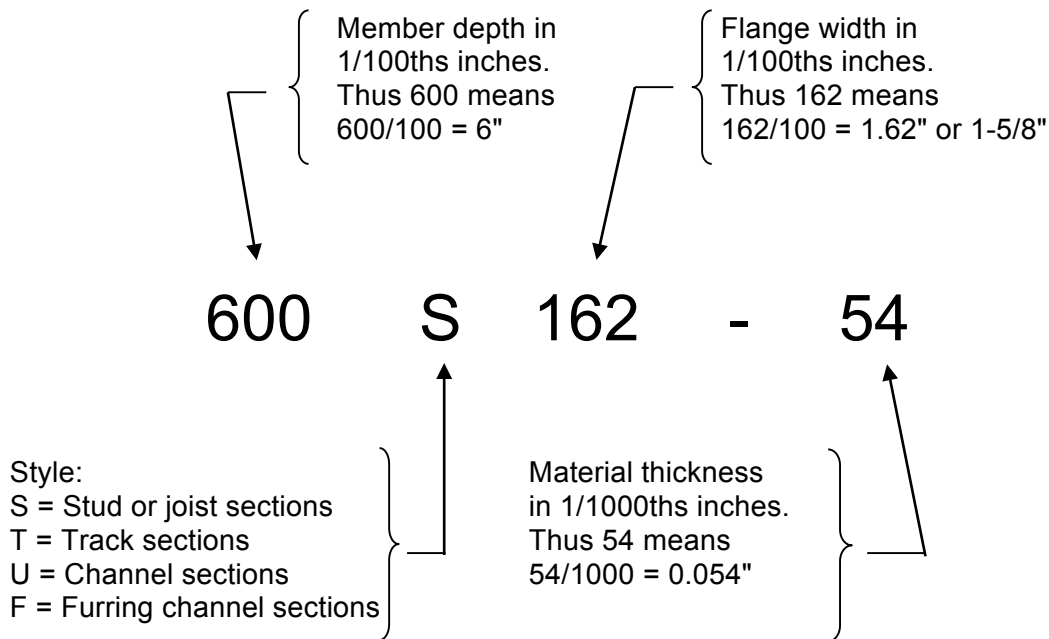
### 1. INTRODUCTION

The technical data in this publication is intended as an aid to the design professional and should not be used to replace the judgement of a qualified Engineer or Architect.

### 2. PRODUCT DESIGNATOR

Lightweight steel framing manufacturers in Canada use a common designator method for identifying their products. The designator is a four-part code that identifies depth, flange width, member type and material thickness. This designator (based on Imperial units) is used for both SI metric and Imperial units.

**Example:** 600S162-54



### 3. MANUFACTURER CERTIFICATION AND PRODUCT MARKING

- 3.1 **Lightweight steel framing manufacturers who are members of the CSSBI and adhere to the *CSSBI Manufacturer Certification Requirements for Cold Formed Steel Framing Members* are the only companies that have authorization from the CSSBI to utilize these tables.**

Under the *CSSBI Manufacturer Certification Program*, a participating manufacturer certifies that the designated structural and non-structural cold formed steel (CFS) framing members

it produces meet or exceed the relevant ASTM International (ASTM), Canadian Standards Association (CSA) and American Iron and Steel Institute (AISI) standard requirements. The manufacturer's products are validated through an independent 3<sup>rd</sup> party re-view of the products and production practices, by appropriate testing and inspection.

**3.2 Marking:**

Individual products shall have a legible label, stencil, or embossment on the member with the following minimum information:

- (a) Initials "CSSBI";
- (b) Manufacturer's identification (2 or 3 letters);
- (c) Designation steel thickness (in mils) exclusive of protective coatings; and,
- (d) A reference number identifying the source coil.

*Example:* "CSSBI-XYZ-33 ABCD" would be a 33 mil thick product manufactured by XYZ company who is a CSSBI Manufacturer Member from a coil that can be traced through the reference number "ABCD".

Additional information may also be included at the discretion of the manufacturer.

**4. SECTION GEOMETRIES**

4.1 Section geometries are identified by the product designator method described in Section 2.

4.2 Stud, joist, track and bridging channel members shall be cold formed to shape from sheet steel with a minimum base steel thickness and inside bend radius as follows:

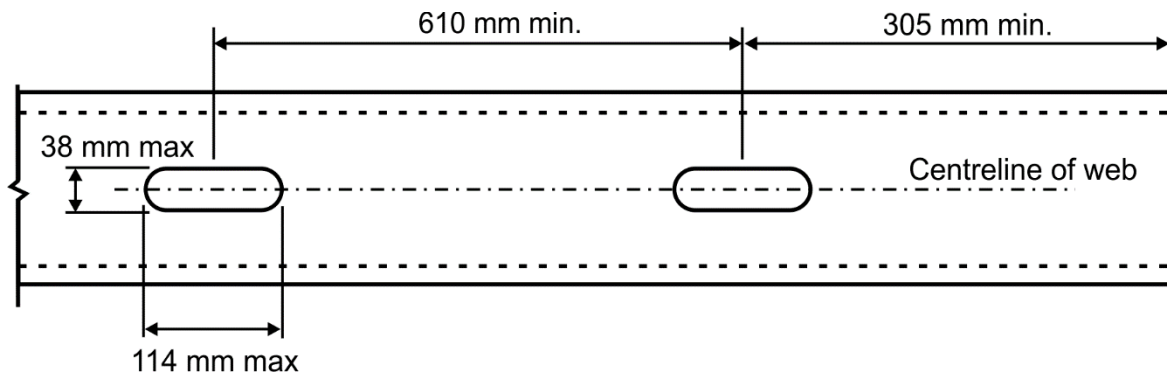
Designation Thickness (mil)	Minimum Base Steel Thickness (mm)	Base Steel Design Thickness (mm)	Inside Bend Radius (mm)
18	0.455	0.478	2.141
33	0.836	0.879	1.941
43	1.087	1.146	1.808
54	1.367	1.438	2.156
68	1.720	1.811	2.715
97	2.454	2.583	3.874

4.3 Stud and joist lip lengths are as follows:

Section	Flange Width (mm)	Lip Length (mm)
S125	31.8	4.76
S162	41.3	12.7
S200	50.8	15.9
S250	63.5	15.9
S300	76.2	15.9

## 5. SECTION PROPERTIES

- 5.1 Structural properties are based on Limit States Design (LSD) of the CSA Standard S136-16, *North American Specification for the Design of Cold-Formed Steel Structural Members*, 2016 edition (S136-16).
- 5.2 Steel shall conform to the requirements of S136-16, AISI S220-15 *North American Standard for Cold-Formed Steel Framing - Nonstructural Members* and AISI S240-15 *North American Standard for Cold-Formed Steel Structural Framing*. Products with a design thicknesses less than or equal to 1.146 mm shall have a minimum yield strength of 230 MPa and products with a design thicknesses equal to or greater than 1.438 mm shall have a minimum yield strength of 345 MPa.
- 5.3 Section properties are computed for the base steel design thicknesses (exclusive of coating) shown in the tables.
- 5.4 When provided, factory punchouts shall be located along the centreline of the webs of the members and shall have a minimum centre-to-centre spacing of 610 mm. Punchouts for members greater than 64 mm deep are a maximum of 38 mm wide by 114 mm in length. Any configuration or combination of holes that fit within the punchout width and length limitations stated above shall be permitted; other punchout configurations and locations not in compliance with the stated limitations must be approved by a design professional.



- 5.5 Increase in yield strength from cold work of forming has been included whenever applicable.
- 5.6 The effective moment of inertia for deflection,  $I_{xd}$ , is based on local buckling at an assumed specified live load stress of  $0.6F_y$ . This moment of inertia is only appropriate for checking serviceability limit states.

## 6. SYMBOLS

### Gross Properties

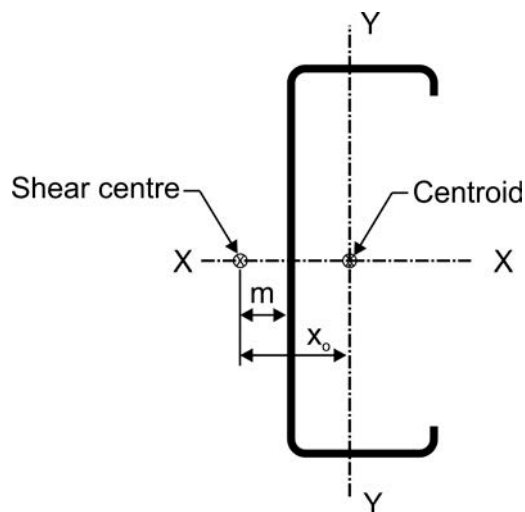
$I_x$	Moment of inertia about x-axis
$I_y$	Moment of inertia about y-axis
$r_x$	Radius of gyration about x-axis
$r_y$	Radius of gyration about y-axis
$V_{rg}$	Factored shear resistance along y-axis of unperforated section

### Effective Properties

$I_{xd}$	Moment of inertia about x-axis for deflection calculations
$M_{rx}$	Factored moment resistance for track, U-channel and furring channel sections based on local buckling
$M_{rxDB}$	Factored moment resistance about x-axis based on distortional buckling, assuming $K_\phi = 0$
$M_{rxLB}$	Factored moment resistance about x-axis based on local buckling
$M_{ryDB}$	Factored moment resistance about y-axis based on distortional buckling with lip in compression
$M_{ryLB}$	Factored moment resistance about y-axis based on local buckling with web/lip in compression
$S_{xe}$	Effective section modulus about x-axis
$V_m$	Factored shear resistance along y-axis of perforated section

### Torsional and other Properties

$\beta$	$1 - (x_o/r_o)^2$
$C_w$	Torsional warping constant
$J$	Saint-Venant torsion constant.
$L_u$	Limiting unbraced length below which lateral-torsional buckling is not considered
$m$	Distance from shear centre to mid-plane of web
$r_o$	Polar radius of gyration about shear centre
$x_o$	Distance from shear centre to centroid along principle x-axis











**Solution:**

Try 600S162-43 studs at 610 mm o.c.

From Single Span Curtain Wall Limiting Heights table under 1.5 kPa specified wind load, the limiting stud height is 3.7 m

Since  $3.7\text{ m} > 3.5\text{ m}$  ∴ OK

**Conclusion:**

Use **600S162-43** section spaced at 610 mm o.c. Web stiffeners are not required.

**7.5 CURTAIN WALL – Double span**

**Given:**

Specified (unfactored) wind load = 2.5 kPa

Stud height = 3 m

Stud spacing = 610 mm o.c.

Deflection limit = L/360

Select a stud section

**Solution:**

Try 800S162-43 studs at 610 mm o.c.

From Double Span Curtain Wall Limiting Heights table under 2.5 kPa specified wind load, the limiting stud height is 3.1a m

Since  $3.1\text{ m} > 3\text{ m}$  ∴ OK

**Conclusion:**

Use **800S162-43** section spaced at 610 mm o.c. Web stiffeners are required at end and interior supports.

**7.6 USE OF WEB CRIPPLING DATA TABLE – Single Web Member**

**Given:**

Single web C-section

Depth = 203 mm

Designation thickness = 54 mil; Base Design Thickness,  $t = 1.438\text{ mm}$

Bearing length,  $N = 75\text{ mm}$

*Determine the factored end-one-flange (EOF) web crippling resistance.*

**Solution:**

From the Factored Web Crippling Data table for Single Web Members

$P_{eo1} = 1.36\text{ kN}$ ;  $P_{eo2} = 0.48\text{ kN}$

$$P_{rEOF} = P_{eo1} + P_{eo2} \sqrt{\frac{N}{t}} = 1.36 + 0.48 \sqrt{\frac{75}{1.438}} = \underline{4.83\text{ kN}}$$

**Conclusion:**

The factored end-one-flange (EOF) web crippling resistance,  $P_{rEOF} = \underline{4.83\text{ kN}}$