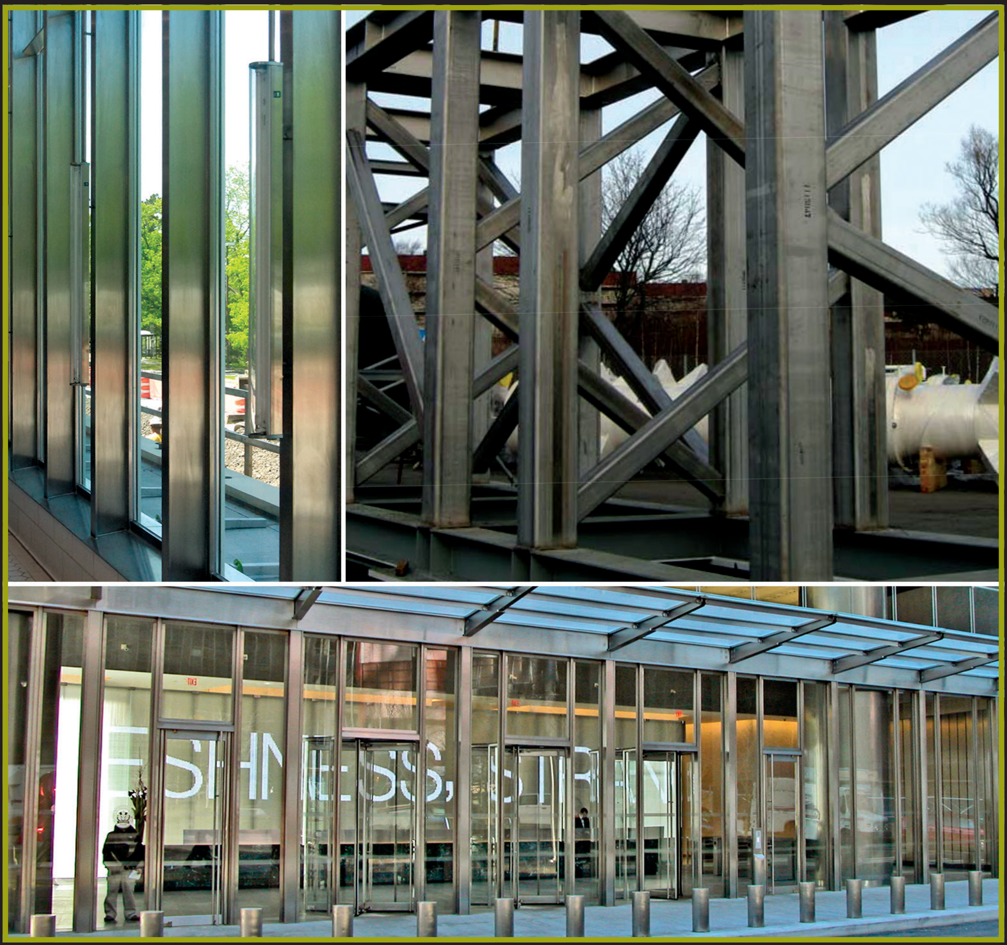
STRUCTURAL STAINLESS STEEL DESIGN TABLES

IN ACCORDANCE WITH AISC DG27: STRUCTURAL STAINLESS STEEL



SCI
Steel Knowledge

IMOA
ISSF
Nickel Institute
TEAM STAINLESS
STALA TUBE
PSP
Stainless Structurals

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

SCI (The Steel Construction Institute) is the leading, independent provider of technical expertise and disseminator of best practice to the steel construction sector. We work in partnership with clients, members and industry peers to help build businesses and provide competitive advantage through the commercial application of our knowledge. We are committed to offering and promoting sustainable and environmentally responsible solutions.

Our service spans the following areas:

Membership
Individual & corporate membership

Advice
Members advisory service

Information
Publications
Education
Events & training

Consultancy
Development
Product development
Engineering support
Sustainability

Assessment
SCI Assessment

Specification
Websites
Engineering software

Publication Number: SCI P420

ISBN 13: 978 1 85942 2397

Published by:

SCI, Silwood Park, Ascot,
Berkshire. SL5 7QN UK

T: +44 (0)1344 636525
F: +44 (0)1344 636570
E: reception@steel-sci.com

www.steel-sci.com

To report any errors, contact:
publications@steel-sci.com

Front cover credits:
Top left:
Dairy plant at Cornell University,
College of Agriculture & Life Sciences
Courtesy: Stainless Structurals

Top right:
Skid for offshore regasification plant
Courtesy: Montanstahl

Bottom:
Stainless steel entrance structure,
7 World Trade Center, New York
Courtesy: Catherine Houska

The information presented in this publication has been prepared in accordance with recognized engineering principles and is for general information only. While it is believed to be accurate, this information should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability and applicability by a licensed professional engineer, designer or architect. The publication of the material contained herein is not intended as a representation or warranty on the part of The Steel Construction Institute or of any other person named herein, that this information is suitable for any general or particular use or of freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability arising from such use. Caution must be exercised when relying upon other specifications and codes developed by other bodies and incorporated by reference herein since such material may be modified or amended from time to time subsequent to the printing of this edition. The Steel Construction Institute bears no responsibility for such material other than to refer to it and incorporate it by reference at the time of the initial publication of this edition.

Publications supplied to the members of the Institute at a discount are not for resale by them.

British Library Cataloguing-in-Publication Data.
A catalogue record for this book is available from the British Library.

FOREWORD

This publication presents design data derived in accordance with AISC DG27 *Structural Stainless Steel* and presented in an equivalent set of tables to those in the AISC *Steel Construction Manual* for carbon steel sections.

The following structural sections are covered in this publication:

- W- and S-shapes
- C- and MC-shapes
- Equal angles
- Rectangular hollow structural sections (HSS)
- Square HSS
- Circular HSS.

Section ranges listed cover sections that are readily available at the time of printing.

The work was carried out by Nancy Baddoo and Michail Georgakis of The Steel Construction Institute.

The work leading to this publication has been jointly funded by the following organisations and their support is gratefully acknowledged:

- International Molybdenum Association (IMOA)
- International Stainless Steel Forum (ISSF)
- Nickel Institute
- Penn Stainless
- Stainless Structurals LLC
- Stalatube.

CONTENTS

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

PART 1: DIMENSIONS AND PROPERTIES

PART 2: DESIGN OF FLEXURAL MEMBERS (F_y = 30 ksi)

Table 2-1	W-Shapes (Welded) Selection by Z_x
Table 2-2	W-Shapes (Welded) Selection by Z_y
Table 2-3	Maximum total uniform load, kips W-Shapes (Welded)
Table 2-4	Maximum total uniform load, kips S-Shapes (Welded)
Table 2-5	Maximum total uniform load, kips S-Shapes (Hot Rolled)
Table 2-6	Maximum total uniform load, kips C-Shapes (Welded)
Table 2-7	Maximum total uniform load, kips C-Shapes (Hot Rolled)
Table 2-8	Maximum total uniform load, kips MC-Shapes (Welded)
Table 2-9	Available flexural strength, kip-ft Rectangular HSS (Roll Formed)
Table 2-10	Available flexural strength, kip-ft Rectangular HSS (Brake Pressed)
Table 2-11	Available flexural strength, kip-ft Square HSS (Roll Formed)
Table 2-12	Available flexural strength, kip-ft Square HSS (Brake Pressed)
Table 2-13	Available flexural strength, kip-ft Round HSS
Table 2-14	Available flexural strength, kip-ft Pipe HSS

PART 3: DESIGN OF FLEXURAL MEMBERS (F_y = 65 ksi)

Table 3-1	W-Shapes (Welded) Selection by Z_x
Table 3-2	W-Shapes (Welded) Selection by Z_y
Table 3-3	Maximum total uniform load, kips W-Shapes (Welded)
Table 3-4	Maximum total uniform load, kips S-Shapes (Welded)
Table 3-5	Maximum total uniform load, kips C-Shapes (Welded)
Table 3-6	Maximum total uniform load, kips MC-Shapes (Welded)
Table 3-7	Available flexural strength, kip-ft Rectangular HSS (Roll Formed)
Table 3-8	Available flexural strength, kip-ft Rectangular HSS (Brake Pressed)
Table 3-9	Available flexural strength, kip-ft Square HSS (Roll Formed)
Table 3-10	Available flexural strength, kip-ft Square HSS (Brake Pressed)
Table 3-11	Available flexural strength, kip-ft Round HSS
Table 3-12	Available flexural strength, kip-ft Pipe HSS

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

PART 4: DESIGN OF COMPRESSION MEMBERS (F_y = 30 ksi)

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

PART 5: DESIGN OF COMPRESSION MEMBERS (F_y = 65 ksi)

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

GENERAL

1.1 Introduction

This publication presents design data in tabular formats as assistance to engineers who are designing stainless steel structural members in accordance with AISC Design Guide 27 *Structural Stainless Steel* (DG27)[1]. The guidance in DG27 is aligned with the design provisions in the 2010 AISC *Specification for Structural Steel Buildings* (AISC 360)[2], hereafter referred to as the AISC *Specification*. The layout and contents of the tables covered in this report closely resemble those given for equivalent carbon steel structural sections in the AISC *Steel Construction Manual* [3].

The symbols used are the same as those in DG27 (and the AISC *Specification*) or the referred product standards.

All properties and strengths have been accurately calculated and rounded to three significant figures.

Two strength levels are covered – 30 ksi which corresponds to austenitic stainless steels and 65 ksi which corresponds to duplex stainless steels. The initial modulus of elasticity was taken as 28,000 ksi (193,000 MPa) for the austenitic stainless steels and 29,000 ksi (200,000 MPa) for the duplex stainless steels (Table 2-9 of DG27).

The density used to calculate the nominal weight was taken as 500 lb/ft^3 (8000 kg/m^3) (Table 2-9 of DG27).

The tables are divided into five parts:.

- Part 1: Dimensions and Properties
- Part 2: Design of flexural members (F_y = 30 ksi)
- Part 3: Design of flexural members (F_y = 65 ksi)
- Part 4: Design of compression members (F_y = 30 ksi)
- Part 5: Design of compression members (F_y = 65 ksi)

The dimensions and property tables are applicable to sections of any grade of steel and have been calculated from the nominal geometry of the cross-sections. Footnotes to the tables give information on availability in duplex and austenitic grades.

The tables for flexural members give the maximum total uniform load for all the shapes except for angles, which are rarely used in bending.

The tables for compression give the available strength in axial compression for all the shapes except for S-, C- and MC-shapes which are rarely used as compression members.

No tables are given for strengths of hot rolled sections with F_y = 65 ksi because they are not available.

Linear interpolation between the tabulated values is permitted.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Note that it is not necessary to give any table for members subject to combined loading because the main parameters required in these checks may be found in the strut (compression) and the beam (flexural) tables.

The tables for welded sections apply to sections which are continuously welded using full penetration butt welds. If intermittent welding, fillet welding or partial penetration welding is used, the designer should check that the shear resistance of the welded section is sufficient to carry the design shear loads. Intermittent welding should be avoided in environments with demanding corrosion/hygiene requirements. Care is also needed with the use of partial penetration welds in demanding corrosion/hygiene environments since corrosion may initiate at crevices.

1.2 Ranges of section sizes

At present, there is no specification on section sizes of stainless steel sections for structural applications. Consequently, a wide variety of sizes and shapes is used in practice. In order to provide practical design information, a large number of stockholders, fabricators and manufacturers in the US were contacted during the preparation of this publication in order to establish the most commonly used sizes for various section shapes. Based on the collected information, ranges of section sizes for stainless steel sections presented in this publication were established according to practical sizes in typical use, structural economy and effective use of material. Some of the shapes listed are not commonly produced or stocked. They will only be produced to order, and may be subject to minimum order quantities. Sections are far more widely available in austenitic stainless steel than duplex stainless steel.

Only the Standard weight class of pipe are covered. For structural applications, round HSS are a more economical choice than pipe.

1.3 Material, section dimensions and tolerances

The relevant product standards are as follows:

ASTM A240/ A240M Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
Chemical composition and mechanical properties for plate, sheet and strip

ASTM A554: Standard Specification for Welded Stainless Steel Mechanical Tubing
Chemical composition, dimensional, straightness and other tolerances for round, square, and rectangular austenitic, ferritic and duplex stainless steel tubing. [This is the most commonly used standard for hollow structural applications. It covers sizes up to 16 in. (406 mm) OD and wall thicknesses of 0.020 in. (0.51 mm) and over.]

ASTM A276 Standard Specification for Stainless Steel Bars and Shapes
Chemical composition and mechanical properties for bars including rounds, squares, and hot-rolled or extruded shapes such as angles, tees and channels.

ASTM A479/479M Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
Chemical composition and mechanical properties for hot- and cold-finished bars of stainless steel, including rounds, squares, and hexagons, and hot-rolled and extruded shapes such as angles, tees, and channels for use in boiler and pressure vessel construction.

ASTM A484/A484M Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings
Dimensional tolerance, straightness, and finish descriptions for hot- or cold-finished bar, squares, angles, channels, tees and other shapes. The finish descriptions are very general.

ASTM A1069/A1069M Standard Specification for Laser-Fused Stainless Steel Bars, Plates and Shapes.
Ordering information, manufacture, materials etc. relating to laser-fused stainless steel bars, plates, and shapes of structural quality for use in bolted or welded structural applications. (Note: Laser fusion is a laser welding process without the use of filler material.)

The relevant standard for welding stainless steel is AWS D1.6/D1.6M, *Structural Welding Code: Stainless steel*. All sections should be welded in line with a general welding procedure specification in accordance with AWS D1.6/D1.6M.

Note that the design wall thickness is equal to the nominal wall thickness for stainless steel square and rectangular HSS. (This differs from the requirement for electric-resistance-welded HSS made from carbon steel where the design wall thickness is equal to 0.93 times the nominal wall thickness.)

1.4 Designation system

The tables cover welded W- and S-shapes and hot rolled S-shapes. Hot rolled S-shapes have a nominal slope of 16.67% on the inner flange surface. W- and S-shapes are designated by the mark W or S, followed by the nominal depth (in.) and nominal weight (lb/ft).

The tables cover welded and hot rolled C-shapes and welded MC-shapes. Hot rolled C-shapes have a nominal slope of 16.67% on the inner flange surface. C- and MC-shapes are designated by the mark C or MC, followed by the nominal depth (in.) and nominal weight (lb/ft).

The tables cover welded and hot rolled Angles (also known as L-shapes). They are designated by the mark L, followed by the leg sizes (in.) and thickness (in.).

The tables cover roll formed and brake pressed square and rectangular hollow structural sections (HSS). Rectangular HSS are designated by the mark HSS, overall outside dimensions (in.), and wall thickness (in.).

The round HSS are designated by the term HSS, nominal outside diameter (in.), and wall thickness (in.) with both dimensions expressed to three decimal places.

The pipe are designated by the term Pipe, nominal diameter (in.) and weight class (Std).

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

1.5 Dimensional, property, mass and force units

The dimensions of sections and section properties are given in inches. The nominal weight is given in lb/foot. The strengths are given in kip (kilopound) per square inch (ksi) where a kip is 1000 lb-force.

Tabulated decimal values are appropriate for use in design calculations, whereas fractional values are appropriate for use in detailing.

1.6 Axis convention

The convention adopted throughout this publication is:

x-x axis	major principal (i.e. strong) axis for W-, S-, C-, MC-shapes and rectangular HSS
y-y axis	minor principal (i.e. weak) axis for W-, S-, C-, MC-shapes and rectangular HSS
x-x axis	rectangular axis for single equal angles
z-z axis	minor principal axis for single angles

SECTION PROPERTIES

2.1 Open sections

The properties for the hot rolled sections were taken from the AISC Shapes Database v14.1 and take into account all tapers, radii and fillets of the sections. Some smaller angle sections were not included in the database and their properties were calculated from first principles, with the assumptions regarding internal and external radii taken from Reference 4.

The following sections give the expressions used for calculating the properties for the welded sections, with negligible radii and fillets assumed.

2.1.1 Area

For W-shapes and S-shapes:

$$A = (d \times b_f) - (d - 2t_f)(b_f - t_w)$$

For C-shapes and MC-shapes:

$$A = \left(2t_f b_f\right) + (d - 2t_f)t_w$$

For angles:

$$A = bt + (b - t)t$$

2.1.2 Detailing dimensions *k*, *k*₁, *T* and workable gage

The following assumptions were made:

$$k = t_f$$

$$k_1 = \frac{t_w}{2}$$

$$T = d - 2k$$

The values for workable gages for hot rolled sections were assumed to apply to the welded sections of equivalent size. Where no values were available for hot rolled sections, engineering judgement was used to determine values.

2.1.3 Moment of inertia (I), $\overline{x}$ and $\overline{y}$

For W- and S-shapes:

$$I_x = \frac{b_f\, d^3}{12} - \frac{(b_f - t_w)(d - 2t_f)^3}{12}$$

$$I_y = \frac{t_f\, {b_f}^3}{6} + \frac{(d - 2t_f){t_w}^3}{12}$$

For M- and MC-shapes:

$$I_x = \frac{b_f\, d^3}{12} - \frac{(b_f - t_w)(d - 2t_f)^3}{12}$$

$$I_y = \frac{t_f\, {b_f}^3}{6} + \left(2b_f t_f\right)\left(\frac{b_f}{2} - \bar{x}\right)^2 + \frac{(d - 2t_f){t_w}^3}{12} + (d - 2t_f)t_w\left(\frac{t_w}{2} - \bar{x}\right)^2$$

Where $\bar{x}$ is the horizontal distance from the outer edge of the channel web to the centre of gravity and is given by:

$$\bar{x} = \frac{t_f {b_f}^2 + \left(\frac{(d - 2t_f){t_w}^2}{2}\right)}{A}$$

For equal angles:

$$I_x = \frac{tb^3}{12} + \left(tb\left(\frac{b}{2} - \bar{y}\right)^2\right) + \frac{(b - t)t^3}{12} + t(b - t)\left(\frac{t}{2} - \bar{y}\right)^2$$

Where $\bar{y}$ is the vertical distance from the designated edge of member to the center of gravity and is given by:

$$\bar{y} = \frac{t^2(b - t) + (b^2 t)}{2A}$$

(The properties around the *y-y* axis are identical for equal angles.)

2.1.4 Radius of gyration (r)

The radius of gyration is derived as follows:

$$r = \sqrt{\frac{I}{A}}$$

2.1.5 Elastic section modulus (S)

The elastic section modulus is used to calculate the elastic design resistance for bending or to calculate the stress at the extreme fibre of the section due to a moment. It is derived as follows:

For W- and S-shapes:

$$S_x = \frac{I_x}{\left(\frac{d}{2}\right)}$$

$$S_y = \frac{I_y}{\left(\frac{b_f}{2}\right)}$$

For M- and MC-shapes

$$S_x = \frac{I_x}{\left(\frac{d}{2}\right)}$$

$$S_y = \frac{I_y}{\left(\frac{b_f}{2}\right)}$$

For equal angles:

$$S_x = \frac{I_x}{b - \bar{y}}$$

For channels and angles, the elastic section modulus about the minor (*y-y*) axis is given for the extreme fibre at the toe(s) of the section only.

2.1.6 Plastic section modulus (Z)

The plastic section modulus, Z, is the sum of the first moments of area of all the elements in the cross-section about the equal area axis of the cross-section.

For W- and S-shapes:

$$Z_x = \ b_f t_f \left(d - t_f\right) + \frac{t_w \left(d - 2t_f\right)^2}{4}$$

$$Z_y = \frac{t_f {b_f}^2}{2} + \frac{\left(d - 2t_f\right) {t_w}^2}{4}$$

For C- and MC-shapes:

$$Z_x = \ b_f t_f \left(d - t_f\right) + \frac{t_w \left(d - 2t_f\right)^2}{4}$$

$$x_p > t_w \qquad Z_y = t_f x_p^2 + t_f (b_f - x_p)^2 + t_w (d - 2t_f)(x_p - \frac{t_w}{2})$$

$$x_p \leq t_w\text{:} \qquad Z_y = t_f x_p^2 + t_f (b_f - x_p)^2 + \left(d - 2t_f\right) \frac{x_p^2}{2} + \left(d - 2t_f\right) \frac{(t_w - x_p)^2}{2}$$

x_p is the horizontal distance from the designated edge of member to its plastic neutral axis (for *y-y* bending) and depends on whether the plastic neutral axis lies within or outside the web:

$$t_w > \frac{b_f}{1 - \frac{d}{2t_f}} \qquad x_p = b_f - \left(\frac{A}{4t_f}\right)$$

$$t_w \leq \frac{b_f}{1 - \frac{d}{2t_f}} \qquad x_p = \frac{A}{2d}$$

For equal angles:

$$Z_x = \frac{b(t - y_p)^2 + 2t(b - t)\left(t - y_p + \frac{b - t}{2}\right) + {y_p}^2 b}{2}$$

y_p is the vertical distance from the designated edge of the member to its plastic neutral axis and is given by:

$$y_p = \frac{A}{2b}$$

2.1.7 Effective radius of gyration r_{ts}

For W-, S-, M- and MC-shapes, the parameter r_{ts} is used in the calculation of the limiting length L_r for doubly symmetric I-shaped members and channels bent about their major axis. r_{ts} is given by:

$$r_{ts} = \sqrt{\frac{\sqrt{I_y C_w}}{S_x}} \qquad \text{(Spec. Eq. F2-7)}$$

2.1.8 Distance between flange centroids (h_0)

For W-, S-, M- and MC-shapes:

$$h_0 = d - t_f$$

2.1.9 Shear Centre (e_0)

For M- and MC-shapes, the shear centre was calculated from Equation 3.19 of the AISC Design Guide 9, *Torsional Analysis of Structural Steel Members* (DG9)[5]:

$$e_0 = \frac{t_f\left(b_f - \left(\frac{t_w}{2}\right)\right)^2}{2t_f\left(b_f - \left(\frac{t_w}{2}\right)\right) + \frac{t_w\left(d - t_f\right)}{3}} - \frac{t_w}{2}$$

2.1.10 Torsional properties (J and C_w)

For W-and S-shapes:

J was determined using the more accurate expressions in DG9[5] (Equation C.19) with both internal and external radius set to zero. C_w was determined from Equation 3.5 of AISC DG9.

$$J = \frac{2b_f {t_f}^3}{3} + \frac{(d - 2t_f){t_w}^3}{3} + \left[2\left(-0.042 + \left(0.22\frac{t_w}{t_f}\right) - \left(0.0725\left(\frac{t_w}{t_f}\right)^2\right)\right)\left(t_f + \frac{{t_w}^2}{4t_f}\right)^4\right] - \left(0.42{t_f}^4\right)$$

$$C_w = \frac{I_y\left(d - t_f\right)^2}{4}$$

For M- and MC-shapes

J was determined using the more accurate expressions in DG9[5] (Equation C.28) with both internal and external radius set to zero. C_w was determined from Equation 3.18 of DG9.

$$J = \frac{2b_f {t_f}^3}{3} + \frac{(d - 2t_f){t_w}^3}{3} + \left[2\left(-0.0908 + \left(0.2621\frac{t_w}{t_f}\right) - \left(0.0945\left(\frac{t_w}{t_f}\right)^2\right)\right)\left(2\left(t_f + t_w - \sqrt{2t_f t_w}\right)\right)^4\right] - \left(0.42{t_f}^4\right)$$

$$C_w = \frac{\left(d - t_f\right)^2 \left(b_f - \left(\frac{t_w}{2}\right)\right)^2 t_f\left(b_f - 2t_w - 3e_0\right)}{6} + \left[\left(e_0 - \left(\frac{t_w}{2}\right)\right)^2 I_x\right]$$

$\overline{r_0}$, the polar radius of gyration about the shear centre and H, a flexural constant, were calculated as:

$$\overline{r_0} = \sqrt{(\bar{x} + e_0)^2 + \frac{I_x + I_y}{A}} \qquad \text{(Spec. Eq. E4-11)}$$

$$H = 1 - \frac{(\bar{x} + e_0)^2}{\overline{r_0}^2} \qquad \text{(Spec. Eq. E4-10)}$$

For equal angles:

J was determined from equation 3.4 and C_w was determined from Equation 3.34 of DG9[5] however since pure torsional shear stresses will generally dominate over warping stresses, it should be noted that stresses due to warping are usually neglected in single angles. The expression for $\overline{r_0}$ assumes the shear centre lies at the intersection of the centrelines of the legs.

$$J = \frac{At^2}{3}$$

$$C_w = \frac{t^3 b^3}{18}$$

$$\overline{r_0} = \sqrt{\frac{I_x + I_y}{A} + 2\left(\bar{x} - \frac{t}{2}\right)^2} \qquad \text{(Spec. Eq. E4-11)}$$

2.1.11 Compact Section Criteria, Section classification and Q_s

For W-shapes:

In the expression h/t_w, $h = d - 2t_f$

The tables for W-shapes indicate if a section is slender when subject to compression or if a section exceeds the compact limit for flexure for the two strength classes (determined in accordance with Table 3-1 and 3-2 of DG27).

Under major axis bending, for 30 ksi, all the webs are compact and all the flanges are compact except W14x90 and W6x15 which have non-compact flanges. For 65 ksi all the webs are compact except for W24×68, W24×55, W21×44, W18×35, W16×31, W16×26, W14×22, W12×14 which are all non-compact. For 65 ksi, all the flanges are compact or non-compact except W14×90 and W6×15 which are slender.

Under compression, about half of the shapes have slender webs at 30 ksi and most of the shapes have slender webs at 65 ksi. All the flanges are non-slender at both strength levels except for W14×90 and W6×15 in 65 ksi stainless steel.

The tables also indicate when the web shear coefficient C_v is less than 1.0 for webs without transverse stiffeners, i.e. when:

$$\frac{h}{t_w} \leq 1.1\sqrt{k_v E/F_y}$$ (Spec. Eq. G2-3)

With $k_v = 5$ for webs without transverse stiffeners and with $h/t_w < 260$.

For S-shapes:

In the expression h/t_w, $h = d - 2t_\mathrm{f}$

All the sections are compact under major axis bending and non-slender under compression.

For C-shapes:

In the expression h/t_w, $h = d - 2t_\mathrm{f}$

All the shapes are compact under major axis bending at 30 ksi and 65 ksi.

All the flanges are non-slender under compression. All the 30 ksi webs are non-slender except for C12x21.7 and C10x15.3. About two thirds of the 65 ksi webs are non-slender.

For MC-shapes:

Under major axis bending, the webs are compact at 30 ksi and 65 ksi. The flanges at 30 ksi are compact except for MC8x19.8 and MC6x10 (non-compact) and MC8x13.5 (slender). The flanges at 65 ksi are slender for MC8x19.8, MC8x13.5 and MC6x10. The flanges at 65 ksi are non-compact for MC6x14.6, MC4x6.5, MC 4x6.1, MC3x3.5 and MC2x1.6.

Under compression, the flanges are non-slender except for MC8x13.5 at 30 ksi and MC8x19.8, MC8x13.5 and MC6x10. The webs are all non-slender except for MC8x13.5 at 65ksi.

For Angles:

The table for angles indicates if a section is slender when subject to compression and gives values for the net reduction factor Q_s. As the scope of DG27 does not cover slender angles, it does not give an expression for calculating Q_s for angles. However, the tables give a conservative estimate for Q_s, modifying *Spec.* equations (E7-10), (E7-11) and (E7-12):

$$\frac{b}{t} \leq 0.38\sqrt{\frac{E}{F_y}} \qquad Q_\mathrm{s} = 1.0$$ (modified *Spec.* Eq. E7-10)

$$0.38\sqrt{\frac{E}{F_y}} < \frac{b}{t} \leq 0.69\sqrt{\frac{E}{F_y}} \qquad Q_s = 1.415 - 1.10\left(\frac{b}{t}\right)\sqrt{\frac{F_y}{E}}$$ (modified *Spec.* Eq. E7-11)

$$\frac{b}{t} > 0.69\sqrt{\frac{E}{F_y}} \qquad Q_s = \frac{0.32E}{F_y\left(\frac{b}{t}\right)^2}$$ (modified *Spec.* Eq. E7-12)

2.2 Hollow sections

Section properties are given for both cold roll formed and brake pressed square and rectangular hollow sections. For the same overall dimensions and wall thickness, the section properties of roll formed and brake pressed sections are different because the corner radii are different.

2.2.1 Internal corner radius

For the roll formed square and rectangular HSS, the external radius was assumed to be the maximum values given in Table 5 of ASTM A554 (see Table 2.1 of these Explanatory Notes).

For 0.375 to 0.5 in. wall thickness, the maximum external corner radius was taken as 1.2 in. (as given in Stalatube technical brochure) because no value was given in ASTM A554 for sections thicker than 0.375 in.

Table 2.1 External radii of square and rectangular hollow sections (ASTM A554)

Wall thickness (in.)	**Radii of corners, max (in.)**	**Wall thickness (mm)**	**Radii of corners, max (mm)**
$0.049 < t \leq 0.065$	0.125	$1.24 < t \leq 1.65$	3.2
$0.065 < t \leq 0.083$	0.141	$1.65 < t \leq 2.11$	3.6
$0.083 < t \leq 0.095$	0.188	$2.11 < t \leq 2.42$	4.8
$0.095 < t \leq 0.109$	0.203	$2.42 < t \leq 2.77$	5.2
$0.109 < t \leq 0.134$	0.219	$2.77 < t \leq 3.40$	5.6
$0.134 < t \leq 0.156$	0.250	$3.40 < t \leq 3.96$	6.4
$0.156 < t \leq 0.200$	0.375	$3.96 < t \leq 5.08$	9.5
$0.200 < t \leq 0.250$	0.500	$5.08 < t \leq 6.35$	12.7
$0.250 < t \leq 0.375$	0.750	$6.35 < t \leq 9.53$	19.1
$0.375 < t \leq 0.500$ 1)	1.200	$9.53 < t \leq 12.7$	30.5

1) Not included in ASTM A554

For the brake pressed sections, the external radius was assumed to be $2.5t$ for all thicknesses.

2.2.2 Area

For square and rectangular HSS

$$A = 2t(B + H - 2t) - (4 - \pi)(r_0^2 - r_i^2)$$

The surface area in ft²/ft is given by:

$$SA = \frac{H + B + (\pi - 4)r_o}{6}$$

For round HSS:

$$A = \frac{\pi(D^2 - d^2)}{4}$$

Where the inside diameter, $d = D - 2t$

Version 1.0 03/04/2018

2.2.3 Moment of inertia

For square and rectangular HSS

$$I_x = \left[\frac{BH^3}{12} - \frac{(B-2t)(H-2t)^3}{12} - 4\left(I_g + A_g h_g^2\right) + 4\left(I_\xi + A_\xi h_\xi^2\right)\right]$$

$$I_y = \left[\frac{HB^3}{12} - \frac{(H-2t)(B-2t)^3}{12} - 4\left(I_g + A_g h_g^2\right) + 4\left(I_\xi + A_\xi h_\xi^2\right)\right]$$

Where:

$$A_g = \left(1 - \frac{\pi}{4}\right) r_o^2 \qquad \text{and} \qquad A_\xi = \left(1 - \frac{\pi}{4}\right) r_i^2$$

For the major axis:

$$h_g = \frac{H}{2} - \left(\frac{10-3\pi}{12-3\pi}\right) r_o \qquad \text{and} \qquad h_\xi = \frac{H-2t}{2} - \left(\frac{10-3\pi}{12-3\pi}\right) r_i$$

For the minor axis, substitute B for H in the expressions for $h_g$and h_ξ

$$I_g = \left(\frac{1}{3} - \frac{\pi}{16} - \frac{1}{3(12-3\pi)}\right) r_o^4$$

$$I_\xi = \left(\frac{1}{3} - \frac{\pi}{16} - \frac{1}{3(12-3\pi)}\right) r_i^4$$

For round HSS:

$$I = \frac{\pi}{64}(D^4 - d^4)$$

2.2.4 Elastic section modulus (*S*)

For square and rectangular HSS

$$S_x = \frac{2I_x}{H}$$

$$S_y = \frac{2I_y}{B}$$

For round HSS:

$$S = \frac{2I}{D}$$

2.2.5 Plastic section modulus (*Z*)

For square and rectangular HSS

$$Z_x = \left[\frac{BH^2}{4} - \frac{(B-2t)(H-2t)^2}{4} - 4(A_g h_g) + 4(A_\xi h_\xi)\right]$$

$$Z_y = \left[\frac{HB^2}{4} - \frac{(H-2t)(B-2t)^2}{4} - 4(A_g h_g) + 4(A_\xi h_\xi)\right]$$

For round HSS:

$$S = 0.167(D^3 - d^3)$$

2.2.6 Torsional properties (*J* and *C*)

For square and rectangular HSS

$$J = \left[t^3 \frac{h}{3} + 2KA_h\right]$$

$$C = \left[\frac{J}{t + K/t}\right]$$

where:

$$h = 2[(B-t) + (H-t)] - 2R_c(4-\pi)$$

$$A_h = [(B-t)(H-t)] - R_c^2(4-\pi)$$

$$K = \frac{2A_h t}{h}$$

$$R_c = \frac{r_o + r_i}{2}$$

For round HSS:

$$J = 2I$$

$$C = 2S$$

2.2.7 Compact section criteria

For square and rectangular HSS, in the expressions b/t and h/t, $b = B - 2r_o$ and $h = H - 2r_o$ where r_o is the maximum value for the external radius given in ASTM A554 for roll formed sections or $2.5t$ for brake pressed sections.

DESIGN OF FLEXURAL MEMBERS

The tables apply to members subject to bending about one principal axis. The members are classified in accordance with Section 4 of DG27. The tables do not include strengths for angles in flexure or sections in flexure where the web is classified as slender because they are outside the scope of DG27. An entry of 'S' in the tables denotes a section which has a slender web under flexure.

The design flexural strength, $\phi_b M_n$, and the allowable flexural strength, M_n/Ω_b, were determined using the following resistance and safety factors:

$\phi_b = 0.90$ (LRFD) $\Omega_b = 1.67$ (ASD)

The design shear strength, $\phi_v V_n$, and the allowable shear strength, V_n/Ω_v, were determined using the following resistance and safety factors:

$\phi_v = 0.90$ (LRFD) $\Omega_v = 1.67$ (ASD)

In Tables 2-1 and 3-1, W-shapes are sorted in descending order by strong-axis flexural strength and then grouped in ascending order by weight with the lightest W-shape in each range in bold. Strong-axis available strengths in flexure and shear are given for W-shapes. C_b is taken as unity.

For compact W-shapes, when $L_b \le L_p$, the strong-axis available flexural strength, $\phi_b M_{px}$ or M_{px}/Ω_b, can be determined using the tabulated strength values.
When $L_p < L_b \le L_r$, it is necessary to linearly interpolate between the available strength at L_p and the available strength at L_r as follows:

$$\phi_b M_n = C_b\left[\phi_b M_{px} - \phi_b BF(L_b - L_p)\right] \le \phi_b M_{px} \qquad \text{ASD}$$

$$\frac{M_n}{\Omega_b} = C_b\left[\frac{M_{px}}{\Omega_b} - \frac{BF}{\Omega_b}(L_b - L_p)\right] \le \frac{M_{px}}{\Omega_b} \qquad \text{LRFD}$$

(Note that these values are not tabulated.)

Where:

$$BF = \frac{\left(M_{px} - M_{rx}\right)}{\left(L_r - L_p\right)}$$

L_p is given by modified *Spec.* Eq. F2-5 for compact I-shaped members/channels , and also for I-shaped members/channels with compact webs and non-compact or slender flanges. It is given by modified *Spec* Eq. F4-7 for I shaped members with non-compact webs from DG27

L_r is given by *Spec.* Eq. F2-6 for compact I-shaped members and channels or *Spec.* F4-8 for other I shaped members with compact or non-compact webs

$$M_{px} = F_y Z_x$$

$$M_{rx} = 0.45 F_y S_x$$

The following modified *Spec*. Eq. F3-2 was used for W- and MC-shapes with compact webs and slender flanges. The modification was needed in order to avoid a discontinuity with *Spec*. Eq. F3-1 because of the different λ_{pf} and λ_{rf} limits for stainless steel.

$$M_n = \frac{0.155ES_x}{\lambda^2} \qquad \text{modified } \textit{Spec}\text{. Eq. F3-2}$$

For the same reason, the following modified *Spec*. Eq. F4-14 is applicable for W- and S-shapes with non-compact webs and slender flanges, although in practice this expression was not used because the sections with slender flanges had compact webs, so were designed using modified *Spec*. Eq. F3-2.

$$M_n = \frac{0.155ES_{xc}}{\lambda^2} \qquad \text{modified } \textit{Spec}\text{. Eq. F4-14}$$

The following modified *Spec*. Eq. F6-4 was used for W-, S-, C- and MC-shapes bent about their minor axis with slender flanges. The modification was needed in order to avoid a discontinuity with *Spec*. Eq. F6-2 because of the different λ_{pf} and λ_{rf} limits for stainless steel.

$$F_{cr} = \frac{0.155E}{\left(\frac{b}{t_f}\right)^2} \qquad \text{modified } \textit{Spec}\text{. Eq. F6-4}$$

Table 3.1 of these explanatory notes summarises the equations used to calculate the nominal flexural strength M_n.

In Tables 2-2 and 3-2, W-shapes are sorted in descending order by weak-axis flexural strength and then grouped in ascending order by weight with the lightest W-shape in each range in bold. Weak axis available strengths in flexure are given for W-shapes. C_b is taken as unity. For non-compact W shapes, the tabulated values have been adjusted to account for the non-compactness. The weak axis available shear strength must be checked independently.

In Tables 2-3 and 3-3, maximum total uniform loads on braced ($L_b \leq L_p$) simple-span beams bent about the strong axis are given for W-shapes. The uniform load constant, $\phi_b M_c$ or M_c/Ω_b, (kip-ft), divided by the span length, L (ft), provides the maximum total uniform load (kips) for a braced simple-span beam bent about the strong axis. This is based on the available flexural strength as calculated in accordance with Table 3.1 of these explanatory notes.

The strong-axis available shear strength, $\phi_v V_n$ or V_n/Ω_v, can be determined using the tabulated value. Above the heavy horizontal line in the tables, the maximum total uniform load is limited by the strong-axis available shear strength. The tabulated values can also be used for braced simple-span beams with equal concentrated loads spaced as shown in Table 3-22a of the AISC *Steel Construction Manual* if the concentrated loads are first converted to an equivalent uniform load.

The subsequent tables for S-, C- and MC-shapes give equivalent maximum total uniform loads to Tables 2-3 and 3-3.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Table 3.1
Calculation of M_n, M_r, L_p and L_r

Web	Flange	M_n	M_r	L_p	L_r
Open sections – Strong axis bending					
Compact	Compact	*Spec*. Eq. F2-1	$0.45F_yS_x$	Modified *Spec.* Eq. F2-5	*Spec.* Eq. F2-6
Compact	Non-compact	*Spec*. Eq. F3-1	$0.45F_yS_x$	$L_p{}'$ is tabulated, using AISC *Steel Construction Manual* Eq. 3-2, with L_p from modified *Spec.* Eq. F2-5	*Spec.* Eq. F2-6
Compact	Slender	Modified *Spec.* Eq. F3-2	$0.45F_yS_x$	Not tabulated	
Non-compact	Compact or non-compact	Smallest of *Spec*. Eq. 4-1 or *Spec*. Eq. 4-13	$0.45F_yS_x$	Modified *Spec*. Eq. 4-7	*Spec.* Eq. F4-8
Open sections - Weak axis bending					
N/A	Compact	*Spec*. Eq. F6-1	N/A	N/A	N/A
N/A	Non-compact	Smallest of *Spec*. Eq. F6-2 and *Spec*. Eq. F6-1	N/A	N/A	N/A
N/A	Slender	Smallest of *Spec*. Eq. F6-3 (based on modified *Spec*. Eq. F6-4) and *Spec*. Eq. F6-1	N/A	N/A	N/A
Hollow sections					
Compact	Compact	*Spec*. Eq. F7-1	N/A	N/A	N/A
Compact	Non-compact	Modified *Spec.* Eq. F7-2	N/A	N/A	N/A
Compact	Slender	*Spec*. Eq. F7-3	N/A	N/A	N/A
Non-compact	Compact	Modified *Spec*. Eq. F7-5	N/A	N/A	N/A
Non-compact	Non-compact	Smallest of modified *Spec*. Eq. F7-2 or modified *Spec*. Eq. F7-5	N/A	N/A	N/A
Non-compact	Slender	Smallest of *Spec*. Eq. F7-3 or modified *Spec.* Eq. F7-5	N/A	N/A	N/A

The calculation procedure for channels is the same as for I-shaped sections apart from for the calculation of the coefficient c in the calculation of L_r (*Spec.* Eq. F2-8b). For carbon steel, the C-shapes and MC-shapes are all compact, hence no rules are given for determining the flexural strength for channels with non-compact or slender flanges. However, in stainless steel, some of the MC-shapes have non-compact or slender flanges. For these sections, it was assumed that the rules for carbon steel I-shaped members with non-compact or slender flanges applied, with the coefficient c calculated for channels.

For hollow sections, the tables give the available flexural strength. For non-compact and slender cross-sections, the tabulated values have been adjusted to account for non-compactness and slenderness.

Very long rectangular HSS bent about the major axis will be susceptible to lateral torsional buckling. However, the tables do not determine strengths for this limit state for rectangular HSS since beam deflection will control for all reasonable cases.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

DESIGN OF COMPRESSION MEMBERS

The tables give the available strength in axial compression for W-shapes, angles and hollow sections. The compression members are classified in accordance with Section 4 of DG27.They do not include values for the strength of slender equal leg angles or slender round HSS because they are outside the scope of DG27.

The available strength of compression members, $\phi_c P_n$ or P_n/Ω_c is determined according to Section 5 of DG27, using modified *Spec*. Eq E3-2 and modified *Spec*. E3-3 as appropriate.

The nominal compressive strength, P_n, was determined using the following resistance and safety factors:

$\phi_c = 0.85$ (LRFD) $\Omega_c = 1.76$ (ASD) for round HSS

$\phi_c = 0.90$ (LRFD) $\Omega_c = 1.67$ (ASD) for all other structural sections

Reference should be made to Part 4 of the AISC *Steel Construction Manual* for information on the effective length and column slenderness.

The available strengths in axial compression tabulated for W-shapes and rectangular HSS are given for the effective length with respect to the y-axis $(KL)_y$. However, the effective length with respect to the x-axis $(KL)_x$ must also be investigated. To determine the available strength in axial compression, the table should be entered at the larger of $(KL)_y$ and $(KL)_{y\,eq}$, where:

$$(KL)_{y\,eq} = \frac{(KL)_x}{\frac{r_x}{r_y}} \qquad \text{AISC Steel Construction Manual Eq. (4-1)}$$

Values of the ratio r_x/r_y and other properties useful in design of compression members are listed at the bottom of each table.

For W-shapes, variables P_{wo}, P_{wi}, P_{wb} and P_{fb} shown in Table 4-1 of the AISC *Steel Construction Manual* can be used to determine the strength of W-shapes without stiffeners to resist concentrated forces applied normal to the face(s) of the flange(s), based on the AISC *Specification* Section J.10 and Part 4 of the AISC *Steel Construction Manual*.

The following resistance and safety factors were used:

$\phi_c = 1.00$ (LRFD) $\Omega_c = 1.50$ (ASD) for P_{w0} and P_{wi}

$\phi_c = 0.90$ (LRFD) $\Omega_c = 1.67$ (ASD) for P_{wb} and P_{fb}

Version 1.0 03/04/2018

Available strengths in axial compression are given for single angles, loaded through the centroid of the cross section, based upon the effective length with respect to the *z*-axis, $(KL)_z$. Single angles may be assumed to be loaded through the centroid when the requirements of the AISC *Specification* Section E5 are met, as in these cases the eccentricity is accounted for and the slenderness is reduced by the restraining effects of the support at both ends of the member.

REFERENCES

1 AISC Design Guide 27, Structural Stainless Steel, Baddoo, 2013

2 Specification for Structural Steel Buildings, ANSI/AISC 360-10, AISC 2010

3 Steel Construction Manual, Fourteenth Edition, AISC, 2010

4 www.roymech.co.uk/Useful_Tables/Sections/Angle_dim.htm

5 AISC Design Guide 9, Torsional Analysis of Structural Steel Members, Seaburg and Carter, 1997

PART 1: DIMENSIONS AND PROPERTIES

Version history:	
V1.0	issued 11/06/2017
V1.1	Q_s values for angles corrected in Tables 1-5A & 1-5B

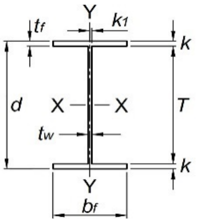


Table 1-1
W-Shapes (Welded*)
Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance				
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		k		k_1	T	Workable Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W24×131 [c2]	38.3	24.5	24½	0.605	⅝	⁵⁄₁₆	12.9	12⅞	0.960	¹⁵⁄₁₆	0.960	¹⁵⁄₁₆	⁵⁄₁₆	22⅝	5½
×117 [c1,c2,f2]	34.2	24.3	24¼	0.550	⁹⁄₁₆	⁵⁄₁₆	12.8	12¾	0.850	⅞	0.850	⅞	⁵⁄₁₆	22⅝	5½
×104 [c1,c2,f2]	30.4	24.1	24	0.500	½	¼	12.8	12¾	0.750	¾	0.750	¾	¼	22⅝	5½
×94 [c1,c2]	27.5	24.3	24¼	0.515	½	¼	9.07	9⅛	0.875	⅞	0.875	⅞	¼	22½	5½
×84 [c1,c2]	24.5	24.1	24⅛	0.470	½	¼	9.02	9	0.770	¾	0.770	¾	¼	22½	5½
×76 [c1,c2]	22.2	23.9	23⅞	0.440	⁷⁄₁₆	¼	8.99	9	0.680	¹¹⁄₁₆	0.680	¹¹⁄₁₆	¼	22½	5½
×68 [c1,c2,f2,v2]	19.9	23.7	23¾	0.415	⁷⁄₁₆	¼	8.97	9	0.585	⁹⁄₁₆	0.585	⁹⁄₁₆	¼	22½	5½
×62 [c1,c2,v2]	18.0	23.7	23¾	0.430	⁷⁄₁₆	¼	7.04	7	0.590	⁹⁄₁₆	0.590	⁹⁄₁₆	¼	22½	3½ [g]
×55 [c1,c2,f2,v2]	16.0	23.6	23⅝	0.395	⅜	³⁄₁₆	7.01	7	0.505	½	0.505	½	³⁄₁₆	22⅝	3½ [g]
W21×122 [c2]	35.6	21.7	21⅝	0.600	⅝	⁵⁄₁₆	12.4	12⅜	0.960	¹⁵⁄₁₆	0.960	¹⁵⁄₁₆	⁵⁄₁₆	19¾	5½
×111 [c2,f2]	32.5	21.5	21½	0.550	⁹⁄₁₆	⁵⁄₁₆	12.3	12⅜	0.875	⅞	0.875	⅞	⁵⁄₁₆	19¾	5½
×101 [c1,c2,f2]	29.5	21.4	21⅜	0.500	½	¼	12.3	12¼	0.800	¹³⁄₁₆	0.800	¹³⁄₁₆	¼	19¾	5½
×93 [c2]	27.1	21.6	21⅝	0.580	⁹⁄₁₆	⁵⁄₁₆	8.42	8⅜	0.930	¹⁵⁄₁₆	0.930	¹⁵⁄₁₆	⁵⁄₁₆	19¾	5½
×83 [c1,c2]	24.1	21.4	21⅜	0.515	½	¼	8.34	8⅜	0.835	¹³⁄₁₆	0.835	¹³⁄₁₆	¼	19¾	5½
×73 [c1,c2]	21.3	21.2	21¼	0.455	⁷⁄₁₆	¼	8.30	8¼	0.740	¾	0.740	¾	¼	19¾	5½
×68 [c1,c2]	19.8	21.1	21⅛	0.430	⁷⁄₁₆	¼	8.27	8¼	0.685	¹¹⁄₁₆	0.685	¹¹⁄₁₆	¼	19¾	5½
×62 [c1,c2]	18.0	21.0	21	0.400	⅜	³⁄₁₆	8.24	8¼	0.615	⅝	0.615	⅝	³⁄₁₆	19¾	5½
×57 [c1,c2]	16.5	21.1	21	0.405	⅜	³⁄₁₆	6.56	6½	0.650	⅝	0.650	⅝	³⁄₁₆	19¾	3½
×50 [c1,c2,v2]	14.5	20.8	20⅞	0.380	⅜	³⁄₁₆	6.53	6½	0.535	⁹⁄₁₆	0.535	⁹⁄₁₆	³⁄₁₆	19¾	3½
×44 [c1,c2,f2,v2]	12.8	20.7	20⅝	0.350	⅜	³⁄₁₆	6.50	6½	0.450	⁷⁄₁₆	0.450	⁷⁄₁₆	³⁄₁₆	19¾	3½
W18×106 [c2]	31.0	18.7	18¾	0.590	⁹⁄₁₆	⁵⁄₁₆	11.2	11¼	0.940	¹⁵⁄₁₆	0.940	¹⁵⁄₁₆	⁵⁄₁₆	16⅞	5½
×97 [c2]	28.4	18.6	18⅝	0.535	⁹⁄₁₆	⁵⁄₁₆	11.1	11⅛	0.870	⅞	0.870	⅞	⁵⁄₁₆	16⅞	5½
×86 [c2,f2]	25.2	18.4	18⅜	0.480	½	¼	11.1	11⅛	0.770	¾	0.770	¾	¼	16⅞	5½
×76 [c1,c2,f2]	22.2	18.2	18¼	0.425	⁷⁄₁₆	¼	11.0	11	0.680	¹¹⁄₁₆	0.680	¹¹⁄₁₆	¼	16⅞	5½
×71 [c2]	20.7	18.5	18½	0.495	½	¼	7.64	7⅝	0.810	¹³⁄₁₆	0.810	¹³⁄₁₆	¼	16⅞	3½ [g]
×65 [c2]	19.0	18.4	18⅜	0.450	⁷⁄₁₆	¼	7.59	7⅝	0.750	¾	0.750	¾	¼	16⅞	3½ [g]
×60 [c1,c2]	17.5	18.2	18¼	0.415	⁷⁄₁₆	¼	7.56	7½	0.695	¹¹⁄₁₆	0.695	¹¹⁄₁₆	¼	16¾	3½ [g]
×55 [c1,c2]	16.1	18.1	18⅛	0.390	⅜	³⁄₁₆	7.53	7½	0.630	⅝	0.630	⅝	³⁄₁₆	16⅞	3½ [g]
×50 [c1,c2]	14.5	18.0	18	0.355	⅜	³⁄₁₆	7.50	7½	0.570	⁹⁄₁₆	0.570	⁹⁄₁₆	³⁄₁₆	16⅞	3½ [g]
×46 [c1,c2]	13.4	18.1	18	0.360	⅜	³⁄₁₆	6.06	6	0.605	⅝	0.605	⅝	³⁄₁₆	16⅞	3½ [g]
×40 [c1,c2,v2]	11.6	17.9	17⅞	0.315	⁵⁄₁₆	³⁄₁₆	6.02	6	0.525	½	0.525	½	³⁄₁₆	16⅞	3½ [g]
×35 [c1,c2,f2,v2]	10.2	17.7	17¾	0.300	⁵⁄₁₆	³⁄₁₆	6.00	6	0.425	⁷⁄₁₆	0.425	⁷⁄₁₆	³⁄₁₆	16⅞	3½ [g]

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with F_y = 30 ksi and F_y = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

[v1/v2] Web shear coefficient, C_v, is less than 1.0 in AISC *Specification* Section G2.1(b) with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Table 1-1 (continued)
W-Shapes (Welded)
Properties

W24-W18

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
133	6.70	37.3	3990	326	10.2	367	340	52.9	2.98	81.4	3.50	23.5	9.06	47100
118	7.53	41.0	3510	289	10.1	325	297	46.5	2.95	71.3	3.47	23.4	6.38	40700
105	8.50	45.1	3080	256	10.1	287	259	40.7	2.92	62.4	3.44	23.3	4.46	35200
95.3	5.18	43.8	2670	220	9.86	251	109	24.0	1.99	37.4	2.41	23.4	4.93	15000
84.9	5.86	48.0	2340	194	9.78	222	94.4	20.9	1.96	32.6	2.38	23.3	3.44	12800
76.8	6.61	51.3	2070	173	9.67	198	82.5	18.4	1.93	28.6	2.35	23.2	2.48	11100
68.8	7.66	54.4	1800	152	9.53	174	70.4	15.7	1.88	24.5	2.32	23.1	1.71	9430
62.5	5.97	52.5	1520	128	9.20	151	34.5	9.79	1.38	15.7	1.76	23.2	1.54	4620
55.4	6.94	57.1	1320	112	9.08	132	29.0	8.29	1.35	13.3	1.73	23.1	1.06	3860
124	6.45	32.9	2940	271	9.08	305	305	49.2	2.92	75.5	3.41	20.7	8.54	32700
113	7.05	35.9	2650	247	9.04	276	274	44.5	2.91	68.1	3.39	20.6	6.48	29200
102	7.68	39.5	2400	225	9.01	251	248	40.3	2.90	61.7	3.37	20.6	4.93	26200
94.1	4.53	34.1	2050	190	8.69	219	92.8	22.1	1.85	34.6	2.25	20.7	5.63	9940
83.6	4.99	38.4	1810	169	8.66	194	80.8	19.4	1.83	30.3	2.22	20.6	4.02	8570
73.8	5.60	43.4	1580	149	8.63	170	70.5	17.0	1.82	26.5	2.20	20.5	2.79	7410
68.8	6.04	46.0	1460	138	8.58	158	64.7	15.6	1.81	24.3	2.19	20.4	2.25	6760
62.6	6.70	49.4	1310	125	8.52	142	57.5	13.9	1.78	21.7	2.17	20.4	1.67	5960
57.3	5.04	48.8	1150	109	8.34	126	30.6	9.34	1.36	14.8	1.69	20.4	1.60	3190
50.3	6.10	52.0	964	92.6	8.15	108	24.9	7.63	1.31	12.1	1.65	20.3	1.01	2570
44.3	7.22	56.5	822	79.6	8.03	93.3	20.7	6.36	1.27	10.1	1.62	20.2	0.672	2110
107	5.96	28.6	1900	203	7.83	229	220	39.4	2.67	60.4	3.11	17.8	7.18	17400
98.5	6.41	31.5	1740	187	7.82	210	201	36.1	2.66	55.2	3.09	17.7	5.62	15800
87.3	7.20	35.1	1520	165	7.77	185	175	31.6	2.64	48.3	3.06	17.6	3.92	13600
76.9	8.12	39.6	1320	145	7.73	162	153	27.6	2.62	42.2	3.03	17.5	2.70	11700
71.8	4.71	34.0	1160	126	7.49	144	60.3	15.8	1.71	24.6	2.06	17.7	3.29	4700
65.8	5.06	37.4	1060	116	7.48	132	54.8	14.4	1.70	22.5	2.04	17.6	2.57	4240
60.7	5.44	40.6	974	107	7.46	122	50.1	13.2	1.69	20.6	2.03	17.5	2.04	3850
55.7	5.98	43.2	881	97.2	7.40	111	44.9	11.9	1.67	18.5	2.01	17.5	1.55	3430
50.4	6.57	47.5	790	87.8	7.37	99.6	40.1	10.7	1.66	16.5	1.99	17.4	1.15	3040
46.5	5.01	46.8	702	77.8	7.24	89.5	22.5	7.43	1.30	11.7	1.59	17.5	1.12	1710
40.3	5.73	53.5	602	67.3	7.20	77.2	19.1	6.35	1.28	9.92	1.57	17.4	0.738	1440
35.2	7.06	56.2	500	56.5	7.02	65.3	15.3	5.11	1.23	8.03	1.53	17.3	0.453	1140

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

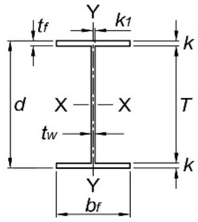


Table 1-1 (continued)
W-Shapes (Welded*)
Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance				
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		k		k_1	T	Workable Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W16×100	29.3	17.0	17	0.585	⁹⁄₁₆	⁵⁄₁₆	10.4	10⅜	0.985	1	0.985	1	⁵⁄₁₆	15⅛	5½
×89 [c2]	26.0	16.8	16¾	0.525	½	¼	10.4	10⅜	0.875	⅞	0.875	⅞	¼	15⅛	5½
×77 [c2]	22.5	16.5	16½	0.455	⁷⁄₁₆	¼	10.3	10¼	0.760	¾	0.760	¾	¼	15	5½
×67 [c1,c2,f2]	19.5	16.3	16⅜	0.395	⅜	³⁄₁₆	10.2	10¼	0.665	¹¹⁄₁₆	0.665	¹¹⁄₁₆	³⁄₁₆	15	5½
×57 [c2]	16.6	16.4	16⅜	0.430	⁷⁄₁₆	¼	7.12	7⅛	0.715	¹¹⁄₁₆	0.715	¹¹⁄₁₆	¼	15	3½ [g]
×50 [c1,c2]	14.6	16.3	16¼	0.380	⅜	³⁄₁₆	7.07	7⅛	0.630	⅝	0.630	⅝	³⁄₁₆	15⅛	3½ [g]
×45 [c1,c2]	13.1	16.1	16⅛	0.345	⅜	³⁄₁₆	7.04	7⅛	0.565	⅝	0.565	⅝	³⁄₁₆	15	3½ [g]
×40 [c1,c2]	11.6	16.0	16	0.305	⁵⁄₁₆	³⁄₁₆	7.00	7	0.505	½	0.505	½	³⁄₁₆	15	3½ [g]
×36 [c1,c2,f2]	10.4	15.9	15⅞	0.295	⁵⁄₁₆	³⁄₁₆	6.99	7	0.430	⁷⁄₁₆	0.430	⁷⁄₁₆	³⁄₁₆	15⅛	3½ [g]
×31 [c1,c2,f2,v2]	8.99	15.9	15⅞	0.275	¼	⅛	5.53	5½	0.440	⁷⁄₁₆	0.440	⁷⁄₁₆	⅛	15⅛	3½
×26 [c1,c2,f2,v2]	7.55	15.7	15¾	0.250	¼	⅛	5.50	5½	0.345	⅜	0.345	⅜	⅛	15⅛	3½
W14×120 [f2]	35.0	14.5	14½	0.590	⁹⁄₁₆	⁵⁄₁₆	14.7	14¾	0.940	¹⁵⁄₁₆	0.940	¹⁵⁄₁₆	⁵⁄₁₆	12⅝	5½
×109 [f2]	31.7	14.3	14⅜	0.525	½	¼	14.6	14⅝	0.860	⅞	0.860	⅞	¼	12⅝	5½
×99 [f2]	28.8	14.2	14⅛	0.485	½	¼	14.6	14⅝	0.780	¾	0.780	¾	¼	12⅝	5½
×90 [c2,f1,f2]	26.2	14.0	14	0.440	⁷⁄₁₆	¼	14.5	14½	0.710	¹¹⁄₁₆	0.710	¹¹⁄₁₆	¼	12⅝	5½
×82	23.7	14.3	14¼	0.510	½	¼	10.1	10⅛	0.855	⅞	0.855	⅞	¼	12⅝	5½
×74 [c2]	21.5	14.2	14⅛	0.450	⁷⁄₁₆	¼	10.1	10⅛	0.785	¹³⁄₁₆	0.785	¹³⁄₁₆	¼	12⅝	5½
×68 [c2]	19.7	14.0	14	0.415	⁷⁄₁₆	¼	10.0	10	0.720	¾	0.720	¾	¼	12½	5½
×61 [c2,f2]	17.6	13.9	13⅞	0.375	⅜	³⁄₁₆	10.0	10	0.645	⅝	0.645	⅝	³⁄₁₆	12⅝	5½
×53 [c2]	15.3	13.9	13⅞	0.370	⅜	³⁄₁₆	8.06	8	0.660	¹¹⁄₁₆	0.660	¹¹⁄₁₆	³⁄₁₆	12⅝	5½
×48 [c2]	13.8	13.8	13¾	0.340	⁵⁄₁₆	³⁄₁₆	8.03	8	0.595	⅝	0.595	⅝	³⁄₁₆	12⅝	5½
×43 [c1,c2,f2]	12.3	13.7	13⅝	0.305	⁵⁄₁₆	³⁄₁₆	8.00	8	0.530	½	0.530	½	³⁄₁₆	12⅝	5½
×38 [c1,c2]	11.0	14.1	14⅛	0.310	⁵⁄₁₆	³⁄₁₆	6.77	6¾	0.515	½	0.515	½	³⁄₁₆	13⅛	3½ [g]
×34 [c1,c2,f2]	9.86	14.0	14	0.285	⁵⁄₁₆	³⁄₁₆	6.75	6¾	0.455	⁷⁄₁₆	0.455	⁷⁄₁₆	³⁄₁₆	13⅛	3½
×30 [c1,c2,f2]	8.71	13.8	13⅞	0.270	¼	⅛	6.73	6¾	0.385	⅜	0.385	⅜	⅛	13	3½
×26 [c1,c2]	7.55	13.9	13⅞	0.255	¼	⅛	5.03	5	0.420	⁷⁄₁₆	0.420	⁷⁄₁₆	⅛	13	2¾ [g]
×22 [c1,c2,f2,v2]	6.36	13.7	13¾	0.230	¼	⅛	5.00	5	0.335	⁵⁄₁₆	0.335	⁵⁄₁₆	⅛	13	2¾ [g]

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with F_y = 30 ksi and F_y = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

[v1/v2] Web shear coefficient, C_v, is less than 1.0 in AISC *Specification* Section G2.1(b) with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Table 1-1 (continued)
W-Shapes (Welded)
Properties

W16-W14

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
102	5.29	25.6	1480	174	7.10	197	186	35.7	2.52	54.8	2.92	16.0	7.41	11900
90.2	5.92	28.6	1290	154	7.05	174	163	31.4	2.50	48.0	2.89	15.9	5.21	10200
77.9	6.77	33.0	1100	133	7.00	149	138	26.9	2.48	41.1	2.86	15.8	3.40	8590
67.8	7.70	38.0	947	116	6.96	129	119	23.2	2.47	35.4	2.83	15.7	2.27	7290
57.7	4.98	34.9	750	91.3	6.72	104	43.1	12.1	1.61	18.8	1.93	15.7	2.07	2660
50.7	5.61	39.5	651	80.1	6.68	91.0	37.2	10.5	1.60	16.3	1.90	15.6	1.42	2270
45.5	6.23	43.5	579	71.8	6.64	81.3	32.8	9.34	1.58	14.4	1.89	15.6	1.03	1990
40.4	6.93	49.2	511	63.8	6.62	71.9	28.8	8.25	1.57	12.7	1.87	15.5	0.727	1730
36.2	8.12	50.8	441	55.6	6.50	62.9	24.5	7.00	1.53	10.8	1.84	15.4	0.492	1460
31.2	6.28	54.5	367	46.2	6.39	53.0	12.4	4.49	1.17	7.00	1.44	15.4	0.409	739
26.2	7.97	60.0	294	37.4	6.24	43.2	9.59	3.49	1.13	5.45	1.40	15.3	0.226	564
121	7.80	21.4	1360	188	6.24	210	495	67.5	3.76	102	4.22	13.5	8.81	22700
110	8.49	24.0	1230	171	6.22	190	447	61.2	3.75	92.6	4.19	13.5	6.67	20200
100.0	9.34	26.0	1100	155	6.17	171	402	55.2	3.73	83.5	4.16	13.4	5.00	18000
90.7	10.2	28.6	987	141	6.14	155	362	49.9	3.72	75.5	4.14	13.3	3.76	16000
82.4	5.92	24.7	870	122	6.05	137	148	29.3	2.50	44.7	2.86	13.5	4.65	6710
74.5	6.41	28.0	784	111	6.04	124	134	26.6	2.49	40.4	2.84	13.4	3.53	5990
68.2	6.97	30.4	711	101	6.01	113	121	24.2	2.48	36.8	2.83	13.3	2.73	5380
61.1	7.75	33.6	628	90.5	5.97	100	107	21.5	2.47	32.7	2.80	13.2	1.97	4710
53.1	6.11	34.1	530	76.1	5.88	85.2	57.6	14.3	1.94	21.9	2.24	13.3	1.71	2530
48.0	6.75	37.1	473	68.6	5.85	76.5	51.4	12.8	1.93	19.5	2.22	13.2	1.26	2240
42.7	7.54	41.3	416	61.0	5.81	67.7	45.2	11.3	1.91	17.2	2.21	13.1	0.893	1950
38.2	6.57	42.2	380	53.8	5.87	60.6	26.7	7.88	1.56	12.1	1.83	13.6	0.729	1230
34.2	7.41	45.9	334	47.8	5.82	53.7	23.3	6.91	1.54	10.6	1.82	13.5	0.515	1070
30.2	8.74	48.4	285	41.2	5.72	46.4	19.6	5.82	1.50	8.96	1.79	13.5	0.338	886
26.2	5.98	51.3	240	34.4	5.63	39.4	8.90	3.54	1.09	5.52	1.32	13.5	0.313	405
22.0	7.46	56.8	193	28.1	5.51	32.3	6.99	2.80	1.05	4.36	1.29	13.4	0.176	314

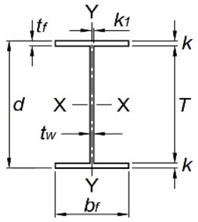


Table 1-1 (continued)
W-Shapes (Welded*)
Dimensions

Shape	Area, *A*	Depth, *d*		Web			Flange				Distance				
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		*k*		k_1	*T*	Workable Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W12×106	30.9	12.9	12⅞	0.610	⅝	5/16	12.2	12¼	0.990	1	0.990	1	5/16	10⅞	5½
×96	27.9	12.7	12¾	0.550	9/16	5/16	12.2	12⅛	0.900	⅞	0.900	⅞	5/16	10⅞	5½
×87 ^{f2}	25.3	12.5	12½	0.515	½	¼	12.1	12⅛	0.810	13/16	0.810	13/16	¼	10⅞	5½
×79 ^{f2}	22.9	12.4	12⅜	0.470	½	¼	12.1	12⅛	0.735	¾	0.735	¾	¼	10⅞	5½
×72 ^{f2}	20.8	12.3	12¼	0.430	7/16	¼	12.0	12	0.670	11/16	0.670	11/16	¼	11	5½
×65 ^{c2,f2}	18.8	12.1	12⅛	0.390	⅜	3/16	12.0	12	0.605	⅝	0.605	⅝	3/16	10⅞	5½
×58 ^{c2,f2}	16.7	12.2	12¼	0.360	⅜	3/16	10.0	10	0.640	⅝	0.640	⅝	3/16	10⅞	5½
×53 ^{c2,f2}	15.3	12.1	12	0.345	⅜	3/16	10.0	10	0.575	9/16	0.575	9/16	3/16	11	5½
×50 ^{c2}	14.4	12.2	12¼	0.370	⅜	3/16	8.08	8⅛	0.640	⅝	0.640	⅝	3/16	10⅞	5½
×45 ^{c2,f2}	12.9	12.1	12	0.335	5/16	3/16	8.05	8	0.575	9/16	0.575	9/16	3/16	11	5½
×40 ^{c2,f2}	11.5	11.9	12	0.295	5/16	3/16	8.05	8	0.515	½	0.515	½	3/16	10⅞	5½
×35 ^{c1,c2}	10.3	12.5	12½	0.300	5/16	3/16	6.56	6½	0.520	½	0.520	½	3/16	11½	3½
×30 ^{c1,c2,f2}	8.72	12.3	12⅜	0.260	¼	⅛	6.52	6½	0.440	7/16	0.440	7/16	⅛	11⅜	3½
×26 ^{c1,c2,f2}	7.57	12.2	12¼	0.230	¼	⅛	6.49	6½	0.380	⅜	0.380	⅜	⅛	11½	3½
×22 ^{c1,c2}	6.41	12.3	12¼	0.260	¼	⅛	4.03	4	0.425	7/16	0.425	7/16	⅛	11½	2¼ ^{g}
×19 ^{c1,c2}	5.50	12.2	12⅛	0.235	¼	⅛	4.01	4	0.350	⅜	0.350	⅜	⅛	11½	2¼ ^{g}
×16 ^{c1,c2,f2,v2}	4.64	12.0	12	0.220	¼	⅛	3.99	4	0.265	¼	0.265	¼	⅛	11½	2¼ ^{g}
×14 ^{c1,c2,f2,v2}	4.08	11.9	11⅞	0.200	3/16	⅛	3.97	4	0.225	¼	0.225	¼	⅛	11½	2¼ ^{g}
W10×88	25.7	10.8	10⅞	0.605	⅝	5/16	10.3	10¼	0.990	1	0.990	1	5/16	8⅞	5½
×77	22.4	10.6	10⅝	0.530	½	¼	10.2	10¼	0.870	⅞	0.870	⅞	¼	8⅞	5½
×68	19.8	10.4	10⅜	0.470	½	¼	10.1	10⅛	0.770	¾	0.770	¾	¼	8⅞	5½
×60 ^{f2}	17.4	10.2	10¼	0.420	7/16	¼	10.1	10⅛	0.680	11/16	0.680	11/16	¼	8⅞	5½
×54 ^{f2}	15.6	10.1	10⅛	0.370	⅜	3/16	10.0	10	0.615	⅝	0.615	⅝	3/16	8⅞	5½
×49 ^{f2}	14.2	9.98	10	0.340	5/16	3/16	10.0	10	0.560	9/16	0.560	9/16	3/16	8⅞	5½
×45	13.0	10.1	10⅛	0.350	⅜	3/16	8.02	8	0.620	⅝	0.620	⅝	3/16	8⅞	5½
×39 ^{c2,f2}	11.3	9.92	9⅞	0.315	5/16	3/16	7.99	8	0.530	½	0.530	½	3/16	8⅞	5½
×33 ^{c2,f2}	9.49	9.73	9¾	0.290	5/16	3/16	7.96	8	0.435	7/16	0.435	7/16	3/16	8⅞	5½
×30 ^{c2}	8.76	10.5	10½	0.300	5/16	3/16	5.81	5¾	0.510	½	0.510	½	3/16	9½	2¾ ^{g}
×26 ^{c2}	7.53	10.3	10⅜	0.260	¼	⅛	5.77	5¾	0.440	7/16	0.440	7/16	⅛	9⅜	2¾ ^{g}
×22 ^{c1,c2,f2}	6.41	10.2	10⅛	0.240	¼	⅛	5.75	5¾	0.360	⅜	0.360	⅜	⅛	9½	2¾ ^{g}
×19 ^{c2}	5.54	10.2	10¼	0.250	¼	⅛	4.02	4	0.395	⅜	0.395	⅜	⅛	9⅜	2¼ ^{g}
×17 ^{c1,c2}	4.91	10.1	10⅛	0.240	¼	⅛	4.01	4	0.330	5/16	0.330	5/16	⅛	9½	2¼ ^{g}
×15 ^{c1,c2,f2}	4.33	9.99	10	0.230	¼	⅛	4.00	4	0.270	¼	0.270	¼	⅛	9½	2¼ ^{g}
×12 ^{c1,c2,f2}	3.46	9.87	9⅞	0.190	3/16	⅛	3.96	4	0.210	3/16	0.210	3/16	⅛	9½	2¼ ^{g}

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with F_y = 30 ksi and F_y = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

[v1/v2] Web shear coefficient, C_v, is less than 1.0 in AISC *Specification* Section G2.1(b) with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note: Welded sections are available both in austenitic and duplex stainless steel.

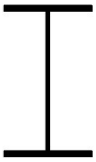


Table 1-1 (continued)

W-Shapes (Welded)

Properties

W12-W10

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
107	6.17	17.9	925	143	5.47	162	301	49.3	3.13	74.9	3.54	11.9	8.51	10700
96.7	6.76	19.8	824	130	5.44	146	270	44.4	3.11	67.4	3.51	11.8	6.36	9410
87.6	7.48	21.2	731	117	5.38	130	241	39.7	3.09	60.3	3.48	11.7	4.70	8270
79.4	8.22	23.2	654	106	5.34	117	216	35.8	3.07	54.2	3.45	11.6	3.51	7320
72.2	8.99	25.4	588	96.0	5.31	106	195	32.4	3.06	49.1	3.43	11.6	2.66	6540
65.1	9.92	28.0	524	86.5	5.28	95.2	174	29.0	3.05	44.0	3.41	11.5	1.96	5780
58.1	7.82	30.3	467	76.6	5.28	84.7	107	21.4	2.53	32.4	2.84	11.6	1.88	3570
52.9	8.69	31.6	417	69.1	5.23	76.3	95.7	19.2	2.50	29.0	2.82	11.5	1.39	3160
49.9	6.31	29.5	385	63.2	5.18	70.7	56.3	13.9	1.98	21.3	2.27	11.6	1.55	1880
44.8	7.00	32.6	342	56.6	5.14	63.1	49.9	12.4	1.97	18.9	2.25	11.5	1.13	1650
39.9	7.82	37.0	303	50.7	5.13	56.1	44.8	11.1	1.97	16.9	2.25	11.4	0.808	1460
35.6	6.31	38.2	283	45.2	5.25	50.7	24.5	7.47	1.54	11.4	1.80	12.0	0.700	879
30.2	7.41	44.1	236	38.2	5.20	42.7	20.3	6.24	1.53	9.55	1.78	11.9	0.428	720
26.2	8.54	49.8	202	33.0	5.16	36.8	17.3	5.34	1.51	8.15	1.76	11.8	0.279	607
22.2	4.74	44.1	154	25.0	4.90	28.9	4.65	2.31	0.852	3.64	1.05	11.9	0.266	164
19.1	5.72	48.8	127	20.9	4.81	24.3	3.76	1.88	0.827	2.97	1.03	11.8	0.161	131
16.1	7.53	52.1	100	16.7	4.65	19.6	2.82	1.41	0.779	2.25	0.99	11.7	0.090	96.8
14.1	8.82	57.3	86.1	14.5	4.59	17.0	2.35	1.19	0.760	1.89	0.975	11.7	0.061	80.4
89.1	5.18	14.6	530	97.7	4.54	112	179	34.8	2.64	53.0	3.00	9.85	7.07	4330
77.8	5.86	16.7	451	85.2	4.49	96.7	154	30.1	2.62	45.8	2.96	9.73	4.78	3630
68.5	6.58	18.9	390	74.9	4.44	84.3	133	26.4	2.60	40.0	2.93	9.63	3.31	3090
60.4	7.41	21.1	337	65.9	4.40	73.6	116	23.0	2.58	34.9	2.90	9.54	2.28	2640
54.2	8.15	23.9	299	59.2	4.37	65.7	103	20.6	2.57	31.2	2.88	9.48	1.67	2320
49.3	8.93	26.1	268	53.8	4.35	59.4	93.4	18.7	2.56	28.3	2.86	9.42	1.26	2070
45.2	6.47	25.3	244	48.3	4.33	54.0	53.3	13.3	2.02	20.2	2.29	9.48	1.36	1200
39.0	7.53	28.1	205	41.3	4.27	45.9	45.0	11.3	2.00	17.1	2.26	9.39	0.866	992
32.9	9.15	30.6	166	34.2	4.19	37.9	36.6	9.19	1.96	14.0	2.23	9.30	0.502	790
30.4	5.70	31.5	168	32.1	4.38	36.2	16.7	5.75	1.38	8.82	1.61	9.96	0.582	414
26.1	6.56	36.3	143	27.6	4.35	30.9	14.1	4.89	1.37	7.48	1.59	9.89	0.374	345
22.2	7.99	39.4	117	22.9	4.26	25.7	11.4	3.97	1.33	6.09	1.56	9.81	0.219	275
19.2	5.09	37.8	94.6	18.5	4.13	21.2	4.29	2.13	0.880	3.34	1.07	9.85	0.209	104
17.0	6.08	39.4	80.2	15.9	4.04	18.3	3.56	1.77	0.851	2.79	1.05	9.78	0.138	85.1
15.0	7.41	41.1	67.2	13.5	3.94	15.6	2.89	1.44	0.817	2.28	1.02	9.72	0.091	68.3
12.0	9.43	49.7	52.2	10.6	3.88	12.3	2.18	1.10	0.794	1.73	0.998	9.66	0.046	50.8

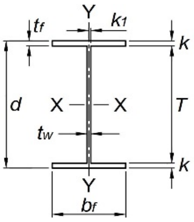


Table 1-1 (continued)

W-Shapes (Welded*)

Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance				
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		k		k_1	T	Workable Gage
											k_{des}	k_{det}			
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
W8×67	19.5	9.00	9	0.570	9⁄16	5⁄16	8.28	8¼	0.935	15⁄16	0.935	15⁄16	5⁄16	7⅛	5½
×58	17.0	8.75	8¾	0.510	½	¼	8.22	8¼	0.810	13⁄16	0.810	13⁄16	¼	7⅛	5½
×48	14.0	8.50	8½	0.400	⅜	3⁄16	8.11	8⅛	0.685	11⁄16	0.685	11⁄16	3⁄16	7⅛	5½
×40 [f2]	11.6	8.25	8¼	0.360	⅜	3⁄16	8.07	8⅛	0.560	9⁄16	0.560	9⁄16	3⁄16	7⅛	5½
×35 [f2]	10.2	8.12	8⅛	0.310	5⁄16	3⁄16	8.02	8	0.495	½	0.495	½	3⁄16	7⅛	5½
×31 [f2]	8.99	8.00	8	0.285	5⁄16	3⁄16	8.00	8	0.435	7⁄16	0.435	7⁄16	3⁄16	7⅛	5½
×28 [f2]	8.11	8.06	8	0.285	5⁄16	3⁄16	6.54	6½	0.465	7⁄16	0.465	7⁄16	3⁄16	7⅛	4
×24 [c2,f2]	6.94	7.93	7⅞	0.245	¼	⅛	6.50	6½	0.400	⅜	0.400	⅜	⅛	7⅛	4
×21 [c2]	6.09	8.28	8¼	0.250	¼	⅛	5.27	5¼	0.400	⅜	0.400	⅜	⅛	7½	2¾ [g]
×18 [c2,f2]	5.19	8.14	8⅛	0.230	¼	⅛	5.25	5¼	0.330	5⁄16	0.330	5⁄16	⅛	7½	2¾ [g]
×15 [c2]	4.36	8.11	8⅛	0.245	¼	⅛	4.02	4	0.315	5⁄16	0.315	5⁄16	⅛	7½	2¼ [g]
×13 [c2,f2]	3.76	7.99	8	0.230	¼	⅛	4.00	4	0.255	¼	0.255	¼	⅛	7½	2¼ [g]
×10 [c1,c2,f2]	2.89	7.89	7⅞	0.170	3⁄16	⅛	3.94	4	0.205	3⁄16	0.205	3⁄16	⅛	7½	2¼ [g]
W6×25	7.28	6.38	6⅜	0.320	5⁄16	3⁄16	6.08	6⅛	0.455	7⁄16	0.455	7⁄16	3⁄16	5½	3½
×20 [f2]	5.82	6.20	6¼	0.260	¼	⅛	6.02	6	0.365	⅜	0.365	⅜	⅛	5½	3½
×16	4.69	6.28	6¼	0.260	¼	⅛	4.03	4	0.405	⅜	0.405	⅜	⅛	5½	2¼ [g]
×15 [c2,f1,f2]	4.37	5.99	6	0.230	¼	⅛	5.99	6	0.260	¼	0.260	¼	⅛	5½	3½
×12 [f2]	3.50	6.03	6	0.230	¼	⅛	4.00	4	0.280	¼	0.280	¼	⅛	5½	2¼ [g]
×9 [c2,f2]	2.62	5.90	5⅞	0.170	3⁄16	⅛	3.94	4	0.215	3⁄16	0.215	3⁄16	⅛	5½	2¼ [g]
W5×19	5.48	5.15	5⅛	0.270	¼	⅛	5.03	5	0.430	7⁄16	0.430	7⁄16	⅛	4¼	2¾ [g]
×18.9	5.48	5.00	5	0.316	5⁄16	3⁄16	5.00	5	0.416	7⁄16	0.416	7⁄16	3⁄16	4⅛	2¾ [g]
×16	4.63	5.01	5	0.240	¼	⅛	5.00	5	0.360	⅜	0.360	⅜	⅛	4¼	2¾ [g]
W4×13	3.77	4.16	4⅛	0.280	¼	⅛	4.06	4	0.345	⅜	0.345	⅜	⅛	3½	2¼ [g]

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with F_y = 30 ksi and F_y = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

[v1/v2] Web shear coefficient, C_v, is less than 1.0 in AISC *Specification* Section G2.1(b) with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Table 1-1 (continued)
W-Shapes (Welded)
Properties

W8-W4

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
67.8	4.43	12.5	270	60.0	3.72	69.7	88.6	21.4	2.13	32.6	2.44	8.07	4.77	1440
58.8	5.07	14.0	226	51.7	3.65	59.3	75.1	18.3	2.10	27.8	2.40	7.94	3.13	1180
48.4	5.92	17.8	182	42.9	3.61	48.5	60.9	15.0	2.09	22.8	2.36	7.82	1.84	930
40.2	7.21	19.8	145	35.1	3.53	39.3	49.1	12.2	2.06	18.5	2.32	7.69	1.03	726
35.2	8.10	23.0	125	30.8	3.51	34.2	42.6	10.6	2.05	16.1	2.30	7.63	0.706	619
31.2	9.19	25.0	108	27.1	3.47	29.9	37.1	9.27	2.03	14.0	2.28	7.57	0.486	530
28.1	7.03	25.0	96.4	23.9	3.45	26.7	21.6	6.62	1.63	10.1	1.85	7.60	0.482	312
24.1	8.12	29.1	81.1	20.5	3.42	22.7	18.3	5.63	1.62	8.54	1.83	7.53	0.306	259
21.1	6.59	29.9	74.2	17.9	3.49	20.1	9.77	3.71	1.27	5.67	1.47	7.88	0.258	152
18.0	7.95	32.5	60.9	15.0	3.43	16.7	7.97	3.03	1.24	4.65	1.44	7.81	0.154	121
15.1	6.37	30.5	47.0	11.6	3.28	13.3	3.41	1.70	0.884	2.65	1.07	7.80	0.119	51.8
13.0	7.84	32.5	38.5	9.65	3.20	11.1	2.73	1.36	0.852	2.14	1.05	7.74	0.075	40.8
10.0	9.61	44.0	29.8	7.55	3.21	8.59	2.09	1.06	0.851	1.65	1.03	7.69	0.035	30.9
25.3	6.68	17.1	53.0	16.6	2.70	18.8	17.1	5.61	1.53	8.55	1.74	5.93	0.434	150
20.2	8.25	21.0	41.0	13.2	2.65	14.8	13.3	4.41	1.51	6.71	1.71	5.84	0.224	113
16.3	4.98	21.0	31.8	10.1	2.60	11.5	4.43	2.20	0.972	3.38	1.13	5.88	0.205	38.2
15.2	11.5	23.8	28.7	9.59	2.56	10.6	9.32	3.11	1.46	4.74	1.67	5.73	0.092	76.5
12.1	7.14	23.8	21.7	7.19	2.49	8.16	2.99	1.50	0.925	2.31	1.09	5.75	0.080	24.7
9.10	9.16	32.2	16.0	5.43	2.47	6.09	2.19	1.11	0.914	1.71	1.07	5.69	0.035	17.7
19.0	5.85	15.9	25.9	10.1	2.17	11.5	9.13	3.63	1.29	5.52	1.46	4.72	0.287	50.8
19.0	6.01	13.2	23.8	9.53	2.09	10.9	8.69	3.48	1.26	5.31	1.45	4.58	0.280	45.7
16.1	6.94	17.9	21.1	8.41	2.13	9.47	7.50	3.00	1.27	4.56	1.44	4.65	0.172	40.6
13.1	5.88	12.4	11.2	5.38	1.72	6.19	3.85	1.90	1.01	2.91	1.17	3.82	0.135	14.0

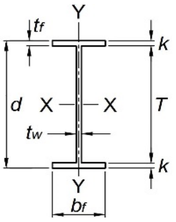


Table 1-2A
S-Shapes (Welded*)
Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance		
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		k	T	Workable Gage
	in.²	in.		in.		in.	in.		in.		in.	in.	in.
S15×50	14.6	15.0	15	0.550	⁹⁄₁₆	⁵⁄₁₆	5.64	5⅝	0.622	⅝	⅝	13¾	3½[g]
×42.9	12.5	15.0	15	0.411	⁷⁄₁₆	¼	5.50	5½	0.622	⅝	⅝	13¾	3½[g]
S12×50	14.6	12.0	12	0.687	¹¹⁄₁₆	⅜	5.48	5½	0.659	¹¹⁄₁₆	¹¹⁄₁₆	10⅝	3[g]
×40.8	12.0	12.0	12	0.472	⁷⁄₁₆	¼	5.25	5¼	0.659	¹¹⁄₁₆	¹¹⁄₁₆	10⅝	3[g]
×35	10.2	12.0	12	0.428	⁷⁄₁₆	¼	5.08	5⅛	0.544	⁹⁄₁₆	⁹⁄₁₆	10⅞	3[g]
×31.8	9.26	12.0	12	0.350	⅜	³⁄₁₆	5.00	5	0.544	⁹⁄₁₆	⁹⁄₁₆	10⅞	3[g]
S10×35	10.2	10.0	10	0.594	⅝	⁵⁄₁₆	4.94	5	0.491	½	½	9	2¾[g]
×25.4	7.38	10.0	10	0.311	⁵⁄₁₆	³⁄₁₆	4.66	4⅝	0.491	½	½	9	2¾[g]
S8×23	6.70	8.00	8	0.441	⁷⁄₁₆	¼	4.17	4⅛	0.425	⁷⁄₁₆	⁷⁄₁₆	7⅛	2¼[g]
×18.4	5.34	8.00	8	0.271	¼	⅛	4.00	4	0.425	⁷⁄₁₆	⁷⁄₁₆	7⅛	2¼[g]
S7×20	5.82	7.00	7	0.450	½	¼	3.86	3⅞	0.392	⅜	⅜	6¼	2[g]
×15.3	4.44	7.00	7	0.252	¼	⅛	3.66	3⅝	0.392	⅜	⅜	6¼	2[g]
S6×17.25	5.02	6.00	6	0.465	⁷⁄₁₆	¼	3.57	3⅝	0.359	⅜	⅜	5¼	—
×12.5	3.62	6.00	6	0.232	¼	⅛	3.33	3⅜	0.359	⅜	⅜	5¼	—
S5×14.75	4.29	5.00	5	0.494	½	¼	3.28	3¼	0.326	⁵⁄₁₆	⁵⁄₁₆	4⅜	—
×10	2.89	5.00	5	0.214	³⁄₁₆	⅛	3.00	3	0.326	⁵⁄₁₆	⁵⁄₁₆	4⅜	—
S4×9.5	2.75	4.00	4	0.326	⁵⁄₁₆	³⁄₁₆	2.80	2¾	0.293	⁵⁄₁₆	⁵⁄₁₆	3⅜	—
×7.7	2.22	4.00	4	0.193	³⁄₁₆	⅛	2.66	2⅝	0.293	⁵⁄₁₆	⁵⁄₁₆	3⅜	—
S3×7.5	2.17	3.00	3	0.349	⅜	³⁄₁₆	2.51	2½	0.260	¼	¼	2½	—
×5.7	1.63	3.00	3	0.170	³⁄₁₆	⅛	2.33	2⅜	0.260	¼	¼	2½	—

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

— Indicates flange is too narrow to establish a workable gage.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Table 1-2A (continued)
S-Shapes (Welded)
Properties

S-SHAPES

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
50.6	4.53	25.0	482	64.3	5.75	76.5	18.8	6.67	1.13	10.9	1.45	14.4	1.66	972
43.4	4.42	33.5	443	59.1	5.95	68.6	17.3	6.29	1.18	9.99	1.45	14.4	1.17	894
50.6	4.16	15.5	302	50.3	4.55	60.6	18.4	6.72	1.12	11.2	1.44	11.3	2.23	592
41.6	3.98	22.6	271	45.2	4.75	52.7	16.0	6.10	1.15	9.68	1.42	11.3	1.34	514
35.4	4.67	25.5	228	38.0	4.73	44.4	12.0	4.72	1.08	7.52	1.34	11.5	0.820	394
32.1	4.60	31.2	217	36.2	4.84	41.6	11.4	4.56	1.11	7.13	1.34	11.5	0.674	374
35.4	5.03	15.2	146	29.2	3.78	35.1	10.0	4.05	0.990	6.79	1.28	9.51	1.04	226
25.6	4.75	29.0	123	24.6	4.08	28.1	8.30	3.56	1.06	5.55	1.27	9.51	0.445	188
23.2	4.91	16.2	64.3	16.1	3.10	19.1	5.19	2.49	0.880	4.04	1.10	7.58	0.422	74.5
18.5	4.71	26.4	57.1	14.3	3.27	16.3	4.55	2.28	0.923	3.53	1.10	7.58	0.245	65.3
20.2	4.92	13.8	42.1	12.0	2.69	14.3	3.80	1.97	0.808	3.24	1.02	6.61	0.351	41.5
15.4	4.67	24.7	36.4	10.4	2.86	11.9	3.21	1.75	0.850	2.72	1.01	6.61	0.175	35.0
17.4	4.97	11.4	26.1	8.70	2.28	10.5	2.77	1.55	0.743	2.57	0.948	5.64	0.297	22.0
12.6	4.64	22.8	21.9	7.30	2.46	8.36	2.21	1.33	0.781	2.06	0.924	5.64	0.121	17.6
14.9	5.03	8.80	15.1	6.04	1.88	7.33	1.96	1.20	0.676	2.02	0.871	4.67	0.263	10.7
10.0	4.60	20.3	12.2	4.88	2.05	5.58	1.47	0.980	0.713	1.52	0.839	4.67	0.081	8.03
9.54	4.78	10.5	6.73	3.37	1.56	3.99	1.08	0.771	0.627	1.24	0.771	3.71	0.088	3.71
7.70	4.54	17.7	6.01	3.01	1.65	3.45	0.921	0.692	0.644	1.07	0.753	3.71	0.051	3.16
7.53	4.83	7.11	2.90	1.93	1.16	2.32	0.694	0.553	0.566	0.895	0.702	2.74	0.068	1.30
5.65	4.48	14.6	2.50	1.67	1.24	1.92	0.549	0.471	0.580	0.724	0.671	2.74	0.030	1.03

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

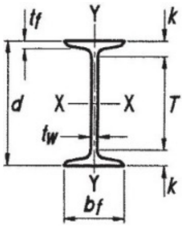


Table 1-2B

S-Shapes (Hot Rolled)

Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance		
				Thickness, t_w		$t_w/2$	Width, b_f		Thickness, t_f		k	T	Workable Gage
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.
S6×12.5	3.66	6.00	6	0.232	¼	⅛	3.33	3⅜	0.359	⅜	¹³⁄₁₆	4⅜	—
S5×10	2.93	5.00	5	0.214	³⁄₁₆	⅛	3.00	3	0.326	⁵⁄₁₆	¾	3½	—
S4×7.7	2.26	4.00	4	0.193	³⁄₁₆	⅛	2.66	2⅝	0.293	⁵⁄₁₆	¾	2½	—
S3×5.7	1.66	3.00	3	0.170	³⁄₁₆	⅛	2.33	2⅜	0.260	¼	⅝	1¾	—

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

— Indicates flange is too narrow to establish a workable gage.

Note: Hot rolled sections are only available in austenitic stainless steel.

Table 1-2B (continued)
S-Shapes (Hot Rolled)
Properties

S-SHAPES

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	$b_f/2t_f$	h/t_w	I	S	r	Z	I	S	r	Z			J	C_w
lb/ft			in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{6}
12.7	4.64	19.4	22.0	7.34	2.45	8.45	1.80	1.08	0.702	1.86	0.831	5.64	0.167	14.3
10.2	4.61	16.8	12.3	4.90	2.05	5.66	1.19	0.795	0.638	1.37	0.754	4.67	0.114	6.52
7.84	4.54	14.1	6.05	3.03	1.64	3.50	0.748	0.562	0.576	0.970	0.676	3.71	0.073	2.57
5.76	4.48	11.0	2.50	1.67	1.23	1.94	0.447	0.383	0.518	0.656	0.605	2.74	0.043	0.838

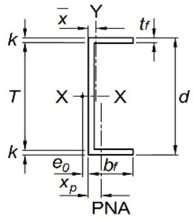


Table 1-3A

C-Shapes (Welded*)

Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance			r_{ts}	h_0
				Thickness, t_w		$t_w/2$	Width, b_f		Average Thickness, t_f		k	T	Workable Gage		
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
C15×50	14.6	15.0	15	0.716	11⁄16	⅜	3.72	3¾	0.650	⅝	⅝	13¾	2¼	1.23	14.4
×40[c2]	11.7	15.0	15	0.520	½	¼	3.52	3½	0.650	⅝	⅝	13¾	2	1.21	14.4
×33.9[c2]	9.90	15.0	15	0.400	⅜	3⁄16	3.40	3⅜	0.650	⅝	⅝	13¾	2	1.19	14.4
C12×30	8.79	12.0	12	0.510	½	¼	3.17	3⅛	0.501	½	½	11	1¾[g]	1.07	11.5
×25[c2]	7.31	12.0	12	0.387	⅜	3⁄16	3.05	3	0.501	½	½	11	1¾[g]	1.06	11.5
×20.7[c1,c2]	6.05	12.0	12	0.282	5⁄16	3⁄16	2.94	3	0.501	½	½	11	1¾[g]	1.04	11.5
C10×30	8.79	10.0	10	0.673	11⁄16	⅜	3.03	3	0.436	7⁄16	7⁄16	9¼	1¾[g]	0.973	9.56
×25	7.32	10.0	10	0.526	½	¼	2.89	2⅞	0.436	7⁄16	7⁄16	9¼	1¾[g]	0.964	9.56
×20	5.85	10.0	10	0.379	⅜	3⁄16	2.74	2¾	0.436	7⁄16	7⁄16	9¼	1½[g]	0.947	9.56
×15.3[c1,c2]	4.46	10.0	10	0.240	¼	⅛	2.60	2⅝	0.436	7⁄16	7⁄16	9¼	1½[g]	0.920	9.56
C9×20	5.85	9.00	9	0.448	7⁄16	¼	2.65	2⅝	0.413	7⁄16	7⁄16	8⅛	1½[g]	0.898	8.59
×15[c2]	4.38	9.00	9	0.285	5⁄16	3⁄16	2.49	2½	0.413	7⁄16	7⁄16	8⅛	1⅜[g]	0.874	8.59
×13.4[c2]	3.91	9.00	9	0.233	¼	⅛	2.43	2⅜	0.413	7⁄16	7⁄16	8⅛	1⅜[g]	0.859	8.59
C8×18.75	5.49	8.00	8	0.487	½	¼	2.53	2½	0.390	⅜	⅜	7¼	1½[g]	0.845	7.61
×13.75	4.02	8.00	8	0.303	5⁄16	3⁄16	2.34	2⅜	0.390	⅜	⅜	7¼	1⅜[g]	0.817	7.61
×11.5[c2]	3.35	8.00	8	0.220	¼	⅛	2.26	2¼	0.390	⅜	⅜	7¼	1⅜[g]	0.798	7.61
C7×14.75	4.31	7.00	7	0.419	7⁄16	¼	2.30	2¼	0.366	⅜	⅜	6¼	1¼[g]	0.779	6.63
×12.25	3.57	7.00	7	0.314	5⁄16	3⁄16	2.19	2¼	0.366	⅜	⅜	6¼	1¼[g]	0.761	6.63
×9.8[c2]	2.85	7.00	7	0.210	3⁄16	⅛	2.09	2⅛	0.366	⅜	⅜	6¼	1¼[g]	0.737	6.63
C6×13	3.80	6.00	6	0.437	7⁄16	¼	2.16	2⅛	0.343	5⁄16	5⁄16	5⅜	1⅜[g]	0.726	5.66
×10.5	3.06	6.00	6	0.314	5⁄16	3⁄16	2.03	2	0.343	5⁄16	5⁄16	5⅜	1⅛[g]	0.703	5.66
×8.2[c2]	2.38	6.00	6	0.200	3⁄16	⅛	1.92	1⅞	0.343	5⁄16	5⁄16	5⅜	1⅛[g]	0.676	5.66
C5×9	2.62	5.00	5	0.325	5⁄16	3⁄16	1.89	1⅞	0.320	5⁄16	5⁄16	4⅜	1⅛[g]	0.651	4.68
×6.7	1.95	5.00	5	0.190	3⁄16	⅛	1.75	1¾	0.320	5⁄16	5⁄16	4⅜	—	0.615	4.68
C4×7.25	2.11	4.00	4	0.321	5⁄16	3⁄16	1.72	1¾	0.296	5⁄16	5⁄16	3⅜	1[g]	0.592	3.70
×5.4	1.56	4.00	4	0.184	3⁄16	⅛	1.58	1⅝	0.296	5⁄16	5⁄16	3⅜	—	0.554	3.70
C3×6	1.75	3.00	3	0.356	⅜	3⁄16	1.60	1⅝	0.273	¼	¼	2½	—	0.546	2.73
×5	1.45	3.00	3	0.258	¼	⅛	1.50	1½	0.273	¼	¼	2½	—	0.521	2.73
×4.1	1.19	3.00	3	0.170	3⁄16	⅛	1.41	1⅜	0.273	¼	¼	2½	—	0.493	2.73

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

— Indicates flange is too narrow to establish a workable gage.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Table 1-3A (continued)
C-Shapes (Welded)
Properties

C-SHAPES

Nominal Wt.	Shear Ctr, e_0	Axis X-X				Axis Y-Y						Torsional Properties			
		I	S	r	Z	I	S	r	$\bar{x}$	Z	x_p	J	C_w	$\bar{r}_0$	H
lb/ft	in.	in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.	
50.6	0.584	403	53.7	5.25	68.3	13.3	4.64	0.954	0.857	8.93	0.487	2.31	493	5.53	0.932
40.6	0.767	347	46.3	5.45	57.2	11.2	4.19	0.978	0.847	7.62	0.390	1.21	408	5.76	0.921
34.3	0.896	313	41.7	5.62	50.5	9.84	3.89	0.997	0.870	6.98	0.330	0.833	356	5.98	0.913
30.5	0.618	162	27.0	4.29	33.7	6.37	2.62	0.851	0.735	4.86	0.366	0.722	151	4.58	0.913
25.4	0.747	144	24.0	4.44	29.3	5.58	2.43	0.874	0.750	4.37	0.305	0.436	131	4.76	0.901
21.0	0.869	129	21.5	4.62	25.5	4.81	2.24	0.892	0.788	4.01	0.252	0.296	112	4.99	0.890
30.5	0.367	103	20.6	3.42	26.7	4.82	2.06	0.741	0.691	4.14	0.440	1.07	79.1	3.66	0.916
25.4	0.495	91.0	18.2	3.53	23.0	4.17	1.88	0.755	0.670	3.56	0.366	0.580	68.5	3.79	0.906
20.3	0.637	78.7	15.7	3.67	19.3	3.51	1.70	0.775	0.672	3.07	0.293	0.296	56.8	3.97	0.891
15.5	0.796	67.1	13.4	3.88	15.8	2.84	1.51	0.798	0.720	2.71	0.223	0.166	45.3	4.24	0.872
20.3	0.516	60.8	13.5	3.22	16.9	3.00	1.49	0.716	0.636	2.77	0.325	0.350	39.4	3.50	0.892
15.2	0.684	50.9	11.3	3.41	13.6	2.41	1.32	0.742	0.660	2.36	0.243	0.163	31.1	3.74	0.871
13.6	0.741	47.6	10.6	3.49	12.5	2.18	1.25	0.747	0.680	2.24	0.217	0.132	28.0	3.84	0.863
19.0	0.432	43.9	11.0	2.83	13.9	2.44	1.27	0.667	0.611	2.41	0.343	0.359	25.1	3.09	0.886
13.9	0.603	36.0	9.00	2.99	10.9	1.88	1.09	0.684	0.614	1.96	0.251	0.145	19.1	3.30	0.864
11.6	0.697	32.4	8.10	3.11	9.57	1.63	1.01	0.698	0.647	1.82	0.209	0.102	16.4	3.46	0.849
14.9	0.442	27.1	7.74	2.51	9.70	1.69	0.981	0.626	0.577	1.82	0.308	0.213	13.1	2.78	0.866
12.4	0.536	24.1	6.89	2.60	8.40	1.43	0.887	0.633	0.578	1.61	0.255	0.124	11.1	2.90	0.852
9.88	0.647	21.2	6.06	2.73	7.14	1.19	0.804	0.646	0.609	1.45	0.204	0.077	9.12	3.07	0.833
13.2	0.381	17.3	5.77	2.13	7.28	1.28	0.797	0.580	0.555	1.50	0.317	0.190	7.20	2.40	0.848
10.6	0.484	15.1	5.03	2.22	6.16	1.05	0.708	0.586	0.548	1.28	0.255	0.099	5.88	2.52	0.832
8.25	0.599	13.1	4.37	2.35	5.14	0.843	0.627	0.595	0.576	1.13	0.198	0.057	4.72	2.69	0.809
9.09	0.430	8.88	3.55	1.84	4.37	0.772	0.565	0.543	0.524	1.03	0.262	0.082	2.94	2.14	0.801
6.76	0.552	7.45	2.98	1.95	3.52	0.578	0.479	0.544	0.543	0.869	0.195	0.041	2.20	2.31	0.775
7.32	0.385	4.56	2.28	1.47	2.82	0.518	0.424	0.495	0.498	0.772	0.264	0.059	1.23	1.79	0.757
5.41	0.499	3.82	1.91	1.56	2.27	0.379	0.354	0.493	0.511	0.644	0.195	0.029	0.907	1.93	0.726
6.07	0.324	2.07	1.38	1.09	1.73	0.365	0.328	0.457	0.488	0.600	0.292	0.048	0.464	1.43	0.678
5.03	0.393	1.85	1.23	1.13	1.51	0.295	0.289	0.451	0.480	0.520	0.242	0.029	0.380	1.50	0.661
4.13	0.461	1.65	1.10	1.18	1.31	0.233	0.252	0.442	0.486	0.459	0.198	0.019	0.306	1.57	0.636

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

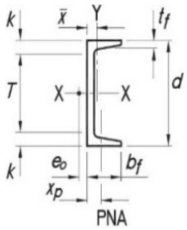


Table 1-3B
C-Shapes (Hot Rolled)
Dimensions

Shape	Area, A	Depth, d		Web			Flange				Distance			r_{ts}	h_0
				Thickness, t_w		$t_w/2$	Width, b_f		Average Thickness, t_f		k	T	Workable Gage		
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
C8×18.75	5.51	8.00	8	0.487	½	¼	2.53	2½	0.390	⅜	¹⁵⁄₁₆	6⅛	1½ [g]	0.800	7.61
C6×10.5	3.07	6.00	6	0.314	⁵⁄₁₆	³⁄₁₆	2.03	2	0.343	⁵⁄₁₆	¹³⁄₁₆	4⅜	1⅛ [g]	0.669	5.66
×8.2	2.39	6.00	6	0.200	³⁄₁₆	⅛	1.92	1⅞	0.343	⁵⁄₁₆	¹³⁄₁₆	4⅜	1⅛ [g]	0.643	5.66
C5×9	2.64	5.00	5	0.325	⁵⁄₁₆	³⁄₁₆	1.89	1⅞	0.320	⁵⁄₁₆	¾	3½	1⅛ [g]	0.616	4.68
×6.7	1.97	5.00	5	0.190	³⁄₁₆	⅛	1.75	1¾	0.320	⁵⁄₁₆	¾	3½	—	0.584	4.68
C4×7.25	2.13	4.00	4	0.321	⁵⁄₁₆	³⁄₁₆	1.72	1¾	0.296	⁵⁄₁₆	¾	2½	1 [g]	0.563	3.70
×5.4	1.58	4.00	4	0.184	³⁄₁₆	⅛	1.58	1⅝	0.296	⁵⁄₁₆	¾	2½	—	0.528	3.70
C3×4.1	1.20	3.00	3	0.170	³⁄₁₆	⅛	1.41	1⅜	0.273	¼	¹¹⁄₁₆	1⅝	—	0.469	2.73

[c1] Shape is slender for compression with F_y = 30 ksi.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

— Indicates flange is too narrow to establish a workable gage.

Note: Hot rolled sections are only available in austenitic stainless steel.

Table 1-3B (continued)
C-Shapes (Hot Rolled)
Properties

Nominal Wt.	Shear Ctr, e_0	Axis X-X				Axis Y-Y						Torsional Properties			
		I	S	r	Z	I	S	r	$\bar{x}$	Z	x_p	J	C_w	$\bar{r}_0$	H
lb/ft	in.	in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.	
19.1	0.431	43.9	11.0	2.82	13.9	1.97	1.01	0.598	0.565	2.17	0.344	0.434	25.1	3.05	0.894
10.6	0.486	15.1	5.04	2.22	6.18	0.860	0.561	0.529	0.500	1.14	0.256	0.128	5.91	2.48	0.842
8.29	0.599	13.1	4.35	2.34	5.16	0.687	0.488	0.536	0.512	0.987	0.199	0.074	4.70	2.65	0.824
9.16	0.427	8.89	3.56	1.84	4.39	0.624	0.444	0.486	0.478	0.913	0.264	0.109	2.93	2.10	0.815
6.83	0.552	7.48	2.99	1.95	3.55	0.470	0.372	0.489	0.484	0.757	0.215	0.055	2.22	2.26	0.790
7.39	0.386	4.58	2.29	1.47	2.84	0.425	0.337	0.447	0.459	0.695	0.266	0.082	1.24	1.75	0.767
5.48	0.501	3.85	1.92	1.56	2.29	0.312	0.277	0.444	0.457	0.565	0.231	0.040	0.921	1.88	0.742
4.16	0.461	1.65	1.10	1.18	1.32	0.191	0.196	0.398	0.437	0.399	0.262	0.027	0.307	1.53	0.655

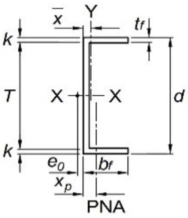


Table 1-4

MC-Shapes (Welded*)

Dimensions

Shape	Area, *A*	Depth, *d*		Web			Flange				Distance			r_{ts}	h_0
				Thickness, t_w		$t_w/2$	Width, b_f		Average Thickness, t_f		*k*	*T*	Workable Gage		
	in.^{2}	in.		in.		in.	in.		in.		in.	in.	in.	in.	in.
MC8×19.8 [c2,f1,f2]	5.72	8.00	8	0.375	⅜	3⁄16	4.00	4	0.375	⅜	⅜	7¼	2½	1.41	7.63
×13.5 [c1,c2,f1,f2]	3.88	8.00	8	0.250	¼	⅛	4.00	4	0.250	¼	¼	7½	2½	1.42	7.75
MC6×14.6 [f2]	4.22	6.00	6	0.375	⅜	3⁄16	3.00	3	0.375	⅜	⅜	5¼	2 [g]	1.05	5.63
×10 [c2,f1,f2]	2.88	6.00	6	0.250	¼	⅛	3.00	3	0.250	¼	¼	5½	2 [g]	1.06	5.75
MC4×6.5 [f2]	1.88	4.00	4	0.250	¼	⅛	2.00	2	0.250	¼	¼	3½	—	0.702	3.75
×6.1 [f2]	1.75	4.00	4	0.250	¼	⅛	1.75	1¾	0.250	¼	¼	3½	—	0.611	3.75
MC3×4.8	1.38	3.00	3	0.250	¼	⅛	1.50	1½	0.250	¼	¼	2½	—	0.521	2.75
×3.5 [f2]	1.01	3.00	3	0.188	3⁄16	⅛	1.38	1⅜	0.188	3⁄16	3⁄16	2⅝	—	0.483	2.81
MC2×3	0.875	2.00	2	0.250	¼	⅛	1.00	1	0.250	¼	¼	1½	—	0.342	1.75
×2.4	0.680	2.00	2	0.188	3⁄16	⅛	1.00	1	0.188	3⁄16	3⁄16	1⅝	—	0.346	1.81
×1.6 [f2]	0.469	2.00	2	0.125	⅛	1⁄16	1.00	1	0.125	⅛	⅛	1¾	—	0.351	1.88

[c1/c2] Shape is slender for compression with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

[g] The actual size, combination and orientation of fastener components should be compared with the geometry of the cross section to ensure compatibility.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

— Indicates flange is too narrow to establish a workable gage.

Note: Welded sections are available both in austenitic and duplex stainless steel.

Table 1-4 (continued)
MC-Shapes (Welded)
Properties

MC-SHAPES

Nominal Wt.	Shear Ctr, e_0	Axis X-X				Axis Y-Y						Torsional Properties			
		I	S	r	Z	I	S	r	$\bar{x}$	Z	x_p	J	C_w	$\bar{r}_0$	H
lb/ft	in.	in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.	
19.8	1.24	55.5	13.9	3.11	16.4	8.72	3.05	1.23	1.14	5.49	0.358	0.254	88.3	4.11	0.665
13.5	1.33	38.8	9.70	3.16	11.3	6.08	2.09	1.25	1.09	3.77	0.243	0.076	63.7	4.17	0.663
14.6	0.867	22.3	7.43	2.30	8.91	3.52	1.67	0.913	0.887	3.00	0.352	0.183	19.3	3.03	0.665
9.99	0.953	15.9	5.30	2.35	6.20	2.49	1.15	0.930	0.841	2.08	0.240	0.055	14.4	3.10	0.665
6.52	0.578	4.41	2.21	1.53	2.64	0.695	0.493	0.608	0.590	0.890	0.235	0.034	1.70	2.02	0.666
6.07	0.462	3.97	1.99	1.51	2.41	0.474	0.379	0.520	0.500	0.684	0.219	0.032	1.16	1.86	0.732
4.79	0.391	1.75	1.17	1.13	1.42	0.277	0.267	0.448	0.464	0.483	0.230	0.024	0.363	1.48	0.666
3.50	0.377	1.31	0.873	1.14	1.05	0.174	0.178	0.415	0.400	0.319	0.168	0.010	0.239	1.44	0.709
3.03	0.203	0.456	0.456	0.722	0.578	0.074	0.112	0.290	0.339	0.201	0.219	0.014	0.038	0.948	0.673
2.36	0.246	0.377	0.377	0.745	0.465	0.060	0.088	0.297	0.319	0.159	0.170	0.006	0.034	0.981	0.668
1.63	0.289	0.276	0.276	0.767	0.330	0.043	0.062	0.304	0.296	0.111	0.117	0.002	0.027	1.010	0.665

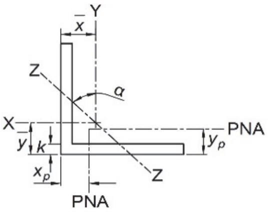


Table 1-5A

Equal Angles (Welded*)

Properties

Shape	k	Wt.	Area, A	Axis X-X						Flexural-Torsional Properties		
				I	S	r	$\bar{y}$	Z	y_p	J	C_w	$\bar{r}_0$
	in.	lb/ft	in.^{2}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.
L8×8×¾ [c2]	¾	39.7	11.4	69.7	12.2	2.47	2.28	22.0	0.713	2.14	10.4	4.41
×⅝ [c1,c2]	⅝	33.3	9.61	59.4	10.3	2.49	2.23	18.6	0.601	1.25	6.16	4.44
×½ [c1,c2]	½	26.9	7.75	48.6	8.36	2.50	2.19	15.1	0.484	0.646	3.23	4.48
×⅜ [c1,c2]	⅜	20.3	5.86	37.3	6.36	2.52	2.14	11.5	0.366	0.275	1.40	4.51
×¼ [c1,c2]	¼	13.7	3.94	25.5	4.32	2.54	2.09	7.76	0.246	0.082	0.424	4.55
L6×6×¾	¾	29.3	8.44	28.2	6.67	1.83	1.77	12.0	0.703	1.58	4.17	3.25
×⅝ [c2]	⅝	24.7	7.11	24.2	5.67	1.84	1.73	10.2	0.593	0.926	2.50	3.29
×½ [c1,c2]	½	19.9	5.75	19.9	4.61	1.86	1.68	8.31	0.479	0.479	1.32	3.32
×⅜ [c1,c2]	⅜	15.1	4.36	15.4	3.53	1.88	1.64	6.35	0.363	0.204	0.575	3.36
×¼ [c1,c2]	¼	10.2	2.94	10.6	2.40	1.90	1.59	4.32	0.245	0.061	0.176	3.39
L5×5×¾	¾	24.1	6.94	15.7	4.52	1.50	1.52	8.16	0.694	1.30	2.32	2.67
×⅝	⅝	20.3	5.86	13.6	3.86	1.52	1.48	6.95	0.586	0.763	1.40	2.71
×½ [c2]	½	16.5	4.75	11.3	3.17	1.54	1.43	5.68	0.475	0.396	0.744	2.75
×⅜ [c1,c2]	⅜	12.5	3.61	8.74	2.42	1.56	1.39	4.36	0.361	0.169	0.327	2.78
×⁵⁄₁₆ [c1,c2]	⁵⁄₁₆	10.5	3.03	7.42	2.04	1.56	1.36	3.68	0.303	0.099	0.193	2.79
×¼ [c1,c2]	¼	8.45	2.44	6.05	1.65	1.57	1.34	2.98	0.244	0.051	0.101	2.81
L4×4×½	½	13.0	3.75	5.56	1.97	1.22	1.18	3.56	0.469	0.313	0.366	2.17
×⅜ [c2]	⅜	9.92	2.86	4.36	1.52	1.23	1.14	2.74	0.358	0.134	0.162	2.21
×¼ [c1,c2]	¼	6.72	1.94	3.04	1.05	1.25	1.09	1.88	0.243	0.040	0.051	2.24
L3½×3½×⅜ [c2]	⅜	8.62	2.48	2.87	1.15	1.08	1.01	2.08	0.354	0.116	0.106	1.92
×¼ [c1,c2]	¼	5.85	1.69	2.01	0.793	1.09	0.966	1.43	0.241	0.035	0.033	1.95
L3×3×½	½	9.54	2.75	2.22	1.07	0.898	0.932	1.93	0.458	0.229	0.144	1.60
×⅜	⅜	7.32	2.11	1.76	0.833	0.913	0.887	1.50	0.352	0.099	0.065	1.63
×¼ [c1,c2]	¼	4.99	1.44	1.24	0.574	0.928	0.841	1.04	0.240	0.030	0.021	1.66
×³⁄₁₆ [c1,c2]	³⁄₁₆	3.78	1.09	0.962	0.441	0.939	0.819	0.794	0.182	0.013	0.009	1.68
L2½×2½×⅜	⅜	6.01	1.73	0.984	0.567	0.754	0.764	1.02	0.346	0.081	0.036	1.34
×¼ [c2]	¼	4.12	1.19	0.703	0.394	0.769	0.716	0.711	0.238	0.025	0.012	1.37
×³⁄₁₆ [c1,c2]	³⁄₁₆	3.13	0.902	0.547	0.303	0.779	0.695	0.545	0.180	0.011	0.005	1.39
L2×2×⅜	⅜	4.71	1.36	0.479	0.351	0.593	0.635	0.633	0.340	0.064	0.017	1.05
×¼	¼	3.25	0.938	0.348	0.247	0.609	0.591	0.445	0.235	0.020	0.006	1.08
×³⁄₁₆ [c2]	³⁄₁₆	2.48	0.715	0.272	0.190	0.617	0.569	0.343	0.179	0.008	0.003	1.10
×⅛ [c1,c2]	⅛	1.68	0.484	0.190	0.131	0.627	0.547	0.235	0.121	0.003	0.001	1.12

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note 1: For workable gages, refer to Table 1-5C.

Note 2: Welded sections are available in austenitic and duplex stainless steel.

Table 1-5A (continued)
Equal Angles (Welded)
Properties

Shape	Axis Y-Y						Axis Z-Z				Q_s	
	I	S	r	$\bar{x}$	Z	x_p	I	S	r	Tan α	F_y = 30 ksi	F_y = 65 ksi
	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{3}	in.			
L8×8×¾ [c2]	69.7	12.2	2.47	2.28	22.0	0.713	28.3	8.78	1.58	1.00	1.00	0.860
×⅝ [c1,c2]	59.4	10.3	2.49	2.23	18.6	0.601	24.0	7.61	1.58	1.00	0.954	0.748
×½ [c1,c2]	48.6	8.36	2.50	2.19	15.1	0.484	19.6	6.33	1.59	1.00	0.839	0.558
×⅜ [c1,c2]	37.3	6.36	2.52	2.14	11.5	0.366	15.0	4.96	1.60	1.00	0.656	0.314
×¼ [c1,c2]	25.5	4.32	2.54	2.09	7.76	0.246	10.2	3.45	1.61	1.00	0.292	0.139
L6×6×¾	28.2	6.67	1.83	1.77	12.0	0.703	11.7	4.67	1.18	1.00	1.00	1.00
×⅝ [c2]	24.2	5.67	1.84	1.73	10.2	0.593	9.91	4.05	1.18	1.00	1.00	0.915
×½ [c1,c2]	19.9	4.61	1.86	1.68	8.31	0.479	8.06	3.39	1.18	1.00	0.983	0.790
×⅜ [c1,c2]	15.4	3.53	1.88	1.64	6.35	0.363	6.21	2.68	1.19	1.00	0.839	0.558
×¼ [c1,c2]	10.6	2.40	1.90	1.59	4.32	0.245	4.27	1.90	1.21	1.00	0.519	0.248
L5×5×¾	15.7	4.52	1.50	1.52	8.16	0.694	6.55	3.05	0.971	1.00	1.00	1.00
×⅝	13.6	3.86	1.52	1.48	6.95	0.586	5.62	2.69	0.979	1.00	1.00	1.00
×½ [c2]	11.3	3.17	1.54	1.43	5.68	0.475	4.64	2.29	0.988	1.00	1.00	0.894
×⅜ [c1,c2]	8.74	2.42	1.56	1.39	4.36	0.361	3.53	1.80	0.989	1.00	0.935	0.721
×5⁄16 [c1,c2]	7.42	2.04	1.56	1.36	3.68	0.303	2.99	1.55	0.993	1.00	0.839	0.558
×¼ [c1,c2]	6.05	1.65	1.57	1.34	2.98	0.244	2.43	1.28	0.998	1.00	0.695	0.357
L4×4×½	5.56	1.97	1.22	1.18	3.56	0.469	2.29	1.37	0.781	1.00	1.00	1.00
×⅜ [c2]	4.36	1.52	1.23	1.14	2.74	0.358	1.77	1.10	0.787	1.00	1.00	0.860
×¼ [c1,c2]	3.04	1.05	1.25	1.09	1.88	0.243	1.23	0.798	0.796	1.00	0.839	0.558
L3½×3½×⅜ [c2]	2.87	1.15	1.08	1.01	2.08	0.354	1.18	0.826	0.690	1.00	1.00	0.929
×¼ [c1,c2]	2.01	0.793	1.09	0.966	1.43	0.241	0.812	0.594	0.693	1.00	0.911	0.686
L3×3×½	2.22	1.07	0.898	0.932	1.93	0.458	0.942	0.715	0.585	1.00	1.00	1.00
×⅜	1.76	0.833	0.913	0.887	1.50	0.352	0.726	0.579	0.587	1.00	1.00	1.00
×¼ [c1,c2]	1.24	0.574	0.928	0.841	1.04	0.240	0.500	0.420	0.589	1.00	0.983	0.790
×3⁄16 [c1,c2]	0.962	0.441	0.939	0.819	0.794	0.182	0.388	0.335	0.597	1.00	0.839	0.558
L2½×2½×⅜	0.984	0.567	0.754	0.764	1.02	0.346	0.412	0.381	0.488	1.00	1.00	1.00
×¼ [c2]	0.703	0.394	0.769	0.716	0.711	0.238	0.287	0.283	0.491	1.00	1.00	0.894
×3⁄16 [c1,c2]	0.547	0.303	0.779	0.695	0.545	0.180	0.221	0.225	0.495	1.00	0.935	0.721
L2×2×⅜	0.479	0.351	0.593	0.635	0.633	0.340	0.206	0.229	0.389	1.00	1.00	1.00
×¼	0.348	0.247	0.609	0.591	0.445	0.235	0.144	0.172	0.392	1.00	1.00	1.00
×3⁄16 [c2]	0.272	0.190	0.617	0.569	0.343	0.179	0.110	0.137	0.392	1.00	1.00	0.860
×⅛ [c1,c2]	0.190	0.131	0.627	0.547	0.235	0.121	0.077	0.099	0.398	1.00	0.839	0.558

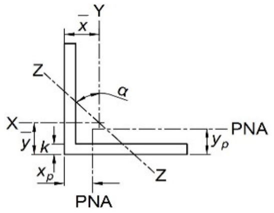


Table 1-5A (continued)

Equal Angles (Welded*)

Properties

Shape	k	Wt.	Area, A	Axis X-X						Flexural-Torsional Properties		
				I	S	r	$\bar{y}$	Z	y_p	J	C_w	$\bar{r}_0$
	in.	lb/ft	in.^{2}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.
L1½×1½×¼	¼	2.38	0.688	0.139	0.134	0.449	0.466	0.242	0.229	0.014	0.002	0.798
×³⁄₁₆	³⁄₁₆	1.83	0.527	0.110	0.104	0.457	0.444	0.188	0.176	0.006	0.001	0.814
×⅛	⅛	1.25	0.359	0.078	0.072	0.466	0.422	0.130	0.120	0.002	0.000	0.832
L1¼×1¼×¼	¼	1.95	0.563	0.077	0.091	0.369	0.402	0.163	0.225	0.012	0.001	0.653
×³⁄₁₆	³⁄₁₆	1.50	0.434	0.062	0.071	0.376	0.381	0.128	0.174	0.005	0.001	0.670
×⅛ [c2]	⅛	1.03	0.297	0.044	0.049	0.384	0.358	0.089	0.119	0.002	0.000	0.686
L1×1×¼	¼	1.52	0.438	0.037	0.056	0.290	0.339	0.101	0.219	0.009	0.001	0.510
×³⁄₁₆	³⁄₁₆	1.18	0.340	0.030	0.044	0.297	0.318	0.079	0.170	0.004	0.000	0.526
×⅛	⅛	0.813	0.234	0.022	0.031	0.305	0.296	0.056	0.117	0.001	0.000	0.543
L¾×¾×⅛	⅛	0.596	0.172	0.009	0.017	0.224	0.233	0.030	0.115	0.001	0.000	0.399
L½×½×⅛	⅛	0.379	0.109	0.002	0.007	0.145	0.170	0.013	0.109	0.001	0.000	0.256

[c1/c2] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

* The values in the tables apply to sections which are continuously welded with full penetration welds, including laser fusion.

Note 1: For workable gages, refer to Table 1-5C.

Note 2: Welded sections are available in austenitic and duplex stainless steel.

Table 1-5A (continued)
Equal Angles (Welded)
Properties

Shape	Axis Y-Y						Axis Z-Z				Q_s	
	I	S	r	$\bar{x}$	Z	x_p	I	S	r	Tan α	F_y = 30 ksi	F_y = 65 ksi
	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{3}	in.			
L1½×1½×¼	0.139	0.134	0.449	0.466	0.242	0.229	0.059	0.090	0.293	1.00	1.00	1.00
×3⁄16	0.110	0.104	0.457	0.444	0.188	0.176	0.045	0.072	0.294	1.00	1.00	1.00
×⅛	0.078	0.072	0.466	0.422	0.130	0.120	0.032	0.053	0.297	1.00	0.983	0.790
L1¼×1¼×¼	0.077	0.091	0.369	0.402	0.163	0.225	0.033	0.059	0.243	1.00	1.00	1.00
×3⁄16	0.062	0.071	0.376	0.381	0.128	0.174	0.026	0.048	0.243	1.00	1.00	1.00
×⅛[c2]	0.044	0.049	0.384	0.358	0.089	0.119	0.018	0.035	0.245	1.00	1.00	0.894
L1×1×¼	0.037	0.056	0.290	0.339	0.101	0.219	0.017	0.035	0.196	1.00	1.00	1.00
×3⁄16	0.030	0.044	0.297	0.318	0.079	0.170	0.013	0.029	0.194	1.00	1.00	1.00
×⅛	0.022	0.031	0.305	0.296	0.056	0.117	0.009	0.021	0.195	1.00	1.00	1.00
L¾×¾×⅜	0.009	0.017	0.224	0.233	0.030	0.115	0.004	0.011	0.146	1.00	1.00	1.00
L½×½×⅛	0.002	0.007	0.145	0.170	0.013	0.109	0.001	0.004	0.098	1.00	1.00	1.00

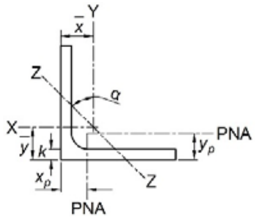


Table 1-5B
Equal Angles (Hot Rolled)
Properties

Shape	k	Wt.	Area, A	Axis X-X						Flexural-Torsional Properties		
				I	S	r	ȳ	Z	y_p	J	C_w	$\bar{r}_0$
	in.	lb/ft	in.^{2}	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{6}	in.
L6×6×½ [c1,c2]	1	20.0	5.77	19.9	4.59	1.86	1.67	8.22	0.481	0.501	1.32	3.31
×⅜ [c1,c2]	⅞	15.2	4.38	15.4	3.51	1.87	1.62	6.27	0.365	0.218	0.575	3.34
L5×5×½ [c2]	1	16.6	4.79	11.3	3.15	1.53	1.42	5.66	0.479	0.417	0.744	2.73
×⅜ [c1,c2]	⅞	12.7	3.65	8.76	2.41	1.55	1.37	4.33	0.365	0.183	0.327	2.76
L4×4×½	⅞	13.0	3.75	5.52	1.96	1.21	1.18	3.50	0.469	0.322	0.366	2.16
×⅜ [c2]	¾	9.92	2.86	4.32	1.50	1.23	1.13	2.69	0.358	0.141	0.162	2.19
×¼ [c1,c2]	⅝	6.69	1.93	3.00	1.03	1.25	1.08	1.82	0.241	0.044	0.051	2.22
L3½×3½×⅜ [c2]	¾	8.64	2.5	2.82	1.13	1.06	1.00	1.95	0.356	0.117	0.106	1.90
×¼ [c1,c2]	⅝	5.88	1.7	1.97	0.772	1.08	0.951	1.32	0.242	0.035	0.033	1.92
L3×3×½	⅞	9.57	2.76	2.20	1.06	0.895	0.929	1.91	0.460	0.230	0.144	1.59
×⅜	¾	7.32	2.11	1.75	0.825	0.910	0.884	1.48	0.352	0.101	0.065	1.62
×¼ [c1,c2]	⅝	4.99	1.44	1.23	0.569	0.926	0.836	1.02	0.240	0.031	0.021	1.65
×3⁄16 [c1,c2]	9⁄16	3.78	1.09	0.948	0.433	0.933	0.812	0.774	0.182	0.014	0.009	1.67
L2½×2½×⅜	⅝	6.00	1.730	0.972	0.558	0.749	0.758	1.01	0.346	0.083	0.036	1.33
×¼ [c2]	½	4.13	1.190	0.692	0.387	0.764	0.711	0.695	0.238	0.026	0.012	1.36
×3⁄16 [c1,c2]	7⁄16	3.12	0.901	0.535	0.295	0.771	0.687	0.529	0.180	0.011	0.005	1.38
L2×2×⅜	⅝	4.75	1.370	0.476	0.348	0.591	0.632	0.629	0.343	0.066	0.017	1.05
×¼	½	3.27	0.944	0.346	0.244	0.605	0.586	0.440	0.236	0.021	0.006	1.08
×3⁄16 [c2]	7⁄16	2.50	0.722	0.271	0.188	0.612	0.561	0.338	0.181	0.009	0.003	1.09
×⅛ [c1,c2]	⅜	1.70	0.491	0.189	0.129	0.620	0.534	0.230	0.123	0.003	0.001	1.10
L1½×1½×¼	⅜	2.40	0.689	0.138	0.133	0.447	0.464	0.227	0.231	0.014	0.002	0.793
×3⁄16	5⁄16	1.84	0.529	0.109	0.103	0.454	0.441	0.176	0.178	0.006	0.001	0.809
×⅛ [c1,c2]	¼	1.26	0.361	0.077	0.071	0.462	0.417	0.119	0.121	0.002	0.000	0.823
L1¼×1¼×¼	⅜	1.96	0.564	0.076	0.090	0.367	0.401	0.151	0.227	0.012	0.001	0.650
×3⁄16	5⁄16	1.51	0.435	0.061	0.070	0.374	0.378	0.118	0.175	0.005	0.001	0.665
×⅛ [c2]	¼	1.04	0.299	0.043	0.048	0.381	0.354	0.080	0.121	0.002	0.000	0.679
L1×1×¼	⅜	1.53	0.439	0.037	0.055	0.288	0.338	0.090	0.220	0.009	0.001	0.507
×3⁄16	5⁄16	1.19	0.342	0.030	0.043	0.294	0.316	0.071	0.172	0.004	0.000	0.521
×⅛	¼	0.821	0.236	0.021	0.030	0.301	0.292	0.049	0.119	0.001	0.000	0.535
L¾×¾×⅜	5⁄16	0.605	0.174	0.008	0.016	0.217	0.226	0.025	0.116	0.001	0.000	0.384
L½×½×⅛	5⁄16	0.388	0.112	0.002	0.006	0.138	0.165	0.010	0.112	0.001	0.000	0.243

[c1] Shape is slender for compression with F_y = 30 ksi and F_y = 65 ksi respectively.

Note 1: For workable gages, refer to Table 1-5C.

Note 2: Hot rolled sections are only available in austenitic stainless steel.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Table 1-5B (continued)

Equal Angles (Hot Rolled)

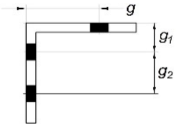
Properties

EQUAL ANGLES

Shape	Axis Y-Y						Axis Z-Z				Q_s
	I	S	r	$\bar{x}$	Z	x_p	I	S	r	Tan α	F_y = 30 ksi
	in.^{4}	in.^{3}	in.	in.	in.^{3}	in.	in.^{4}	in.^{3}	in.		
L6×6×½ [c1,c2]	19.9	4.59	1.86	1.67	8.22	0.481	8.06	3.40	1.18	1.00	0.983
×⅜ [c1,c2]	15.4	3.51	1.87	1.62	6.27	0.365	6.21	2.69	1.19	1.00	0.839
L5×5×½ [c2]	11.3	3.15	1.53	1.42	5.66	0.479	4.64	2.29	0.980	1.00	1.00
×⅜ [c1,c2]	8.76	2.41	1.55	1.37	4.33	0.365	3.55	1.83	0.986	1.00	0.935
L4×4×½	5.52	1.96	1.21	1.18	3.50	0.469	2.25	1.35	0.776	1.00	1.00
×⅜ [c2]	4.32	1.50	1.23	1.13	2.69	0.358	1.73	1.08	0.779	1.00	1.00
×¼ [c1,c2]	3.00	1.03	1.25	1.08	1.82	0.241	1.19	0.776	0.783	1.00	0.839
L3½×3½×⅜ [c2]	2.82	1.13	1.06	1.00	1.95	0.356	1.16	0.820	0.683	1.00	1.00
×¼ [c1,c2]	1.97	0.772	1.08	0.951	1.32	0.242	0.807	0.600	0.690	1.00	0.911
L3×3×½	2.20	1.06	0.895	0.929	1.91	0.460	0.922	0.703	0.580	1.00	1.00
×⅜	1.75	0.825	0.910	0.884	1.48	0.352	0.716	0.570	0.581	1.00	1.00
×¼ [c1,c2]	1.23	0.569	0.926	0.836	1.02	0.240	0.490	0.415	0.585	1.00	0.983
×³⁄₁₆ [c1,c2]	0.948	0.433	0.933	0.812	0.774	0.182	0.373	0.326	0.586	1.00	0.840
L2½×2½×⅜	0.972	0.558	0.749	0.758	1.01	0.346	0.400	0.373	0.481	1.00	1.00
×¼ [c2]	0.692	0.387	0.764	0.711	0.695	0.238	0.276	0.274	0.482	1.00	1.00
×³⁄₁₆ [c1,c2]	0.535	0.295	0.771	0.687	0.529	0.180	0.209	0.216	0.482	1.00	0.936
L2×2×⅜	0.476	0.348	0.591	0.632	0.629	0.343	0.203	0.227	0.386	1.00	1.00
×¼	0.346	0.244	0.605	0.586	0.440	0.236	0.142	0.171	0.387	1.00	1.00
×³⁄₁₆ [c2]	0.271	0.188	0.612	0.561	0.338	0.181	0.109	0.137	0.389	1.00	1.00
×⅛ [c1,c2]	0.189	0.129	0.620	0.534	0.230	0.123	0.076	0.099	0.391	1.00	0.839
L1½×1½×¼	0.138	0.133	0.447	0.464	0.227	0.231	0.058	0.089	0.291	1.00	1.00
×³⁄₁₆	0.109	0.103	0.454	0.441	0.176	0.178	0.045	0.072	0.292	1.00	1.00
×⅛ [c1,c2]	0.077	0.071	0.462	0.417	0.119	0.121	0.032	0.053	0.295	1.00	0.983
L1¼×1¼×¼	0.076	0.090	0.367	0.401	0.151	0.227	0.033	0.058	0.242	1.00	1.00
×³⁄₁₆	0.061	0.070	0.374	0.378	0.118	0.175	0.026	0.048	0.242	1.00	1.00
×⅛ [c2]	0.043	0.048	0.381	0.354	0.080	0.121	0.018	0.036	0.245	1.00	1.00
L1×1×¼	0.037	0.055	0.288	0.338	0.090	0.220	0.017	0.035	0.194	1.00	1.00
×³⁄₁₆	0.030	0.043	0.294	0.316	0.071	0.172	0.013	0.028	0.193	1.00	1.00
×⅛	0.021	0.030	0.301	0.292	0.049	0.119	0.009	0.022	0.194	1.00	1.00
L¾×¾×⅜	0.008	0.016	0.217	0.226	0.025	0.116	0.003	0.011	0.141	1.00	1.00
L½×½×⅛	0.002	0.006	0.138	0.165	0.010	0.112	0.001	0.004	0.091	1.00	1.00

Table 1-5C

Workable Gages in Equal Angle Legs, in.

	**Leg**	**8**	**6**	**5**	**4**	**3½**	**3**	**2½**	**2**	**1½**	**1¼**	**1**
	g	4½	3½	3	2½	2	1¾	1⅜	1⅛	⅞	¾	⅝
	g_1	3	2¼	2	—	—	—	—	—	—	—	—
	g_2	3	2½	1¾	—	—	—	—	—	—	—	—

Note: Other gages are permitted to suit specific requirements subject to clearances and edge distance limitations.

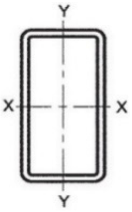


Table 1-6A

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS16×8×0.500	0.500	76.9	22.2	11.2	27.2	711	88.9	5.66	112
×0.375	0.375	59.2	17.1	17.3	38.7	565	70.6	5.75	87.6
×0.312	0.312	49.5	14.3	20.8	46.5	476	59.5	5.77	73.5
×0.250 *	0.250	40.2	11.6	28.0	60.0	393	49.1	5.82	60.3
HSS14×10×0.500	0.500	76.9	22.2	15.2	23.2	600	85.7	5.20	104
×0.375	0.375	59.2	17.1	22.7	33.3	476	68.0	5.28	81.5
×0.312	0.312	49.5	14.3	27.2	40.1	401	57.3	5.30	68.4
×0.250	0.250	40.2	11.6	36.0	52.0	331	47.3	5.34	56.0
HSS14×8×0.500	0.500	70.0	20.2	11.2	23.2	509	72.7	5.02	90.6
×0.375	0.375	54.0	15.6	17.3	33.3	407	58.1	5.11	71.3
×0.312	0.312	45.2	13.0	20.8	40.1	343	49.0	5.14	59.9
×0.250	0.250	36.7	10.6	28.0	52.0	284	40.6	5.18	49.2
HSS14×6×0.500	0.500	63.1	18.2	7.20	23.2	417	59.6	4.79	77.1
×0.375	0.375	48.8	14.1	12.0	33.3	337	48.1	4.89	61.1
×0.312	0.312	40.8	11.8	14.4	40.1	284	40.6	4.91	51.3
×0.250	0.250	33.3	9.59	20.0	52.0	237	33.9	4.97	42.3
HSS12×10×0.500	0.500	70.0	20.2	15.2	19.2	413	68.8	4.52	82.9
×0.375	0.375	54.0	15.6	22.7	28.0	330	55.0	4.60	65.2
×0.312	0.312	45.2	13.0	27.2	33.7	278	46.3	4.62	54.8
×0.250	0.250	36.7	10.6	36.0	44.0	230	38.3	4.66	44.9
HSS12×8×0.500	0.500	63.1	18.2	11.2	19.2	347	57.8	4.37	71.4
×0.375	0.375	48.8	14.1	17.3	28.0	279	46.5	4.45	56.5
×0.312	0.312	40.8	11.8	20.8	33.7	236	39.3	4.47	47.5
×0.250 *	0.250	33.3	9.59	28.0	44.0	196	32.7	4.52	39.1
HSS12×6×0.500	0.500	56.1	16.2	7.20	19.2	281	46.8	4.16	59.9
×0.375	0.375	43.6	12.6	12.0	28.0	228	38.0	4.25	47.7
×0.312	0.312	36.5	10.5	14.4	33.7	193	32.2	4.29	40.2
×0.250	0.250	29.8	8.59	20.0	44.0	161	26.8	4.33	33.2
HSS12×4×0.500	0.500	49.2	14.2	3.20	19.2	215	35.8	3.89	48.4
×0.375	0.375	38.4	11.1	6.67	28.0	178	29.7	4.00	39.0
×0.312	0.312	32.2	9.28	8.01	33.7	151	25.2	4.03	32.9
×0.250 *	0.250	26.3	7.59	12.0	44.0	127	21.2	4.09	27.3
×0.180 *	0.180	19.2	5.54	18.1	62.5	94.5	15.8	4.13	20.2

Note 1: For compactness criteria, refer to Table 1-6C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS16×8×0.500	241	60.3	3.29	69.0	13.8	5.75	603	106	3.83
×0.375	193	48.3	3.36	54.2	14.3	6.31	466	83.3	3.89
×0.312	163	40.8	3.38	45.6	14.6	6.60	395	70.9	3.89
×0.250 *	135	33.8	3.41	37.4	14.9	6.88	321	58.2	3.93
HSS14×10×0.500	357	71.4	4.01	82.7	11.8	7.75	734	118	3.83
×0.375	284	56.8	4.08	64.8	12.3	8.31	565	92.3	3.89
×0.312	240	48.0	4.10	54.5	12.6	8.60	478	78.4	3.89
×0.250	198	39.6	4.13	44.6	12.9	8.88	387	64.2	3.93
HSS14×8×0.500	213	53.3	3.25	61.5	11.8	5.75	502	91.6	3.49
×0.375	171	42.8	3.31	48.5	12.3	6.31	388	72.3	3.56
×0.312	145	36.3	3.34	40.8	12.6	6.60	330	61.8	3.56
×0.250	120	30.0	3.36	33.5	12.9	6.88	268	50.8	3.60
HSS14×6×0.500	110	36.7	2.46	42.4	11.8	3.75	298	65.6	3.16
×0.375	89.1	29.7	2.51	33.6	12.3	4.31	234	52.7	3.23
×0.312	76.0	25.3	2.54	28.4	12.6	4.60	199	45.0	3.23
×0.250	63.4	21.1	2.57	23.4	12.9	4.88	163	37.3	3.26
HSS12×10×0.500	312	62.4	3.93	73.2	9.75	7.75	585	99.6	3.49
×0.375	249	49.8	4.00	57.6	10.3	8.31	451	78.4	3.56
×0.312	211	42.2	4.03	48.4	10.6	8.60	382	66.7	3.56
×0.250	174	34.8	4.05	39.7	10.9	8.88	309	54.7	3.60
HSS12×8×0.500	185	46.3	3.19	54.0	9.75	5.75	403	77.5	3.16
×0.375	149	37.3	3.25	42.7	10.3	6.31	313	61.6	3.23
×0.312	127	31.8	3.28	36.0	10.6	6.60	266	52.6	3.23
×0.250 *	105	26.3	3.31	29.6	10.9	6.88	216	43.3	3.26
HSS12×6×0.500	94.4	31.5	2.41	36.9	9.75	3.75	243	55.7	2.83
×0.375	77.2	25.7	2.48	29.4	10.3	4.31	190	44.6	2.89
×0.312	65.9	22.0	2.51	24.9	10.6	4.60	162	38.2	2.89
×0.250	55.2	18.4	2.53	20.6	10.9	4.88	133	31.8	2.93
HSS12×4×0.500	36.2	18.1	1.60	21.7	9.75	1.75	111	33.8	2.49
×0.375	30.5	15.3	1.66	17.6	10.3	2.31	89.6	27.9	2.56
×0.312	26.3	13.2	1.68	15.0	10.6	2.60	77.2	24.2	2.56
×0.250 *	22.3	11.2	1.71	12.5	10.9	2.88	63.8	20.3	2.60
×0.180 *	16.9	8.45	1.75	9.27	11.2	3.19	47.6	15.3	2.61

— Indicates flat depth or width is too small to establish a workable flat.

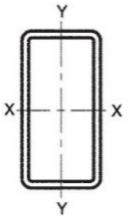


Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS10×8×0.500	0.500	56.1	16.2	11.2	15.2	222	44.4	3.70	54.2
×0.375	0.375	43.6	12.6	17.3	22.7	180	36.0	3.78	43.1
×0.312	0.312	36.5	10.5	20.8	27.2	152	30.4	3.80	36.3
×0.250	0.250	29.8	8.59	28.0	36.0	127	25.4	3.85	30.0
HSS10×6×0.500	0.500	49.2	14.2	7.20	15.2	176	35.2	3.52	44.7
×0.375	0.375	38.4	11.1	12.0	22.7	145	29.0	3.61	35.9
×0.312	0.312	32.2	9.28	14.4	27.2	123	24.6	3.64	30.3
×0.250 *	0.250	26.3	7.59	20.0	36.0	103	20.6	3.68	25.1
×0.180 *	0.180	19.2	5.54	29.2	51.4	76.8	15.4	3.72	18.5
HSS10×4×0.500	0.500	42.3	12.2	3.20	15.2	131	26.2	3.28	35.2
×0.375	0.375	33.2	9.58	6.67	22.7	110	22.0	3.39	28.7
×0.312	0.312	27.8	8.03	8.01	27.2	93.6	18.7	3.41	24.2
×0.250	0.250	22.9	6.59	12.0	36.0	79.3	15.9	3.47	20.2
HSS10×2×0.375	0.375	28.0	8.08	1.33	22.7	75.4	15.1	3.05	21.5
×0.250	0.250	19.4	5.59	4.00	36.0	55.5	11.1	3.15	15.4
×0.180	0.180	14.2	4.10	6.94	51.4	42.1	8.42	3.20	11.5
HSS9×5×0.500	0.500	42.3	12.2	5.20	13.2	117	26.0	3.10	33.6
×0.375	0.375	33.2	9.58	9.33	20.0	97.8	21.7	3.20	27.3
×0.250	0.250	22.9	6.59	16.0	32.0	70.3	15.6	3.27	19.3
HSS9×3×0.500	0.500	35.3	10.2	1.20	13.2	80.9	18.0	2.82	25.1
×0.375	0.375	28.0	8.08	4.00	20.0	69.9	15.5	2.94	20.9
×0.250	0.250	19.4	5.59	8.00	32.0	51.1	11.4	3.02	14.9
×0.180	0.180	14.2	4.10	12.5	45.8	38.6	8.58	3.07	11.1
HSS8×6×0.500	0.500	42.3	12.2	7.20	11.2	101	25.3	2.88	31.5
×0.375	0.375	33.2	9.58	12.0	17.3	83.7	20.9	2.96	25.6
×0.312	0.312	27.8	8.03	14.4	20.8	71.2	17.8	2.98	21.6
×0.250	0.250	22.9	6.59	20.0	28.0	60.1	15.0	3.02	18.0
×0.180	0.180	16.7	4.82	29.2	40.3	45.0	11.3	3.06	13.3
HSS8×4×0.500	0.500	35.3	10.2	3.20	11.2	72.3	18.1	2.66	24.0
×0.375	0.375	28.0	8.08	6.67	17.3	61.9	15.5	2.77	19.9
×0.312	0.312	23.5	6.78	8.01	20.8	52.8	13.2	2.79	16.8
×0.250 *	0.250	19.4	5.59	12.0	28.0	45.1	11.3	2.84	14.1
×0.180 *	0.180	14.2	4.10	18.1	40.3	34.0	8.50	2.88	10.5
×0.120 *	0.120	9.67	2.79	29.7	63.0	23.7	5.93	2.91	7.27

Note 1: For compactness criteria, refer to Table 1-6C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS10×8×0.500	157	39.3	3.11	46.5	7.75	5.75	308	63.4	2.83
×0.375	127	31.8	3.17	37.0	8.31	6.31	240	50.7	2.89
×0.312	108	27.0	3.21	31.2	8.60	6.60	204	43.3	2.89
×0.250	90.2	22.6	3.24	25.8	8.88	6.88	166	35.8	2.93
HSS10×6×0.500	79.3	26.4	2.36	31.4	7.75	3.75	188	45.5	2.49
×0.375	65.4	21.8	2.43	25.2	8.31	4.31	148	36.8	2.56
×0.312	55.8	18.6	2.45	21.3	8.60	4.60	126	31.5	2.56
×0.250 *	46.9	15.6	2.49	17.7	8.88	4.88	103	26.2	2.60
×0.180 *	35.1	11.7	2.52	13.1	9.19	5.19	76.3	19.6	2.61
HSS10×4×0.500	30.1	15.1	1.57	18.2	7.75	1.75	87.6	27.7	2.16
×0.375	25.5	12.8	1.63	14.9	8.31	2.31	70.9	23.0	2.23
×0.312	22.1	11.1	1.66	12.7	8.60	2.60	61.1	19.9	2.23
×0.250	18.8	9.40	1.69	10.6	8.88	2.88	50.5	16.7	2.26
HSS10×2×0.375	4.85	4.85	0.775	6.05	8.31	0.313	16.8	9.32	1.89
×0.250	3.85	3.85	0.830	4.50	8.88	0.875	13.0	7.36	1.93
×0.180	3.04	3.04	0.861	3.43	9.19	1.19	10.1	5.80	1.95
HSS9×5×0.500	46.3	18.5	1.95	22.3	6.75	2.75	116	32.4	2.16
×0.375	38.8	15.5	2.01	18.1	7.31	3.31	92.7	26.7	2.23
×0.250	28.2	11.3	2.07	12.8	7.88	3.88	65.3	19.2	2.26
HSS9×3×0.500	13.3	8.87	1.14	11.1	6.75	0.750	42.0	16.7	1.83
×0.375	11.7	7.80	1.20	9.29	7.31	1.31	35.2	14.4	1.89
×0.250	8.84	5.89	1.26	6.73	7.88	1.88	25.8	10.8	1.93
×0.180	6.81	4.54	1.29	5.07	8.19	2.19	19.5	8.27	1.95
HSS8×6×0.500	64.1	21.4	2.29	25.9	5.75	3.75	135	35.3	2.16
×0.375	53.5	17.8	2.36	21.0	6.31	4.31	107	28.8	2.23
×0.312	45.7	15.2	2.39	17.8	6.60	4.60	91.7	24.9	2.23
×0.250	38.6	12.9	2.42	14.8	6.88	4.88	75.1	20.7	2.26
×0.180	29.0	9.67	2.45	11.0	7.19	5.19	55.5	15.5	2.28
HSS8×4×0.500	23.9	12.0	1.53	14.7	5.75	1.75	64.6	21.5	1.83
×0.375	20.6	10.3	1.60	12.2	6.31	2.31	52.6	18.0	1.89
×0.312	17.8	8.90	1.62	10.4	6.60	2.60	45.4	15.7	1.89
×0.250 *	15.3	7.65	1.65	8.72	6.88	2.88	37.6	13.2	1.93
×0.180 *	11.6	5.80	1.68	6.52	7.19	3.19	28.1	10.1	1.95
×0.120 *	8.16	4.08	1.71	4.51	7.46	3.46	19.3	7.02	1.97

— Indicates flat depth or width is too small to establish a workable flat.

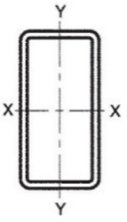


Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS8×2×0.375	0.375	22.8	6.58	1.33	17.3	40.1	10.0	2.47	14.2
×0.312	0.312	19.2	5.53	1.60	20.8	34.3	8.58	2.49	12.0
×0.250	0.250	15.9	4.59	4.00	28.0	30.1	7.53	2.56	10.3
×0.180	0.180	11.7	3.38	6.94	40.3	23.0	5.75	2.61	7.72
×0.120	0.120	8.01	2.31	13.0	63.0	16.3	4.08	2.66	5.37
HSS7×5×0.500	0.500	35.3	10.2	5.20	9.20	61.4	17.5	2.45	22.5
×0.375	0.375	28.0	8.08	9.33	14.7	52.2	14.9	2.54	18.5
×0.250	0.250	19.4	5.59	16.0	24.0	38.0	10.9	2.61	13.2
×0.180	0.180	14.2	4.10	23.6	34.7	28.7	8.20	2.65	9.80
HSS7×4×0.500	0.500	31.9	9.18	3.20	9.20	50.8	14.5	2.35	19.2
×0.375	0.375	25.4	7.33	6.67	14.7	44.0	12.6	2.45	16.0
×0.250	0.250	17.6	5.09	12.0	24.0	32.3	9.23	2.52	11.5
HSS7×3×0.500	0.500	28.4	8.18	1.20	9.20	40.2	11.5	2.22	16.0
×0.375	0.375	22.8	6.58	4.00	14.7	35.7	10.2	2.33	13.5
×0.250	0.250	15.9	4.59	8.00	24.0	26.6	7.60	2.41	9.79
×0.180	0.180	11.7	3.38	12.5	34.7	20.3	5.80	2.45	7.35
HSS6×4×0.500	0.500	28.4	8.18	3.20	7.20	33.8	11.3	2.03	14.9
×0.375	0.375	22.8	6.58	6.67	12.0	29.7	9.90	2.12	12.5
×0.312	0.312	19.2	5.53	8.01	14.4	25.5	8.50	2.15	10.7
×0.250 *	0.250	15.9	4.59	12.0	20.0	22.1	7.37	2.19	9.06
×0.180 *	0.180	11.7	3.38	18.1	29.2	16.8	5.60	2.23	6.79
×0.120 *	0.120	8.01	2.31	29.7	46.4	11.8	3.93	2.26	4.72
HSS6×3×0.500	0.500	24.9	7.18	1.20	7.20	26.2	8.73	1.91	12.1
×0.375	0.375	20.2	5.83	4.00	12.0	23.8	7.93	2.02	10.4
×0.312	0.312	17.0	4.91	4.81	14.4	20.5	6.83	2.04	8.89
×0.250	0.250	14.2	4.09	8.00	20.0	17.9	5.97	2.09	7.62
×0.180	0.180	10.5	3.02	12.5	29.2	13.8	4.60	2.14	5.74
×0.120	0.120	7.18	2.07	21.4	46.4	9.76	3.25	2.17	4.01
HSS6×2×0.375	0.375	17.6	5.08	1.33	12.0	17.8	5.93	1.87	8.33
×0.312	0.312	14.9	4.28	1.60	14.4	15.4	5.13	1.90	7.12
×0.250	0.250	12.4	3.59	4.00	20.0	13.8	4.60	1.96	6.18
×0.180	0.180	9.23	2.66	6.94	29.2	10.7	3.57	2.01	4.70
×0.120	0.120	6.35	1.83	13.0	46.4	7.68	2.56	2.05	3.30

Note 1: For compactness criteria, refer to Table 1-6C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS8×2×0.375	3.85	3.85	0.765	4.83	6.31	0.313	12.9	7.34	1.56
×0.312	3.45	3.45	0.790	4.20	6.60	0.596	11.5	6.60	1.56
×0.250	3.08	3.08	0.819	3.63	6.88	0.875	9.94	5.80	1.60
×0.180	2.44	2.44	0.850	2.78	7.19	1.19	7.72	4.58	1.61
×0.120	1.78	1.78	0.878	1.96	7.46	1.46	5.47	3.30	1.64
HSS7×5×0.500	36.1	14.4	1.88	17.8	4.75	2.75	80.5	24.4	1.83
×0.375	30.8	12.3	1.95	14.6	5.31	3.31	64.6	20.2	1.89
×0.250	22.6	9.04	2.01	10.4	5.88	3.88	45.8	14.7	1.93
×0.180	17.1	6.84	2.04	7.79	6.19	4.19	34.0	11.1	1.95
HSS7×4×0.500	20.8	10.4	1.51	12.9	4.75	1.75	53.3	18.4	1.66
×0.375	18.1	9.05	1.57	10.8	5.31	2.31	43.6	15.5	1.73
×0.250	13.5	6.75	1.63	7.78	5.88	2.88	31.3	11.5	1.76
HSS7×3×0.500	10.1	6.73	1.11	8.58	4.75	0.750	29.9	12.5	1.49
×0.375	9.08	6.05	1.17	7.32	5.31	1.31	25.4	10.9	1.56
×0.250	6.95	4.63	1.23	5.36	5.88	1.88	18.6	8.23	1.60
×0.180	5.38	3.59	1.26	4.05	6.19	2.19	14.1	6.35	1.61
HSS6×4×0.500	17.7	8.85	1.47	11.2	3.75	1.75	42.4	15.4	1.49
×0.375	15.6	7.80	1.54	9.44	4.31	2.31	34.9	13.1	1.56
×0.312	13.5	6.75	1.56	8.06	4.60	2.60	30.3	11.5	1.56
×0.250 *	11.7	5.85	1.60	6.84	4.88	2.88	25.1	9.71	1.60
×0.180 *	8.99	4.50	1.63	5.14	5.19	3.19	18.9	7.44	1.61
×0.120 *	6.36	3.18	1.66	3.58	5.46	3.46	13.0	5.22	1.64
HSS6×3×0.500	8.53	5.69	1.09	7.33	3.75	0.750	24.0	10.4	1.33
×0.375	7.78	5.19	1.16	6.34	4.31	1.31	20.6	9.19	1.39
×0.312	6.82	4.55	1.18	5.45	4.60	1.60	18.0	8.12	1.39
×0.250	6.00	4.00	1.21	4.67	4.88	1.88	15.1	6.96	1.43
×0.180	4.66	3.11	1.24	3.54	5.19	2.19	11.5	5.41	1.45
×0.120	3.34	2.23	1.27	2.48	5.46	2.46	7.97	3.83	1.47
HSS6×2×0.375	2.84	2.84	0.748	3.61	4.31	0.313	8.96	5.32	1.23
×0.312	2.55	2.55	0.772	3.15	4.60	0.596	8.00	4.80	1.23
×0.250	2.31	2.31	0.802	2.75	4.88	0.875	6.96	4.26	1.26
×0.180	1.84	1.84	0.832	2.12	5.19	1.19	5.42	3.38	1.28
×0.120	1.35	1.35	0.859	1.51	5.46	1.46	3.84	2.45	1.30

— Indicates flat depth or width is too small to establish a workable flat.

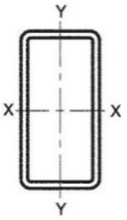


Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS5×4×0.500	0.500	24.9	7.18	3.20	5.20	20.9	8.36	1.71	11.0
×0.375	0.375	20.2	5.83	6.67	9.3	18.7	7.48	1.79	9.44
×0.312	0.312	17.0	4.91	8.01	11.2	16.2	6.48	1.82	8.06
×0.250	0.250	14.2	4.09	12.0	16.0	14.1	5.64	1.86	6.89
×0.180	0.180	10.5	3.02	18.1	23.6	10.8	4.32	1.89	5.19
×0.120	0.120	7.18	2.07	29.7	38.0	7.67	3.07	1.92	3.62
HSS5×3×0.500	0.500	21.4	6.18	1.20	5.20	15.8	6.32	1.60	8.77
×0.375	0.375	17.6	5.08	4.00	9.33	14.7	5.88	1.70	7.71
×0.312	0.312	14.9	4.28	4.81	11.2	12.7	5.08	1.72	6.59
×0.250	0.250	12.4	3.59	8.00	16.0	11.3	4.52	1.77	5.70
×0.180	0.180	9.23	2.66	12.5	23.6	8.74	3.50	1.81	4.32
×0.120	0.120	6.35	1.83	21.4	38.0	6.24	2.50	1.85	3.04
HSS5×2×0.250	0.250	10.7	3.09	4.00	16.0	8.48	3.39	1.66	4.51
×0.180	0.180	7.98	2.30	6.94	23.6	6.64	2.66	1.70	3.46
×0.120	0.120	5.51	1.59	13.0	38.0	4.81	1.92	1.74	2.45
HSS4×3×0.250	0.250	10.7	3.09	8.00	12.0	6.45	3.23	1.44	4.03
×0.180	0.180	7.98	2.30	12.5	18.1	5.05	2.53	1.48	3.08
×0.120 *	0.120	5.51	1.59	21.4	29.7	3.65	1.83	1.52	2.18
×0.080 *	0.080	3.75	1.08	34.0	46.5	2.54	1.27	1.53	1.50
HSS4×2×0.375	0.375	12.4	3.58	1.33	6.67	5.75	2.88	1.27	4.00
×0.312	0.312	10.5	3.04	1.60	8.01	5.04	2.52	1.29	3.46
×0.250	0.250	8.98	2.59	4.00	12.0	4.69	2.35	1.35	3.09
×0.180	0.180	6.74	1.94	6.94	18.1	3.73	1.87	1.39	2.39
×0.120 *	0.120	4.68	1.35	13.0	29.7	2.74	1.37	1.42	1.71
×0.080 *	0.080	3.19	0.921	21.5	46.5	1.93	0.965	1.45	1.19
HSS4×1.5×0.250	0.250	8.11	2.34	2.00	12.0	3.81	1.91	1.28	2.62
×0.180	0.180	6.11	1.76	4.17	18.1	3.08	1.54	1.32	2.05
×0.120	0.120	4.26	1.23	8.85	29.7	2.29	1.15	1.36	1.48
×0.083	0.083	3.02	0.871	14.7	44.8	1.68	0.840	1.39	1.07
×0.063	0.063	2.30	0.662	20.0	60.0	1.29	0.645	1.40	0.818
HSS3×2×0.250	0.250	7.24	2.09	4.00	8.00	2.21	1.47	1.03	1.92
×0.180	0.180	5.49	1.58	6.94	12.5	1.80	1.20	1.07	1.51
×0.120 *	0.120	3.85	1.11	13.0	21.4	1.35	0.900	1.10	1.10
×0.080 *	0.080	2.64	0.761	21.5	34.0	0.957	0.638	1.12	0.769

Note 1: For compactness criteria, refer to Table 1-6C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS5×4×0.500	14.7	7.35	1.43	9.42	2.75	1.75	31.8	12.3	1.33
×0.375	13.2	6.60	1.50	8.08	3.31	2.31	26.5	10.6	1.39
×0.312	11.4	5.70	1.52	6.91	3.60	2.60	23.0	9.31	1.39
×0.250	9.98	4.99	1.56	5.90	3.88	2.88	19.2	7.96	1.43
×0.180	7.68	3.84	1.59	4.46	4.19	3.19	14.5	6.13	1.45
×0.120	5.45	2.73	1.62	3.11	4.46	3.46	9.96	4.31	1.47
HSS5×3×0.500	6.95	4.63	1.06	6.08	2.75	0.750	18.3	8.34	1.16
×0.375	6.48	4.32	1.13	5.35	3.31	1.31	15.9	7.47	1.23
×0.312	5.69	3.79	1.15	4.61	3.60	1.60	13.9	6.61	1.23
×0.250	5.05	3.37	1.19	3.98	3.88	1.88	11.7	5.70	1.26
×0.180	3.95	2.63	1.22	3.04	4.19	2.19	8.93	4.45	1.28
×0.120	2.84	1.89	1.25	2.14	4.46	2.46	6.21	3.17	1.30
HSS5×2×0.250	1.92	1.92	0.788	2.32	3.88	0.875	5.50	3.49	1.10
×0.180	1.55	1.55	0.821	1.79	4.19	1.19	4.29	2.78	1.11
×0.120	1.14	1.14	0.847	1.28	4.46	1.46	3.04	2.02	1.14
HSS4×3×0.250	4.10	2.73	1.15	3.30	2.88	1.88	8.47	4.46	1.10
×0.180	3.23	2.15	1.19	2.53	3.19	2.19	6.47	3.49	1.11
×0.120 *	2.34	1.56	1.21	1.79	3.46	2.46	4.51	2.50	1.14
×0.080 *	1.64	1.09	1.23	1.24	3.64	2.64	3.10	1.75	1.15
HSS4×2×0.375	1.83	1.83	0.715	2.39	2.31	0.313	5.13	3.30	0.893
×0.312	1.65	1.65	0.737	2.10	2.60	0.596	4.60	3.01	0.893
×0.250	1.54	1.54	0.771	1.88	2.88	0.875	4.06	2.72	0.928
×0.180	1.25	1.25	0.803	1.47	3.19	1.19	3.18	2.18	0.946
×0.120 *	0.927	0.927	0.829	1.06	3.46	1.46	2.26	1.60	0.969
×0.080 *	0.660	0.660	0.847	0.736	3.64	1.64	1.57	1.13	0.980
HSS4×1.5×0.250	0.755	1.01	0.568	1.26	2.88	0.375	2.28	1.86	0.845
×0.180	0.631	0.841	0.599	1.00	3.19	0.690	1.84	1.54	0.863
×0.120	0.481	0.641	0.625	0.734	3.46	0.960	1.34	1.15	0.885
×0.083	0.359	0.479	0.642	0.534	3.63	1.13	0.973	0.854	0.897
×0.063	0.280	0.373	0.650	0.411	3.72	1.22	0.755	0.668	0.899
HSS3×2×0.250	1.15	1.15	0.742	1.44	1.88	0.875	2.68	1.95	0.762
×0.180	0.947	0.947	0.774	1.14	2.19	1.19	2.12	1.59	0.780
×0.120 *	0.715	0.715	0.803	0.831	2.46	1.46	1.51	1.17	0.802
×0.080 *	0.512	0.512	0.820	0.583	2.64	1.64	1.06	0.843	0.813

— Indicates flat depth or width is too small to establish a workable flat.

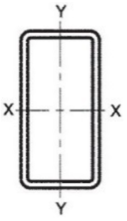


Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS3×1.5×0.250	0.250	6.38	1.84	2.00	8.00	1.73	1.15	0.970	1.58
×0.180	0.180	4.86	1.40	4.17	12.5	1.44	0.960	1.01	1.26
×0.120	0.120	3.43	0.990	8.85	21.4	1.10	0.733	1.05	0.927
×0.083	0.083	2.45	0.705	14.7	32.8	0.814	0.543	1.07	0.676
×0.060	0.060	1.79	0.516	20.8	45.8	0.606	0.404	1.08	0.499
HSS3×1×0.180	0.180	4.24	1.22	1.39	12.5	1.08	0.720	0.941	1.01
×0.120	0.120	3.02	0.870	4.69	21.4	0.847	0.565	0.987	0.754
×0.080 *	0.080	2.08	0.601	8.98	34.0	0.616	0.411	1.01	0.536
×0.060 *	0.060	1.58	0.456	12.5	45.8	0.477	0.318	1.02	0.411
HSS2.5×1.5×0.250	0.250	5.51	1.59	2.00	6.00	1.05	0.840	0.813	1.15
×0.180	0.180	4.24	1.22	4.17	9.7	0.892	0.714	0.855	0.931
×0.120	0.120	3.02	0.870	8.85	17.2	0.692	0.554	0.892	0.695
×0.083	0.083	2.16	0.622	14.7	26.7	0.518	0.414	0.913	0.510
×0.063	0.063	1.64	0.474	20.0	36.0	0.403	0.322	0.922	0.392
HSS2.5×1×0.120	0.120	2.60	0.750	4.69	17.2	0.522	0.418	0.834	0.552
×0.083	0.083	1.87	0.539	8.66	26.7	0.397	0.318	0.858	0.409
×0.063	0.063	1.43	0.412	12.0	36.0	0.310	0.248	0.867	0.316
HSS2×1.5×0.120	0.120	2.60	0.750	8.85	13.0	0.396	0.396	0.727	0.492
×0.080 *	0.080	1.81	0.521	15.2	21.5	0.291	0.291	0.747	0.352
×0.060 *	0.060	1.37	0.396	20.8	29.2	0.226	0.226	0.755	0.271
HSS2×1×0.180	0.180	2.99	0.862	1.39	6.94	0.349	0.349	0.636	0.484
×0.120	0.120	2.18	0.630	4.69	13.0	0.290	0.290	0.678	0.380
×0.080 *	0.080	1.53	0.441	8.98	21.5	0.217	0.217	0.701	0.275
×0.060 *	0.060	1.16	0.336	12.5	29.2	0.170	0.170	0.711	0.213
HSS1.5×1×0.120	0.120	1.77	0.510	4.69	8.85	0.137	0.183	0.518	0.237
×0.080 *	0.080	1.25	0.361	8.98	15.2	0.105	0.140	0.539	0.175
×0.060 *	0.060	0.957	0.276	12.5	20.8	0.083	0.111	0.549	0.136

Note 1: For compactness criteria, refer to Table 1-6C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Table 1-6A (continued)

Rectangular HSS (Roll Formed)

Dimensions and Properties

HSS3-
HSS1.5

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS3×1.5×0.250	0.557	0.743	0.550	0.949	1.88	0.375	1.53	1.33	0.678
×0.180	0.473	0.631	0.581	0.767	2.19	0.690	1.25	1.12	0.696
×0.120	0.366	0.488	0.608	0.568	2.46	0.960	0.914	0.847	0.719
×0.083	0.276	0.368	0.626	0.416	2.63	1.13	0.666	0.632	0.730
×0.060	0.208	0.277	0.635	0.309	2.73	1.23	0.499	0.478	0.732
HSS3×1×0.180	0.173	0.346	0.377	0.438	2.19	0.190	0.546	0.650	0.613
×0.120	0.142	0.284	0.404	0.336	2.46	0.460	0.422	0.519	0.635
×0.080 *	0.107	0.214	0.422	0.242	2.64	0.640	0.307	0.387	0.647
×0.060 *	0.084	0.168	0.429	0.188	2.73	0.730	0.240	0.306	0.649
HSS2.5×1.5×0.250	0.458	0.611	0.537	0.793	1.38	0.375	1.17	1.07	0.595
×0.180	0.394	0.525	0.568	0.648	1.69	0.690	0.963	0.907	0.613
×0.120	0.309	0.412	0.596	0.486	1.96	0.960	0.709	0.695	0.635
×0.083	0.234	0.312	0.613	0.358	2.13	1.13	0.518	0.521	0.647
×0.063	0.183	0.244	0.621	0.276	2.22	1.22	0.403	0.410	0.649
HSS2.5×1×0.120	0.118	0.236	0.397	0.283	1.96	0.460	0.334	0.426	0.552
×0.083	0.092	0.184	0.414	0.212	2.13	0.627	0.250	0.328	0.563
×0.063	0.073	0.147	0.422	0.165	2.22	0.719	0.197	0.261	0.565
HSS2×1.5×0.120	0.252	0.336	0.580	0.403	1.46	0.960	0.512	0.543	0.552
×0.080 *	0.186	0.248	0.597	0.289	1.64	1.14	0.364	0.398	0.563
×0.060 *	0.145	0.193	0.605	0.223	1.73	1.23	0.283	0.313	0.565
HSS2×1×0.180	0.112	0.224	0.360	0.291	1.19	0.190	0.314	0.406	0.446
×0.120	0.095	0.190	0.388	0.230	1.46	0.460	0.247	0.333	0.469
×0.080 *	0.073	0.145	0.406	0.169	1.64	0.640	0.180	0.251	0.480
×0.060 *	0.058	0.115	0.414	0.131	1.73	0.730	0.142	0.200	0.482
HSS1.5×1×0.120	0.072	0.143	0.375	0.178	0.960	0.460	0.163	0.239	0.385
×0.080 *	0.056	0.111	0.392	0.132	1.14	0.640	0.120	0.183	0.397
×0.060 *	0.044	0.089	0.401	0.103	1.23	0.730	0.095	0.147	0.399

— Indicates flat depth or width is too small to establish a workable flat.

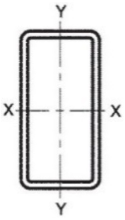


Table 1-6B

Rectangular HSS (Press Braked)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS32×16×0.375	0.375	121	35.0	37.7	80.3	4790	299	11.7	365
HSS32×8×0.375	0.375	100	29.0	16.3	80.3	3280	205	10.6	270
HSS28×8×0.375	0.375	90.0	26.0	16.3	69.7	2320	166	9.45	215
×0.312	0.312	75.4	21.7	20.6	84.7	1960	140	9.50	181
HSS24×16×0.375	0.375	100	29.0	37.7	59.0	2390	199	9.08	237
×0.312	0.312	84.1	24.2	46.3	71.9	2020	168	9.14	199
HSS24×8×0.375	0.375	79.6	23.0	18.3	61.0	1550	129	8.21	166
×0.312	0.312	66.7	19.2	22.6	73.9	1320	110	8.29	140
HSS20×16×0.625	0.625	146	42.1	20.6	27.0	2430	243	7.60	290
×0.500 *	0.500	118	34.1	27.0	35.0	2010	201	7.68	238
×0.375 *	0.375	90.0	26.0	37.7	48.3	1550	155	7.72	182
×0.312 *	0.312	75.4	21.7	46.3	59.1	1310	131	7.77	154
HSS20×12×0.625	0.625	129	37.1	14.2	27.0	1960	196	7.27	242
×0.500 *	0.500	105	30.1	19.0	35.0	1630	163	7.36	199
×0.375 *	0.375	79.6	23.0	27.0	48.3	1260	126	7.40	153
×0.312 *	0.312	66.7	19.2	33.5	59.1	1070	107	7.47	129
×0.250 *	0.250	53.9	15.5	43.0	75.0	873	87.3	7.50	105
HSS20×8×0.625	0.625	111	32.1	7.80	27.0	1490	149	6.81	193
×0.500 *	0.500	90.7	26.1	11.0	35.0	1250	125	6.92	160
×0.375 *	0.375	69.2	20.0	16.3	48.3	976	97.6	6.99	124
×0.312 *	0.312	58.1	16.7	20.6	59.1	829	82.9	7.05	104
×0.250 *	0.250	46.9	13.5	27.0	75.0	678	67.8	7.09	84.9
HSS20×4×0.375	0.375	58.8	17.0	5.67	48.3	687	68.7	6.36	94.1
×0.312	0.312	49.4	14.3	7.82	59.1	587	58.7	6.41	79.8
×0.250	0.250	40.0	11.5	11.0	75.0	483	48.3	6.48	65.1
HSS18×6×0.625	0.625	94.0	27.1	4.60	23.8	949	105	5.92	141
×0.500 *	0.500	76.8	22.1	7.00	31.0	800	88.9	6.02	117
×0.375 *	0.375	58.8	17.0	11.0	43.0	632	70.2	6.10	91.1
×0.312 *	0.312	49.4	14.3	14.2	52.7	539	59.9	6.14	77.2
×0.250 *	0.250	40.0	11.5	19.0	67.0	442	49.1	6.20	63.0

Note 1: For compactness criteria, refer to Table 1-6D.

Note 2: All press braked sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Note 4: Press braked sections are available in larger sizes and an extended range of thicknesses compared to roll formed sections.

Table 1-6B (continued)

Rectangular HSS (Press Braked)

Dimensions and Properties

HSS32-
HSS18

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS32×16×0.375	1660	208	6.89	227	30.3	14.3	3920	357	7.87
HSS32×8×0.375	365	91.3	3.55	99.4	30.3	6.31	1130	171	6.53
HSS28×8×0.375	322	80.5	3.52	88.0	26.3	6.31	958	149	5.87
×0.312	274	68.5	3.55	74.3	26.6	6.60	810	126	5.89
HSS24×16×0.375	1290	161	6.67	180	22.3	14.3	2640	266	6.53
×0.312	1090	136	6.71	152	22.6	14.6	2220	225	6.56
HSS24×8×0.375	278	69.5	3.48	76.6	22.3	6.31	792	127	5.20
×0.312	237	59.3	3.51	64.7	22.6	6.60	669	108	5.22
HSS20×16×0.625	1730	216	6.41	250	17.2	13.2	3270	347	5.78
×0.500 *	1430	179	6.48	204	17.8	13.8	2660	285	5.82
×0.375 *	1110	139	6.53	157	18.3	14.3	2030	220	5.87
×0.312 *	936	117	6.57	132	18.6	14.6	1710	187	5.89
HSS20×12×0.625	892	149	4.90	170	17.2	9.19	2030	254	5.11
×0.500 *	742	124	4.96	140	17.8	9.75	1660	210	5.15
×0.375 *	579	96.5	5.02	108	18.3	10.3	1270	163	5.20
×0.312 *	491	81.8	5.06	91.1	18.6	10.6	1070	138	5.22
×0.250 *	401	66.8	5.09	74.0	18.9	10.9	865	112	5.24
HSS20×8×0.625	352	88.0	3.31	101	17.2	5.19	980	160	4.44
×0.500 *	297	74.3	3.37	83.9	17.8	5.75	811	134	4.49
×0.375 *	234	58.5	3.42	65.1	18.3	6.31	628	105	4.53
×0.312 *	200	50.0	3.46	55.1	18.6	6.60	531	89.4	4.56
×0.250 *	164	41.0	3.49	44.9	18.9	6.88	432	73.3	4.58
HSS20×4×0.375	49.8	24.9	1.71	28.2	18.3	2.31	166	47.4	3.87
×0.312	43.3	21.7	1.74	24.1	18.6	2.60	143	41.1	3.89
×0.250	36.2	18.1	1.77	19.9	18.9	2.88	118	34.2	3.91
HSS18×6×0.625	163	54.3	2.45	63.6	15.2	3.19	492	101	3.78
×0.500 *	140	46.7	2.52	53.2	15.8	3.75	413	85.9	3.82
×0.375 *	112	37.3	2.57	41.7	16.3	4.31	324	68.4	3.87
×0.312 *	96.1	32.0	2.59	35.5	16.6	4.60	275	58.5	3.89
×0.250 *	79.5	26.5	2.63	29.0	16.9	4.88	225	48.2	3.91

— Indicates flat depth or width is too small to establish a workable flat.

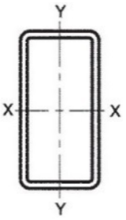


Table 1-6B (continued)
Rectangular HSS (Press Braked)
Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS16×12×0.625	0.625	111	32.1	14.2	20.6	1140	143	5.96	173
×0.500 *	0.500	90.7	26.1	19.0	27.0	948	119	6.03	142
×0.375 *	0.375	69.2	20.0	27.0	37.7	741	92.6	6.09	110
×0.312 *	0.312	58.1	16.7	33.5	46.3	629	78.6	6.14	93.0
×0.250 *	0.250	46.9	13.5	43.0	59.0	514	64.3	6.17	75.6
HSS16×4×0.375	0.375	48.4	14.0	5.67	37.7	374	46.8	5.17	63.2
×0.312	0.312	40.8	11.8	7.82	46.3	321	40.1	5.22	53.8
×0.250	0.250	33.1	9.54	11.0	59.0	266	33.3	5.28	44.1
×0.180	0.180	24.1	6.96	17.2	83.9	198	24.8	5.33	32.5
HSS14×10×0.625	0.625	94.0	27.1	11.0	17.4	711	102	5.12	125
×0.500 *	0.500	76.8	22.1	15.0	23.0	598	85.4	5.20	104
×0.375 *	0.375	58.8	17.0	21.7	32.3	470	67.1	5.26	80.7
×0.312 *	0.312	49.4	14.3	27.1	39.9	401	57.3	5.30	68.3
×0.250 *	0.250	40.0	11.5	35.0	51.0	328	46.9	5.34	55.7
HSS14×6×0.625	0.625	76.6	22.1	4.60	17.4	487	69.6	4.69	91.7
×0.500	0.500	62.9	18.1	7.00	23.0	415	59.3	4.79	76.8
×0.375	0.375	48.4	14.0	11.0	32.3	331	47.3	4.86	60.2
×0.312	0.312	40.8	11.8	14.2	39.9	284	40.6	4.91	51.2
×0.250	0.250	33.1	9.54	19.0	51.0	234	33.4	4.95	41.9
×0.180	0.180	24.1	6.96	28.3	72.8	174	24.9	5.00	30.9
HSS12×8×0.625	0.625	76.6	22.1	7.80	14.2	406	67.7	4.29	85.0
×0.500 *	0.500	62.9	18.1	11.0	19.0	345	57.5	4.37	71.2
×0.375 *	0.375	48.4	14.0	16.3	27.0	275	45.8	4.43	55.7
×0.312 *	0.312	40.8	11.8	20.6	33.5	235	39.2	4.46	47.4
×0.250 *	0.250	33.1	9.54	27.0	43.0	194	32.3	4.51	38.8
×0.180	0.180	24.1	6.96	39.4	61.7	144	24.0	4.55	28.5
HSS12×4×0.375	0.375	38.0	11.0	5.67	27.0	173	28.8	3.97	38.3
×0.312	0.312	32.1	9.26	7.82	33.5	150	25.0	4.02	32.8
×0.250	0.250	26.1	7.54	11.0	43.0	125	20.8	4.07	27.0
×0.180	0.180	19.1	5.52	17.2	61.7	93.6	15.6	4.12	20.0

Note 1: For compactness criteria, refer to Table 1-6D.

Note 2: All press braked sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Note 4: Press braked sections are available in larger sizes and an extended range of thicknesses compared to roll formed sections.

Table 1-6B (continued)

Rectangular HSS (Press Braked)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS16×12×0.625	730	122	4.77	142	13.2	9.19	1470	199	4.44
×0.500 *	610	102	4.83	117	13.8	9.75	1210	166	4.49
×0.375 *	477	79.5	4.88	90.6	14.3	10.3	926	129	4.53
×0.312 *	406	67.7	4.93	76.5	14.6	10.6	779	109	4.56
×0.250 *	332	55.3	4.96	62.3	14.9	10.9	631	89.1	4.58
HSS16×4×0.375	39.9	20.0	1.69	22.8	14.3	2.31	128	37.7	3.20
×0.312	34.8	17.4	1.72	19.5	14.6	2.60	110	32.7	3.22
×0.250	29.1	14.6	1.75	16.1	14.9	2.88	91.0	27.3	3.24
×0.180	22.0	11.0	1.78	12.0	15.2	3.19	67.8	20.5	3.27
HSS14×10×0.625	422	84.4	3.95	99.4	11.2	7.19	891	140	3.78
×0.500 *	356	71.2	4.01	82.5	11.8	7.75	735	118	3.82
×0.375 *	281	56.2	4.07	64.2	12.3	8.31	567	92.1	3.87
×0.312 *	240	48.0	4.10	54.4	12.6	8.60	478	78.3	3.89
×0.250 *	197	39.4	4.14	44.3	12.9	8.88	389	64.3	3.91
HSS14×6×0.625	127	42.3	2.40	50.2	11.2	3.19	355	76.9	3.11
×0.500	109	36.3	2.45	42.2	11.8	3.75	298	65.6	3.15
×0.375	88.0	29.3	2.51	33.3	12.3	4.31	234	52.4	3.20
×0.312	75.9	25.3	2.54	28.4	12.6	4.60	199	45.0	3.22
×0.250	62.9	21.0	2.57	23.3	12.9	4.88	163	37.2	3.24
×0.180	47.1	15.7	2.60	17.2	13.2	5.19	120	27.7	3.27
HSS12×8×0.625	216	54.0	3.13	64.3	9.19	5.19	485	91.6	3.11
×0.500 *	184	46.0	3.19	53.9	9.75	5.75	403	77.4	3.15
×0.375 *	147	36.8	3.24	42.3	10.3	6.31	314	61.4	3.20
×0.312 *	126	31.5	3.27	35.9	10.6	6.60	266	52.5	3.22
×0.250 *	104	26.0	3.30	29.4	10.9	6.88	217	43.3	3.24
×0.180	77.7	19.4	3.34	21.7	11.2	7.19	159	32.1	3.27
HSS12×4×0.375	30.0	15.0	1.65	17.3	10.3	2.31	89.6	27.8	2.53
×0.312	26.2	13.1	1.68	14.9	10.6	2.60	77.2	24.2	2.56
×0.250	22.1	11.1	1.71	12.4	10.9	2.88	63.9	20.2	2.58
×0.180	16.8	8.40	1.74	9.22	11.2	3.19	47.7	15.3	2.60

— Indicates flat depth or width is too small to establish a workable flat.

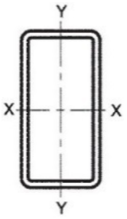


Table 1-6B (continued)

Rectangular HSS (Press Braked)

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	Axis X-X			
						I	*S*	*r*	*Z*
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}
HSS10×6×0.625	0.625	59.3	17.1	4.60	11.0	202	40.4	3.44	52.5
×0.500 *	0.500	49.0	14.1	7.00	15.0	175	35.0	3.52	44.5
×0.375 *	0.375	38.0	11.0	11.0	21.7	142	28.4	3.59	35.3
×0.312 *	0.312	32.1	9.26	14.2	27.1	123	24.6	3.64	30.2
×0.250 *	0.250	26.1	7.54	19.0	35.0	102	20.4	3.68	24.8
×0.180	0.180	19.1	5.52	28.3	50.6	76.2	15.2	3.72	18.4
×0.120	0.120	12.9	3.73	45.0	78.3	52.5	10.5	3.75	12.6
HSS8×4×0.375	0.375	27.6	7.95	5.67	16.3	59.9	15.0	2.74	19.4
×0.312	0.312	23.5	6.76	7.82	20.6	52.5	13.1	2.79	16.8
×0.250	0.250	19.2	5.54	11.0	27.0	44.2	11.1	2.82	13.9
×0.180	0.180	14.1	4.08	17.2	39.4	33.6	8.40	2.87	10.4
×0.120	0.120	9.62	2.77	28.3	61.7	23.5	5.88	2.91	7.20
HSS7×4×0.375	0.375	25.0	7.20	5.67	13.7	42.5	12.1	2.43	15.6
×0.312	0.312	21.3	6.14	7.82	17.4	37.4	10.7	2.47	13.5
×0.250	0.250	17.5	5.04	11.0	23.0	31.7	9.06	2.51	11.3
×0.180	0.180	12.9	3.72	17.2	33.9	24.2	6.91	2.55	8.49
×0.120	0.120	8.78	2.53	28.3	53.3	16.9	4.83	2.58	5.87
HSS6×3×0.250	0.250	14.0	4.04	7.00	19.0	17.4	5.80	2.08	7.46
×0.180	0.180	10.4	3.00	11.7	28.3	13.5	4.50	2.12	5.67
×0.120	0.120	7.12	2.05	20.0	45.0	9.61	3.20	2.17	3.96
HSS6×2×0.250	0.250	12.3	3.54	3.00	19.0	13.3	4.43	1.94	6.02
×0.180	0.180	9.15	2.64	6.11	28.3	10.5	3.50	1.99	4.63
×0.120	0.120	6.29	1.81	11.7	45.0	7.53	2.51	2.04	3.25

Note 1: For compactness criteria, refer to Table 1-6D.

Note 2: All press braked sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel rectangular HSS.

Note 4: Press braked sections are available in larger sizes and an extended range of thicknesses compared to roll formed sections.

Table 1-6B (continued)

Rectangular HSS (Press Braked)

Dimensions and Properties

Shape	Axis Y-Y				Workable Flat		Torsion		Surface Area
	I	*S*	*r*	*Z*	Depth	Width	*J*	*C*	
	in.^{4}	in.^{3}	in.	in.^{3}	in.	in.	in.^{4}	in.^{3}	ft^2/ft
HSS10×6×0.625	90.5	30.2	2.30	36.7	7.19	3.19	222	52.7	2.44
×0.500 *	78.9	26.3	2.37	31.2	7.75	3.75	188	45.5	2.49
×0.375 *	64.3	21.4	2.42	24.8	8.31	4.31	148	36.6	2.53
×0.312 *	55.7	18.6	2.45	21.3	8.60	4.60	126	31.5	2.56
×0.250 *	46.4	15.5	2.48	17.5	8.88	4.88	104	26.3	2.58
×0.180	34.9	11.6	2.51	13.0	9.19	5.19	76.5	19.6	2.60
×0.120	24.1	8.03	2.54	8.90	9.46	5.46	52.0	13.5	2.62
HSS8×4×0.375	20.1	10.1	1.59	11.9	6.31	2.31	52.5	17.9	1.87
×0.312	17.7	8.85	1.62	10.3	6.60	2.60	45.4	15.7	1.89
×0.250	15.0	7.50	1.65	8.61	6.88	2.88	37.7	13.2	1.91
×0.180	11.5	5.75	1.68	6.47	7.19	3.19	28.2	10.0	1.94
×0.120	8.10	4.05	1.71	4.47	7.46	3.46	19.4	7.02	1.96
HSS7×4×0.375	17.6	8.80	1.56	10.6	5.31	2.31	43.6	15.4	1.70
×0.312	15.6	7.80	1.59	9.18	5.60	2.60	37.7	13.5	1.72
×0.250	13.3	6.65	1.62	7.67	5.88	2.88	31.4	11.5	1.74
×0.180	10.2	5.10	1.66	5.79	6.19	3.19	23.5	8.73	1.77
×0.120	7.19	3.60	1.69	4.01	6.46	3.46	16.2	6.13	1.79
HSS6×3×0.250	5.88	3.92	1.21	4.59	4.88	1.88	15.2	6.96	1.41
×0.180	4.61	3.07	1.24	3.51	5.19	2.19	11.5	5.38	1.44
×0.120	3.30	2.20	1.27	2.46	5.46	2.46	8.01	3.83	1.46
HSS6×2×0.250	2.25	2.25	0.797	2.70	4.88	0.875	6.93	4.22	1.24
×0.180	1.82	1.82	0.830	2.10	5.19	1.19	5.42	3.37	1.27
×0.120	1.34	1.34	0.860	1.49	5.46	1.46	3.86	2.45	1.29

— Indicates flat depth or width is too small to establish a workable flat.

Table 1-6C

Rectangular HSS (Roll Formed)

Compactness Criteria

Nominal Wall Thickness, in.	Compactness Criteria for Rectangular HSS							
	Compression		Flexure				Shear	
	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi
	nonslender up to		compact up to		compact up to		C_v = 1.0 up to	
	Web Height, in.		Flange Width, in.		Web Height, in.		Web Height, in.	
0.500	16	14	10	10	16	16	16	16
0.375	14	10	10	10	16	16	16	16
0.312	12	8	10	8	16	16	16	16
0.250	10	7	8	6	16	12	16	12
0.180	7	5	6	5	12	9	12	10
0.120	4	3	4	3	8	6	8	6
0.083	3	—	1.5	1.5	4	4	4	4
0.080	3	2	3	2	4	4	4	4
0.063	2.5	—	1.5	1.5	4	2.5	4	2.5
0.060	2	1.5	1.5	1.5	3	3	3	3

Table 1-6D

Rectangular HSS (Press Braked)

Compactness Criteria

Nominal Wall Thickness, in.	Compactness Criteria for Rectangular HSS							
	Compression		Flexure				Shear	
	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi
	nonslender up to		compact up to		compact up to		C_v = 1.0 up to	
	Web Height, in.		Flange Width, in.		Web Height, in.		Web Height, in.	
0.625	20	18	16	12	20	20	20	20
0.500	20	14	16	12	20	20	20	20
0.375	14	10	12	8	28	20	28	20
0.312	12	8	10	8	24	16	24	16
0.250	10	7	8	6	18	12	18	12
0.180	7	—	6	4	12	8	14	8
0.120	—	—	4	3	8	6	8	6

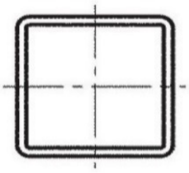


Table 1-7A

Square HSS (Roll Formed)

Dimensions and Properties

HSS12-HSS5

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	*I*	*S*	*r*	*Z*	Workable Flat	Torsion		Surface Area
											J	*C*	
	in.	lb/ft	$in.^2$			$in.^4$	$in.^3$	in.	$in.^3$	in.	$in.^4$	$in.^3$	ft^2/ft
HSS12×12×0.500	0.500	76.9	22.2	19.2	19.2	479	79.8	4.65	94.4	9.75	781	122	3.83
×0.375	0.375	59.2	17.1	28.0	28.0	380	63.3	4.71	73.9	10.3	600	95.3	3.89
×0.312	0.312	49.5	14.3	33.7	33.7	321	53.5	4.74	62.1	10.6	507	80.8	3.89
×0.250 *	0.250	40.2	11.6	44.0	44.0	265	44.2	4.78	50.8	10.9	411	66.3	3.93
HSS10×10×0.500	0.500	63.1	18.2	15.2	15.2	267	53.4	3.83	63.7	7.75	442	81.5	3.16
×0.375	0.375	48.8	14.1	22.7	22.7	214	42.8	3.90	50.4	8.31	342	64.6	3.23
×0.312	0.312	40.8	11.8	27.2	27.2	182	36.4	3.93	42.4	8.60	290	55.0	3.23
×0.250 *	0.250	33.3	9.59	36.0	36.0	151	30.2	3.97	34.9	8.88	235	45.2	3.26
HSS9×9×0.500	0.500	56.1	16.2	13.2	13.2	189	42.0	3.42	50.6	6.75	317	64.5	2.83
×0.375	0.375	43.6	12.6	20.0	20.0	154	34.2	3.50	40.3	7.31	246	51.3	2.89
×0.312	0.312	36.5	10.5	24.0	24.0	130	28.9	3.52	33.9	7.60	209	43.8	2.89
×0.250	0.250	29.8	8.59	32.0	32.0	109	24.2	3.56	28.0	7.88	170	36.2	2.93
HSS8×8×0.500	0.500	49.2	14.2	11.2	11.2	129	32.3	3.01	39.0	5.75	218	49.4	2.49
×0.375	0.375	38.4	11.1	17.3	17.3	106	26.5	3.09	31.3	6.31	171	39.8	2.56
×0.312	0.312	32.2	9.28	20.8	20.8	89.7	22.4	3.11	26.4	6.60	145	34.0	2.56
×0.250 *	0.250	26.3	7.59	28.0	28.0	75.1	18.8	3.15	21.9	6.88	119	28.3	2.60
×0.180 *	0.180	19.2	5.54	40.3	40.3	56.0	14.0	3.18	16.2	7.19	87.3	21.0	2.61
HSS7×7×0.500	0.500	42.3	12.2	9.20	9.20	82.5	23.6	2.60	29.0	4.75	142	36.4	2.16
×0.375	0.375	33.2	9.58	14.7	14.7	68.7	19.6	2.68	23.5	5.31	112	29.5	2.23
×0.312	0.312	27.8	8.03	17.6	17.6	58.6	16.7	2.70	19.8	5.60	96.0	25.5	2.23
×0.250	0.250	22.9	6.59	24.0	24.0	49.4	14.1	2.74	16.5	5.88	78.5	21.2	2.26
HSS6×6×0.500	0.500	35.3	10.2	7.20	7.20	48.9	16.3	2.19	20.4	3.75	86.2	25.4	1.83
×0.375	0.375	28.0	8.08	12.0	12.0	41.6	13.9	2.27	16.8	4.31	68.9	21.0	1.89
×0.312	0.312	23.5	6.78	14.4	14.4	35.6	11.9	2.29	14.2	4.60	59.2	18.2	1.89
×0.250 *	0.250	19.4	5.59	20.0	20.0	30.3	10.1	2.33	11.9	4.88	48.7	15.2	1.93
×0.180 *	0.180	14.2	4.10	29.2	29.2	22.9	7.63	2.36	8.89	5.19	36.1	11.5	1.95
×0.120 *	0.120	9.67	2.79	46.4	46.4	16.0	5.33	2.39	6.13	5.46	24.7	7.99	1.97
HSS5×5×0.500	0.500	28.4	8.18	5.20	5.20	26.0	10.4	1.78	13.3	2.75	47.0	16.3	1.49
×0.375	0.375	22.8	6.58	9.33	9.33	22.8	9.12	1.86	11.2	3.31	38.5	13.8	1.56
×0.312	0.312	19.2	5.53	11.2	11.2	19.6	7.84	1.88	9.52	3.60	33.2	12.0	1.56
×0.250 *	0.250	15.9	4.59	16.0	16.0	16.9	6.76	1.92	8.07	3.88	27.5	10.2	1.60
×0.180 *	0.180	11.7	3.38	23.6	23.6	12.9	5.16	1.95	6.06	4.19	20.6	7.79	1.61
×0.120 *	0.120	8.01	2.31	38.0	38.0	9.10	3.64	1.98	4.21	4.46	14.1	5.44	1.64

Note 1: For compactness criteria, refer to Table 1-7C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel square HSS.

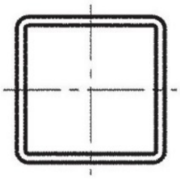
Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS4-HSS1.5

Table 1-7A (continued)

Square HSS (Roll Formed)

Dimensions and Properties



Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	*I*	*S*	*r*	*Z*	Workable Flat	Torsion		Surface Area
											J	*C*	
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}	in.	in.^{4}	in.^{3}	ft^2/ft
HSS4×4×0.500	0.500	21.4	6.18	3.20	3.20	11.6	5.80	1.37	7.67	1.75	21.8	9.25	1.16
×0.375	0.375	17.6	5.08	6.67	6.67	10.7	5.35	1.45	6.72	2.31	18.6	8.17	1.23
×0.312	0.312	14.9	4.28	8.01	8.01	9.29	4.65	1.47	5.76	2.60	16.2	7.20	1.23
×0.250 *	0.250	12.4	3.59	12.0	12.0	8.22	4.11	1.51	4.97	2.88	13.6	6.20	1.26
×0.180 *	0.180	9.23	2.66	18.1	18.1	6.36	3.18	1.55	3.77	3.19	10.3	4.80	1.28
×0.120 *	0.120	6.35	1.83	29.7	29.7	4.55	2.28	1.58	2.65	3.46	7.12	3.40	1.30
×0.083	0.083	4.46	1.29	44.8	44.8	3.27	1.64	1.59	1.88	3.63	5.04	2.44	1.31
HSS3.5×3.5×0.250	0.250	10.7	3.09	10.0	10.0	5.29	3.02	1.31	3.69	2.38	8.89	4.58	1.10
×0.180 *	0.180	7.98	2.30	15.3	15.3	4.14	2.37	1.34	2.83	2.69	6.78	3.58	1.11
×0.120 *	0.120	5.51	1.59	25.5	25.5	3.00	1.71	1.37	2.00	2.96	4.72	2.56	1.14
×0.083	0.083	3.89	1.12	38.8	38.8	2.17	1.24	1.39	1.43	3.13	3.35	1.85	1.15
HSS3×3×0.375	0.375	12.4	3.58	4.00	4.00	3.88	2.59	1.04	3.38	1.31	7.06	4.00	0.893
×0.250	0.250	8.98	2.59	8.00	8.00	3.16	2.11	1.10	2.61	1.88	5.40	3.20	0.928
×0.180	0.180	6.74	1.94	12.5	12.5	2.51	1.67	1.14	2.02	2.19	4.17	2.54	0.946
×0.120 *	0.120	4.68	1.35	21.4	21.4	1.84	1.23	1.17	1.45	2.46	2.93	1.84	0.969
×0.080 *	0.080	3.19	0.921	34.0	34.0	1.30	0.867	1.19	1.00	2.64	2.02	1.29	0.980
HSS2.5×2.5×0.250	0.250	7.24	2.09	6.00	6.00	1.69	1.35	0.899	1.71	1.38	2.97	2.07	0.762
×0.180	0.180	5.49	1.58	9.72	9.72	1.38	1.10	0.935	1.35	1.69	2.33	1.68	0.780
×0.120 *	0.120	3.85	1.11	17.2	17.2	1.03	0.824	0.963	0.980	1.96	1.66	1.24	0.802
×0.080 *	0.080	2.64	0.761	27.7	27.7	0.736	0.589	0.983	0.686	2.14	1.15	0.878	0.813
×0.060	0.060	2.00	0.576	37.5	37.5	0.566	0.453	0.991	0.524	2.23	0.885	0.681	0.815
HSS2×2×0.250	0.250	5.51	1.59	4.00	4.00	0.766	0.766	0.694	1.00	0.875	1.39	1.18	0.595
×0.180	0.180	4.24	1.22	6.94	6.94	0.648	0.648	0.729	0.812	1.19	1.13	0.996	0.613
×0.120	0.120	3.02	0.870	13.0	13.0	0.503	0.503	0.760	0.605	1.46	0.821	0.754	0.635
×0.080 *	0.080	2.08	0.601	21.5	21.5	0.365	0.365	0.779	0.429	1.64	0.578	0.545	0.647
×0.060 *	0.060	1.58	0.456	29.2	29.2	0.283	0.283	0.788	0.329	1.73	0.446	0.425	0.649
HSS1.75×1.75×0.180	0.180	3.61	1.04	5.56	5.56	0.408	0.466	0.626	0.594	0.940	0.725	0.720	0.530
×0.120	0.120	2.60	0.750	10.9	10.9	0.325	0.371	0.658	0.451	1.21	0.537	0.557	0.552
×0.083	0.083	1.87	0.539	17.7	17.7	0.247	0.282	0.677	0.334	1.38	0.393	0.420	0.563
×0.063	0.063	1.43	0.412	24.0	24.0	0.193	0.221	0.684	0.258	1.47	0.307	0.332	0.565
HSS1.5×1.5×0.250	0.250	3.78	1.09	2.00	2.00	0.260	0.347	0.488	0.481	0.375	0.500	0.548	0.428
×0.180	0.180	2.99	0.862	4.17	4.17	0.236	0.315	0.523	0.410	0.690	0.430	0.490	0.446
×0.120	0.120	2.18	0.630	8.85	8.85	0.195	0.260	0.556	0.320	0.960	0.327	0.390	0.469
×0.080 *	0.080	1.53	0.441	15.2	15.2	0.146	0.195	0.575	0.232	1.14	0.235	0.290	0.480
×0.060 *	0.060	1.16	0.336	20.8	20.8	0.114	0.152	0.582	0.179	1.23	0.183	0.229	0.482

Note 1: For compactness criteria, refer to Table 1-7C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel square HSS.

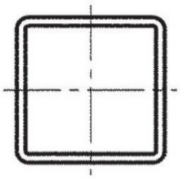


Table 1-7A (continued)

Square HSS (Roll Formed)

Dimensions and Properties

HSS1.25-HSS1

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	*I*	*S*	*r*	*Z*	Workable Flat	Torsion		Surface Area
											J	*C*	
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}	in.	in.^{4}	in.^{3}	ft^2/ft
HSS1.25×1.25×0.180	0.180	2.37	0.682	2.78	2.78	0.121	0.194	0.421	0.260	0.440	0.227	0.304	0.363
×0.120	0.120	1.77	0.510	6.77	6.77	0.105	0.168	0.454	0.211	0.710	0.181	0.255	0.385
×0.080 *	0.080	1.25	0.361	12.1	12.1	0.081	0.129	0.473	0.156	0.890	0.132	0.193	0.397
×0.060 *	0.060	0.957	0.276	16.7	16.7	0.064	0.102	0.481	0.122	0.980	0.104	0.155	0.399
HSS1×1×0.180	0.180	1.74	0.502	1.39	1.39	0.050	0.101	0.317	0.143	0.190	0.099	0.162	0.280
×0.120	0.120	1.35	0.390	4.69	4.69	0.048	0.096	0.352	0.125	0.460	0.086	0.147	0.302
×0.080	0.080	0.973	0.281	8.98	8.98	0.039	0.077	0.371	0.095	0.640	0.065	0.116	0.313
×0.060 *	0.060	0.748	0.216	12.5	12.5	0.031	0.062	0.379	0.075	0.730	0.051	0.094	0.315

Note 1: For compactness criteria, refer to Table 1-7C.

Note 2: All roll formed sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel square HSS.

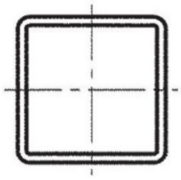


Table 1-7B

Square HSS (Press Braked)

Dimensions and Properties

HSS20-HSS7

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	*I*	*S*	*r*	*Z*	Workable Flat	Torsion		Surface Area
											J	*C*	
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}	in.	in.^{4}	in.^{3}	ft^2/ft
HSS20×20×0.625	0.625	163	47.1	27.0	27.0	2900	290	7.85	339	17.2	4650	441	6.44
×0.500 *	0.500	132	38.1	35.0	35.0	2390	239	7.92	277	17.8	3780	362	6.49
×0.375 *	0.375	100	29.0	48.3	48.3	1840	184	7.97	212	18.3	2880	279	6.53
HSS16×16×0.625	0.625	129	37.1	20.6	20.6	1430	179	6.21	211	13.2	2330	273	5.11
×0.500 *	0.500	105	30.1	27.0	27.0	1190	149	6.29	173	13.8	1900	225	5.15
×0.375 *	0.375	79.6	23.0	37.7	37.7	924	116	6.34	134	14.3	1460	175	5.20
×0.312 *	0.312	66.7	19.2	46.3	46.3	782	97.8	6.38	113	14.6	1220	147	5.22
HSS14×14×0.625	0.625	111	32.1	17.4	17.4	935	134	5.40	159	11.2	1540	204	4.44
×0.500 *	0.500	90.7	26.1	23.0	23.0	780	111	5.47	131	11.8	1260	169	4.49
×0.375 *	0.375	69.2	20.0	32.3	32.3	609	87.0	5.52	101	12.3	967	132	4.53
×0.312 *	0.312	58.1	16.7	39.9	39.9	518	74.0	5.57	85.4	12.6	814	112	4.56
HSS12×12×0.625	0.625	94.0	27.1	14.2	14.2	568	94.7	4.58	113	9.19	949	145	3.78
×0.500 *	0.500	76.8	22.1	19.0	19.0	478	79.7	4.65	94.2	9.75	782	122	3.82
×0.375 *	0.375	58.8	17.0	27.0	27.0	376	62.7	4.70	73.2	10.3	602	95.1	3.87
×0.312 *	0.312	49.4	14.3	33.5	33.5	320	53.3	4.73	62.0	10.6	508	80.9	3.89
×0.250 *	0.250	40.0	11.5	43.0	43.0	263	43.8	4.78	50.5	10.9	412	66.2	3.91
HSS10×10×0.625	0.625	76.6	22.1	11.0	11.0	312	62.4	3.76	75.9	7.19	533	96.5	3.11
×0.500 *	0.500	62.9	18.1	15.0	15.0	266	53.2	3.83	63.5	7.75	442	81.4	3.15
×0.375 *	0.375	48.4	14.0	21.7	21.7	211	42.2	3.88	49.7	8.31	343	64.4	3.20
×0.312 *	0.312	40.8	11.8	27.1	27.1	181	36.2	3.92	42.3	8.60	290	55.0	3.22
×0.250 *	0.250	33.1	9.54	35.0	35.0	149	29.8	3.95	34.6	8.88	236	45.2	3.24
HSS8×8×0.625	0.625	59.3	17.1	7.80	7.80	148	37.0	2.94	45.9	5.19	259	57.5	2.44
×0.500 *	0.500	49.0	14.1	11.0	11.0	128	32.0	3.01	38.9	5.75	218	49.4	2.49
×0.375 *	0.375	38.0	11.0	16.3	16.3	104	26.0	3.07	30.8	6.31	171	39.6	2.53
×0.312 *	0.312	32.1	9.26	20.6	20.6	89.4	22.4	3.11	26.4	6.60	146	34.2	2.56
×0.250 *	0.250	26.1	7.54	27.0	27.0	74.3	18.6	3.14	21.7	6.88	119	28.2	2.58
×0.180	0.180	19.1	5.52	39.4	39.4	55.7	13.9	3.18	16.1	7.19	87.6	21.0	2.60
HSS7×7×0.500 *	0.500	42.1	12.1	9.00	9.00	82.0	23.4	2.60	28.8	4.75	142	36.3	2.15
×0.375 *	0.375	32.8	9.45	13.7	13.7	67.2	19.2	2.67	23.0	5.31	113	29.6	2.20
×0.312 *	0.312	27.8	8.01	17.4	17.4	58.4	16.7	2.70	19.8	5.60	96.0	25.5	2.22
×0.250 *	0.250	22.7	6.54	23.0	23.0	48.7	13.9	2.73	16.3	5.88	78.8	21.2	2.24
×0.180	0.180	16.6	4.80	33.9	33.9	36.7	10.5	2.77	12.2	6.19	58.2	15.9	2.27

Note 1: For compactness criteria, refer to Table 1-7D.

Note 2: All press braked sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

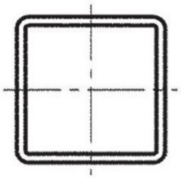
Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel square HSS.

Note 4: Press braked sections are available in larger sizes and an extended range of thicknesses compared to roll formed sections.

Table 1-7B (continued)

Square HSS (Press Braked)

Dimensions and Properties



Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*b/t*	*h/t*	*I*	*S*	*r*	*Z*	Workable Flat	Torsion		Surface Area
											J	*C*	
	in.	lb/ft	in.^{2}			in.^{4}	in.^{3}	in.	in.^{3}	in.	in.^{4}	in.^{3}	ft^2/ft
HSS6×6×0.500 *	0.500	35.2	10.1	7.00	7.00	48.6	16.2	2.19	20.2	3.75	86.0	25.3	1.82
×0.375 *	0.375	27.6	7.95	11.0	11.0	40.5	13.5	2.26	16.4	4.31	69.0	20.8	1.87
×0.312 *	0.312	23.5	6.76	14.2	14.2	35.5	11.8	2.29	14.2	4.60	59.2	18.1	1.89
×0.250 *	0.250	19.2	5.54	19.0	19.0	29.9	9.97	2.32	11.8	4.88	48.8	15.2	1.91
×0.180	0.180	14.1	4.08	28.3	28.3	22.7	7.57	2.36	8.82	5.19	36.3	11.5	1.94
×0.120	0.120	9.62	2.77	45.0	45.0	15.8	5.27	2.39	6.08	5.46	24.8	7.98	1.96
HSS5×5×0.250	0.250	15.7	4.54	15.0	15.0	16.6	6.64	1.91	7.94	3.88	27.6	10.2	1.58
×0.180	0.180	11.6	3.36	22.8	22.8	12.8	5.12	1.95	6.00	4.19	20.7	7.79	1.60
×0.120	0.120	7.95	2.29	36.7	36.7	9.00	3.60	1.98	4.16	4.46	14.2	5.45	1.62

Note 1: For compactness criteria, refer to Table 1-7D.

Note 2: All press braked sections are available in austenitic stainless steel. The sections available in duplex stainless steel are marked *.

Note 3: The design wall thickness is equal to the nominal wall thickness for stainless steel square HSS.

Note 4: Press braked sections are available in larger sizes and an extended range of thicknesses compared to roll formed sections.

Table 1-7C

Square HSS (Roll Formed)

Compactness Criteria

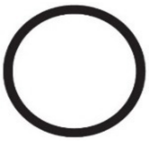
Nominal Wall Thickness, in.	Compactness Criteria for Square HSS							
	Compression		Flexure				Shear	
	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi
	nonslender up to		compact up to		compact up to		C_v = 1.0 up to	
	Web Height, in.		Flange Width, in.		Web Height, in.		Web Height, in.	
0.500	12	12	12	12	12	12	12	12
0.375	12	10	12	10	12	12	12	12
0.312	12	9	12	8	12	12	12	12
0.250	10	7	9	6	12	12	12	12
0.180	6	5	6	5	8	8	8	8
0.120	4	3.5	4	3	6	6	6	6
0.083	1.75	1.75	1.75	1.75	4	4	4	4
0.080	3	2	3	2	3	3	3	3
0.063	1.75	1.75	1.75	—	1.75	1.75	1.75	1.75
0.060	2.5	1.5	2.5	1.5	2.5	2.5	2.5	2.5

Table 1-7D

Square HSS (Press Braked)

Compactness Criteria

Nominal Wall Thickness, in.	Compactness Criteria for Square HSS							
	Compression		Flexure				Shear	
	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi	F_y = 30 ksi	F_y = 65 ksi
	nonslender up to		compact up to		compact up to		C_v = 1.0 up to	
	Web Height, in.		Flange Width, in.		Web Height, in.		Web Height, in.	
0.625	20	16	20	16	20	20	20	20
0.500	20	14	16	14	20	20	20	20
0.375	16	10	14	10	20	20	20	20
0.312	12	8	12	8	20	16	16	16
0.250	10	7	8	7	12	12	12	12
0.180	7	5	7	5	8	8	8	8
0.120	5	—	—	—	6	6	6	6



HSS7.5-
HSS3.75

Table 1-8
Round HSS
Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*D/t*	*I*	*S*	*r*	*Z*	Torsion	
									J	*C*
	in.	lb/ft	$in.^2$		$in.^4$	$in.^3$	in.	$in.^3$	$in.^4$	$in.^3$
HSS7.5×0.375	0.375	29.1	8.39	20.0	53.4	14.2	2.52	19.1	107	28.4
×0.250	0.250	19.7	5.69	30.0	37.5	10.0	2.57	13.1	75.0	20.0
×0.180 [f2]	0.180	14.4	4.14	41.7	27.7	7.39	2.59	9.65	55.4	14.8
×0.120 [c2,f2]	0.120	9.65	2.78	62.5	18.9	5.04	2.61	6.54	37.8	10.1
HSS6.25×0.375	0.375	24.0	6.92	16.7	30.0	9.60	2.08	13.0	60.0	19.2
×0.250	0.250	16.3	4.71	25.0	21.2	6.78	2.12	9.01	42.4	13.6
×0.180 [f2]	0.180	11.9	3.43	34.7	15.8	5.06	2.15	6.63	31.6	10.1
×0.120 [c2,f2]	0.120	8.01	2.31	52.1	10.9	3.49	2.17	4.51	21.8	6.98
HSS5×0.250	0.250	12.9	3.73	20.0	10.6	4.24	1.69	5.65	21.2	8.48
×0.180	0.180	9.45	2.73	27.8	7.93	3.17	1.70	4.18	15.9	6.34
×0.120 [f2]	0.120	6.38	1.84	41.7	5.48	2.19	1.73	2.86	11.0	4.38
×0.109 [c2,f2]	0.109	5.81	1.67	45.9	5.01	2.00	1.73	2.61	10.0	4.00
×0.083 [c2,f2]	0.083	4.45	1.28	60.2	3.88	1.55	1.74	2.01	7.76	3.10
HSS4.5×0.250	0.250	11.6	3.34	18.0	7.56	3.36	1.50	4.52	15.1	6.72
×0.180	0.180	8.47	2.44	25.0	5.71	2.54	1.53	3.36	11.4	5.08
×0.148	0.148	7.02	2.02	30.4	4.80	2.13	1.54	2.80	9.60	4.26
×0.120 [f2]	0.120	5.73	1.65	37.5	3.96	1.76	1.55	2.30	7.92	3.52
×0.109 [f2]	0.109	5.21	1.50	41.3	3.63	1.61	1.56	2.10	7.26	3.22
×0.083 [c2,f2]	0.083	3.99	1.15	54.2	2.81	1.25	1.56	1.62	5.62	2.50
HSS4×0.120 [f2]	0.120	5.07	1.46	33.3	2.76	1.38	1.37	1.81	5.52	2.76
×0.109 [f2]	0.109	4.62	1.33	36.7	2.52	1.26	1.38	1.65	5.04	2.52
×0.083 [c2,f2]	0.083	3.54	1.02	48.2	1.96	0.980	1.39	1.27	3.92	1.96
HSS3.75×0.250	0.250	9.53	2.75	15.0	4.23	2.26	1.24	3.07	8.46	4.52
×0.180	0.180	7.00	2.02	20.8	3.22	1.72	1.26	2.30	6.44	3.44
×0.148	0.148	5.81	1.67	25.3	2.72	1.45	1.28	1.92	5.44	2.90
×0.120 [f2]	0.120	4.75	1.37	31.3	2.26	1.21	1.28	1.58	4.52	2.42
×0.109 [f2]	0.109	4.32	1.25	34.4	2.07	1.10	1.29	1.45	4.14	2.20
×0.083 [c2,f2]	0.083	3.32	0.956	45.2	1.61	0.859	1.30	1.12	3.22	1.72

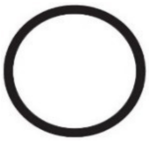
[c1/c2] Shape is slender for compression with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

Note 1: Cold formed sections are available both in austenitic and duplex stainless steel.

Note 2: The design wall thickness is equal to the nominal wall thickness for stainless steel round HSS.

Table 1-8 (continued)
Round HSS
Dimensions and Properties



HSS3.5-
HSS2.75

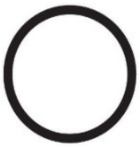
Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*D/t*	*I*	*S*	*r*	*Z*	Torsion	
									J	*C*
	in.	lb/ft	$in.^2$		$in.^4$	$in.^3$	in.	$in.^3$	$in.^4$	$in.^3$
HSS3.5×0.180	0.180	6.51	1.88	19.4	2.59	1.48	1.17	1.99	5.18	2.96
×0.148	0.148	5.40	1.56	23.6	2.19	1.25	1.18	1.66	4.38	2.50
×0.120	0.120	4.42	1.27	29.2	1.82	1.04	1.20	1.37	3.64	2.08
×0.109 [f2]	0.109	4.03	1.16	32.1	1.67	0.954	1.20	1.25	3.34	1.91
×0.083 [f2]	0.083	3.09	0.891	42.2	1.30	0.743	1.21	0.969	2.60	1.49
×0.063 [c2,f2]	0.063	2.34	0.675	56.0	0.997	0.570	1.22	0.739	1.99	1.14
×0.049 [c2,f1,f2]	0.049	1.84	0.531	71.4	0.791	0.452	1.22	0.584	1.58	0.904
HSS3.125×0.250	0.250	7.83	2.26	12.5	2.35	1.50	1.02	2.07	4.70	3.00
×0.180	0.180	5.78	1.67	17.4	1.81	1.16	1.04	1.56	3.62	2.32
×0.120	0.120	3.93	1.13	26.0	1.28	0.819	1.06	1.08	2.56	1.64
×0.109	0.109	3.58	1.03	28.7	1.18	0.755	1.07	0.992	2.36	1.51
×0.083 [f2]	0.083	2.75	0.793	37.7	0.918	0.588	1.08	0.768	1.84	1.18
×0.063 [c2,f2]	0.063	2.09	0.601	50.0	0.705	0.451	1.08	0.586	1.41	0.902
HSS3×0.250	0.250	7.49	2.16	12.0	2.06	1.37	0.977	1.90	4.12	2.74
×0.180	0.180	5.53	1.59	16.7	1.59	1.06	1.00	1.43	3.18	2.12
×0.148	0.148	4.60	1.33	20.3	1.35	0.900	1.01	1.20	2.70	1.80
×0.120	0.120	3.77	1.09	25.0	1.13	0.753	1.02	0.996	2.26	1.51
×0.109	0.109	3.43	0.990	27.5	1.04	0.693	1.02	0.911	2.08	1.39
×0.083 [f2]	0.083	2.64	0.761	36.1	0.810	0.540	1.03	0.706	1.62	1.08
×0.063 [c2,f2]	0.063	2.00	0.577	48.0	0.622	0.415	1.04	0.539	1.24	0.830
×0.049 [c2,f2]	0.049	1.58	0.454	61.2	0.495	0.330	1.04	0.427	0.989	0.660
HSS2.875×0.180	0.180	5.29	1.52	16.0	1.39	0.967	0.956	1.31	2.78	1.93
×0.120	0.120	3.60	1.04	24.0	0.987	0.687	0.974	0.911	1.97	1.37
×0.109	0.109	3.28	0.947	26.4	0.907	0.631	0.979	0.834	1.81	1.26
×0.083 [f2]	0.083	2.52	0.728	34.6	0.710	0.494	0.988	0.647	1.42	0.988
HSS2.75×0.250	0.250	6.81	1.96	11.0	1.55	1.13	0.889	1.57	3.10	2.26
×0.180	0.180	5.04	1.45	15.3	1.21	0.880	0.914	1.19	2.42	1.76
×0.148	0.148	4.20	1.21	18.6	1.03	0.749	0.923	1.00	2.06	1.50
×0.120	0.120	3.44	0.991	22.9	0.859	0.625	0.931	0.831	1.72	1.25
×0.109	0.109	3.14	0.904	25.2	0.790	0.575	0.935	0.761	1.58	1.15
×0.083 [f2]	0.083	2.41	0.695	33.1	0.619	0.450	0.944	0.591	1.24	0.900
×0.065 [f2]	0.065	1.90	0.548	42.3	0.494	0.359	0.949	0.469	0.988	0.718

[c1/c2] Shape is slender for compression with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

Note 1: Cold formed sections are available both in austenitic and duplex stainless steel.

Note 2: The design wall thickness is equal to the nominal wall thickness for stainless steel round HSS.



HSS2.5-
HSS1.9

Table 1-8 (continued)

Round HSS

Dimensions and Properties

Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*D/t*	*I*	*S*	*r*	*Z*	Torsion	
									J	*C*
	in.	lb/ft	in.^{2}		in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}
HSS2.5×0.250	0.250	6.13	1.77	10.0	1.13	0.904	0.799	1.27	2.26	1.81
×0.180	0.180	4.55	1.31	13.9	0.888	0.710	0.823	0.971	1.78	1.42
×0.148	0.148	3.79	1.09	16.9	0.759	0.607	0.834	0.820	1.52	1.21
×0.120	0.120	3.11	0.897	20.8	0.637	0.510	0.843	0.680	1.27	1.02
×0.109	0.109	2.84	0.819	22.9	0.586	0.469	0.846	0.624	1.17	0.938
×0.083	0.083	2.19	0.630	30.1	0.461	0.369	0.855	0.485	0.922	0.738
×0.063 ^{f2}	0.063	1.66	0.479	40.0	0.356	0.285	0.862	0.371	0.711	0.569
×0.049 ^{c2,f2}	0.049	1.31	0.377	51.0	0.283	0.227	0.867	0.294	0.567	0.454
HSS2.375×0.180	0.180	4.30	1.24	13.2	0.753	0.634	0.779	0.869	1.51	1.27
×0.148	0.148	3.59	1.04	16.0	0.645	0.543	0.788	0.735	1.29	1.09
×0.120	0.120	2.95	0.850	19.8	0.542	0.456	0.799	0.611	1.08	0.912
×0.109	0.109	2.69	0.776	21.8	0.499	0.420	0.802	0.560	0.998	0.840
×0.083	0.083	2.07	0.598	28.6	0.393	0.331	0.811	0.436	0.786	0.662
×0.063 ^{f2}	0.063	1.57	0.454	38.0	0.304	0.256	0.818	0.334	0.608	0.512
×0.049 ^{c2,f2}	0.049	1.24	0.358	48.5	0.242	0.204	0.822	0.265	0.484	0.408
HSS2.25×0.180	0.180	4.06	1.17	12.5	0.632	0.562	0.735	0.773	1.26	1.12
×0.148	0.148	3.39	0.977	15.2	0.542	0.482	0.745	0.655	1.08	0.964
×0.120	0.120	2.78	0.803	18.8	0.457	0.406	0.754	0.545	0.914	0.812
×0.109	0.109	2.54	0.733	20.6	0.421	0.374	0.758	0.500	0.842	0.748
×0.083	0.083	1.96	0.565	27.1	0.332	0.295	0.767	0.390	0.664	0.590
×0.063 ^{f2}	0.063	1.49	0.430	36.0	0.257	0.228	0.773	0.299	0.514	0.456
HSS2×0.180	0.180	3.57	1.03	11.1	0.430	0.430	0.646	0.598	0.860	0.860
×0.148	0.148	2.99	0.861	13.5	0.372	0.372	0.657	0.509	0.744	0.744
×0.120	0.120	2.46	0.709	16.7	0.314	0.314	0.665	0.425	0.628	0.628
×0.109	0.109	2.25	0.648	18.3	0.290	0.290	0.669	0.390	0.580	0.580
×0.083	0.083	1.73	0.500	24.1	0.230	0.230	0.678	0.305	0.460	0.460
×0.063 ^{f2}	0.063	1.32	0.380	32.0	0.179	0.179	0.686	0.235	0.358	0.358
×0.049 ^{f2}	0.049	1.04	0.300	40.8	0.143	0.143	0.690	0.187	0.286	0.286
×0.035 ^{c2,f2}	0.035	0.749	0.216	57.1	0.104	0.104	0.694	0.135	0.208	0.208
HSS1.9×0.148	0.148	2.83	0.815	12.8	0.315	0.332	0.622	0.455	0.630	0.664
×0.120	0.120	2.33	0.671	15.8	0.267	0.281	0.631	0.381	0.534	0.562
×0.109	0.109	2.13	0.613	17.4	0.247	0.260	0.635	0.350	0.494	0.520
×0.083	0.083	1.64	0.474	22.9	0.196	0.206	0.643	0.274	0.392	0.412
×0.060	0.063	1.25	0.361	30.4	0.152	0.160	0.649	0.211	0.304	0.320
×0.049 ^{f2}	0.049	0.988	0.285	38.8	0.122	0.128	0.654	0.168	0.244	0.256
×0.035 ^{c2,f2}	0.035	0.711	0.205	54.3	0.089	0.094	0.660	0.122	0.178	0.188

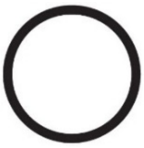
$^{c1/c2}$ Shape is slender for compression with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

$^{f1/f2}$ Shape exceeds compact limit for flexure with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

Note 1: Cold formed sections are available both in austenitic and duplex stainless steel.

Note 2: The design wall thickness is equal to the nominal wall thickness for stainless steel round HSS.

Table 1-8 (continued)
Round HSS
Dimensions and Properties



HSS1.75-
HSS1

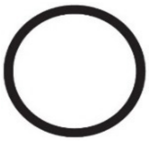
Shape	Wall Thickness, *t*	Nominal Wt.	Area, *A*	*D/t*	*I*	*S*	*r*	*Z*	Torsion	
									J	*C*
	in.	lb/ft	in.^{2}		in.^{4}	in.^{3}	in.	in.^{3}	in.^{4}	in.^{3}
HSS1.75×0.120	0.120	2.13	0.614	14.6	0.205	0.234	0.578	0.319	0.410	0.468
×0.109	0.109	1.95	0.562	16.1	0.190	0.217	0.581	0.294	0.380	0.434
×0.083	0.083	1.51	0.435	21.1	0.151	0.173	0.589	0.231	0.302	0.346
×0.063	0.063	1.15	0.331	28.0	0.118	0.135	0.597	0.178	0.236	0.270
×0.049 [f2]	0.049	0.908	0.262	35.7	0.095	0.108	0.602	0.142	0.190	0.216
×0.035 [c2,f2]	0.035	0.654	0.189	50.0	0.069	0.079	0.606	0.103	0.139	0.159
HSS1.66×0.148	0.148	2.44	0.703	11.2	0.203	0.245	0.537	0.339	0.406	0.490
×0.120	0.120	2.01	0.581	13.8	0.173	0.208	0.546	0.285	0.346	0.416
×0.109	0.109	1.84	0.531	15.2	0.160	0.193	0.549	0.263	0.320	0.386
×0.083	0.083	1.43	0.411	20.0	0.128	0.154	0.558	0.207	0.256	0.308
×0.063	0.063	1.09	0.314	26.6	0.100	0.120	0.564	0.160	0.200	0.240
HSS1.5×0.120	0.120	1.80	0.520	12.5	0.125	0.167	0.490	0.229	0.250	0.334
×0.109	0.109	1.65	0.476	13.8	0.116	0.155	0.494	0.211	0.232	0.310
×0.083	0.083	1.28	0.369	18.1	0.093	0.124	0.502	0.167	0.186	0.248
×0.063	0.063	0.979	0.282	24.0	0.073	0.097	0.509	0.129	0.146	0.195
×0.049	0.049	0.775	0.223	30.6	0.059	0.079	0.514	0.103	0.118	0.157
×0.035 [f2]	0.035	0.559	0.161	42.9	0.043	0.058	0.518	0.075	0.086	0.115
HSS1.25×0.120	0.120	1.48	0.426	10.4	0.069	0.110	0.402	0.154	0.138	0.220
×0.109	0.109	1.36	0.391	11.5	0.064	0.103	0.405	0.142	0.128	0.206
×0.083	0.083	1.06	0.304	15.1	0.052	0.083	0.414	0.113	0.104	0.167
×0.063	0.063	0.809	0.233	20.0	0.041	0.066	0.421	0.088	0.082	0.132
×0.049	0.049	0.641	0.185	25.5	0.033	0.053	0.425	0.071	0.067	0.107
×0.035 [f2]	0.035	0.463	0.134	35.7	0.025	0.040	0.429	0.052	0.049	0.079
HSS1×0.120	0.120	1.15	0.332	8.33	0.033	0.065	0.314	0.094	0.065	0.131
×0.109	0.109	1.06	0.305	9.17	0.031	0.061	0.317	0.087	0.061	0.123
×0.083	0.083	0.829	0.239	12.0	0.025	0.051	0.325	0.070	0.051	0.101
×0.065	0.065	0.662	0.191	15.4	0.021	0.042	0.332	0.057	0.042	0.084
×0.063	0.063	0.638	0.184	16.0	0.020	0.041	0.332	0.055	0.041	0.081
×0.049	0.049	0.508	0.146	20.4	0.017	0.033	0.337	0.044	0.033	0.066
×0.042	0.042	0.438	0.126	23.8	0.015	0.029	0.339	0.039	0.029	0.058
×0.035	0.035	0.368	0.106	28.6	0.012	0.025	0.342	0.033	0.025	0.050
×0.032 [f2]	0.032	0.337	0.097	31.3	0.011	0.023	0.342	0.030	0.023	0.046

[c1/c2] Shape is slender for compression with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

[f1/f2] Shape exceeds compact limit for flexure with *Fy* = 30 ksi and *Fy* = 65 ksi respectively.

Note 1: Cold formed sections are available both in austenitic and duplex stainless steel.

Note 2: The design wall thickness is equal to the nominal wall thickness for stainless steel round HSS.



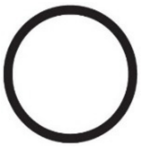
PIPE

Table 1-9
Pipe
Dimensions and Properties

Shape	Nominal Wt.	Dimensions		Wall Thickness	Area	*D/t*	*I*	*S*	*r*	*J*	*Z*
		Outside Diameter	Inside Diameter								
	lb/ft	in.	in.	in.	in.^{2}		in.^{4}	in.^{3}	in.	in.^{4}	in.^{3}
Standard Weight Pipe Schedule 5S											
Pipe 8 Std.	10.1	8.63	8.41	0.109	2.92	79.2	26.5	6.14	3.01	53.0	7.91
Pipe 6 Std.	7.74	6.63	6.41	0.109	2.23	60.8	11.9	3.59	2.31	23.8	4.64
Pipe 5 Std.	6.48	5.56	5.34	0.109	1.87	51.0	6.94	2.50	1.93	13.9	3.24
Pipe 4 Std.	3.99	4.50	4.33	0.083	1.15	54.2	2.81	1.25	1.56	5.62	1.62
Pipe 3½ Std.	3.54	4.00	3.83	0.083	1.02	48.2	1.96	0.980	1.39	3.92	1.27
Pipe 3 Std.	3.09	3.50	3.33	0.083	0.891	42.2	1.30	0.743	1.21	2.60	0.969
Pipe 2½ Std.	2.52	2.88	2.71	0.083	0.729	34.7	0.714	0.496	0.990	1.43	0.650
Pipe 2 Std.	1.64	2.38	2.25	0.065	0.473	36.6	0.317	0.266	0.819	0.634	0.348
Pipe 1½ Std.	1.30	1.90	1.77	0.065	0.375	29.2	0.158	0.166	0.649	0.316	0.219
Pipe 1¼ Std.	1.13	1.66	1.53	0.065	0.326	25.5	0.104	0.125	0.565	0.208	0.165
Pipe 1 Std.	0.885	1.32	1.19	0.065	0.256	20.3	0.051	0.077	0.445	0.101	0.102
Standard Weight Pipe Schedule 10S											
Pipe 12 Std.	24.7	12.8	12.4	0.180	7.14	71.1	142	22.2	4.46	284	28.7
Pipe 10 Std.	19.0	10.8	10.5	0.165	5.51	65.5	78.0	14.4	3.76	156	18.7
Pipe 8 Std.	13.7	8.63	8.33	0.148	3.94	58.3	35.5	8.23	3.00	71.0	10.6
Pipe 6 Std.	9.48	6.63	6.36	0.134	2.73	49.5	14.4	4.34	2.30	28.8	5.66
Pipe 5 Std.	7.93	5.56	5.29	0.134	2.28	41.5	8.41	3.03	1.92	16.8	3.95
Pipe 4 Std.	5.73	4.50	4.26	0.120	1.65	37.5	3.96	1.76	1.55	7.92	2.30
Pipe 3½ Std.	5.07	4.00	3.76	0.120	1.46	33.3	2.76	1.38	1.37	5.52	1.81
Pipe 3 Std.	4.42	3.50	3.26	0.120	1.27	29.2	1.82	1.04	1.20	3.64	1.37
Pipe 2½ Std.	3.60	2.88	2.64	0.120	1.04	24.0	0.993	0.690	0.977	1.99	0.915
Pipe 2 Std.	2.69	2.38	2.16	0.109	0.778	21.8	0.503	0.423	0.804	1.01	0.563
Pipe 1½ Std.	2.13	1.90	1.68	0.109	0.613	17.4	0.247	0.260	0.635	0.494	0.350
Pipe 1¼ Std.	1.84	1.66	1.44	0.109	0.531	15.2	0.160	0.193	0.549	0.320	0.263
Pipe 1 Std.	1.43	1.32	1.10	0.109	0.415	12.1	0.077	0.116	0.430	0.153	0.160
Standard Weight Pipe Schedule 40S											
Pipe 12 Std.	50.6	12.8	12.1	0.375	14.6	34.1	283	44.2	4.40	566	57.9
Pipe 10 Std.	41.3	10.8	10.1	0.365	12.0	29.6	163	30.2	3.69	326	39.8
Pipe 8 Std.	29.1	8.63	7.99	0.322	8.40	26.8	72.6	16.8	2.94	145	22.2
Pipe 6 Std.	19.4	6.63	6.07	0.280	5.59	23.7	28.2	8.51	2.25	56.4	11.3
Pipe 5 Std.	14.9	5.56	5.04	0.258	4.30	21.6	15.1	5.43	1.87	30.2	7.26
Pipe 4 Std.	11.0	4.50	4.03	0.237	3.17	19.0	7.23	3.21	1.51	14.5	4.31
Pipe 3½ Std.	9.29	4.00	3.55	0.226	2.68	17.7	4.79	2.40	1.34	9.58	3.22
Pipe 3 Std.	7.73	3.50	3.07	0.216	2.23	16.2	3.02	1.73	1.16	6.04	2.33
Pipe 2½ Std.	5.91	2.88	2.47	0.203	1.71	14.2	1.54	1.07	0.949	3.08	1.46
Pipe 2 Std.	3.73	2.38	2.07	0.154	1.08	15.5	0.670	0.563	0.788	1.34	0.764
Pipe 1½ Std.	2.77	1.90	1.61	0.145	0.799	13.1	0.310	0.326	0.623	0.620	0.448
Pipe 1¼ Std.	2.32	1.66	1.38	0.140	0.669	11.9	0.195	0.235	0.540	0.390	0.324
Pipe 1 Std.	1.71	1.32	1.05	0.133	0.496	9.92	0.088	0.134	0.422	0.177	0.188

Note: The design wall thickness is equal to the nominal wall thickness for stainless steel pipes.

Table 1-9 (continued)
Pipe
Dimensions and Properties



Shape	Nominal Wt.	Dimensions		Wall Thickness	Area	*D/t*	*I*	*S*	*r*	*J*	*Z*
		Outside Diameter	Inside Diameter								
	lb/ft	in.	in.	in.	in.^{2}		in.^{4}	in.^{3}	in.	in.^{4}	in.^{3}
Standard Weight Pipe Schedule 80S											
Pipe 8 Std.	44.3	8.63	7.63	0.500	12.8	17.3	106	24.6	2.88	212	33.1
Pipe 6 Std.	29.1	6.63	5.77	0.432	8.41	15.3	40.6	12.2	2.20	81.2	16.6
Pipe 5 Std.	21.2	5.56	4.81	0.375	6.11	14.8	20.6	7.41	1.84	41.2	10.1
Pipe 4 Std.	15.3	4.50	3.83	0.337	4.41	13.4	9.61	4.27	1.48	19.2	5.85
Pipe 3½ Std.	12.8	4.00	3.36	0.318	3.68	12.6	6.28	3.14	1.31	12.6	4.32
Pipe 3 Std.	10.5	3.50	2.90	0.300	3.02	11.7	3.89	2.22	1.13	7.78	3.08
Pipe 2½ Std.	7.82	2.88	2.33	0.276	2.26	10.4	1.94	1.35	0.927	3.88	1.88
Pipe 2 Std.	5.12	2.38	1.94	0.218	1.48	10.9	0.874	0.734	0.768	1.75	1.02
Pipe 1½ Std.	3.70	1.90	1.50	0.200	1.07	9.50	0.391	0.412	0.605	0.782	0.581
Pipe 1¼ Std.	3.06	1.66	1.28	0.191	0.881	8.69	0.242	0.292	0.524	0.484	0.414
Pipe 1 Std.	2.22	1.32	0.962	0.179	0.642	7.37	0.107	0.162	0.408	0.214	0.235

Note: The design wall thickness is equal to the nominal wall thickness for stainless steel pipes.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

PART 2: DESIGN OF FLEXURAL MEMBERS (F_y = 30 ksi)

Z_x

Table 2-1
W-Shapes (Welded)
Selection by Z_x

F_y = 30 ksi

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W24×131	**367**	**549**	**826**	**220**	**330**	**8.54**	**12.8**	**6.07**	**44.7**	**3990**	**160**	**240**
W24×117	**325**	**487**	**731**	**195**	**293**	**8.13**	**12.2**	**6.01**	**41.9**	**3510**	**144**	**217**
W21×122	305	457	686	183	274	6.71	10.1	5.95	46.8	2940	140	211
W24×104	**287**	**430**	**646**	**172**	**259**	**7.64**	**11.5**	**5.95**	**39.6**	**3080**	**130**	**195**
W21×111	276	413	621	166	250	6.48	9.74	5.93	44.0	2650	127	192
W24×94	**251**	**376**	**565**	**148**	**223**	**9.04**	**13.6**	**4.05**	**29.2**	**2670**	**135**	**203**
W21×101	251	376	565	152	228	6.25	9.39	5.91	41.8	2400	115	173
W18×106	229	343	515	137	206	5.02	7.55	5.44	46.5	1900	119	179
W24×84	**222**	**332**	**500**	**131**	**196**	**8.56**	**12.9**	**3.99**	**27.6**	**2340**	**122**	**183**
W21×93	219	328	493	128	192	7.55	11.4	3.77	30.2	2050	135	203
W18×97	210	314	473	126	189	4.91	7.38	5.42	43.8	1740	107	161
W14×120	210	314	473	127	190	2.63	3.96	7.66	79.0	1360	92.2	139
W24×76	**198**	**296**	**446**	**117**	**175**	**8.04**	**12.1**	**3.93**	**26.3**	**2070**	**113**	**170**
W16×100	197	295	443	117	176	4.06	6.10	5.13	48.9	1480	107	161
W21×83	194	290	437	114	171	7.24	10.9	3.73	28.1	1810	119	179
W14×109	190	284	428	115	173	2.61	3.92	7.64	72.5	1230	80.9	122
W18×86	185	277	416	111	167	4.73	7.11	5.38	40.4	1520	95.2	143
W24×68	**174**	**260**	**392**	**102**	**154**	**7.44**	**11.2**	**3.83**	**25.1**	**1800**	**106**	**159**
W16×89	174	260	392	104	156	3.99	5.99	5.09	44.4	1290	95.1	143
W14×99	171	256	385	104	157	2.55	3.84	7.60	67.0	1100	74.2	112
W21×73	170	254	383	100	151	6.78	10.2	3.71	26.4	1580	104	156
W18×76	162	243	365	97.7	147	4.47	6.72	5.34	37.7	1320	83.4	125
W12×106	162	243	365	96.3	145	2.04	3.06	6.37	78.2	925	84.8	127
W21×68	**158**	**237**	**356**	**93.0**	**140**	**6.56**	**9.86**	**3.69**	**25.6**	**1460**	**97.8**	**147**
W14×90 [f1]	155	229	345	95.0	143	2.52	3.78	8.59	62.0	987	66.4	99.8
W24x62	**151**	**226**	**340**	**86.2**	**130**	**8.49**	**12.8**	**2.81**	**19.3**	**1520**	**110**	**165**
W16×77	149	223	335	89.6	135	3.82	5.75	5.05	39.9	1100	80.9	122
W12×96	146	219	329	87.6	132	2.03	3.05	6.33	70.9	824	75.3	113
W18×71	144	216	324	84.9	128	5.36	8.05	3.48	27.9	1160	98.7	148
W21×62	**142**	**213**	**320**	**84.2**	**127**	**6.17**	**9.28**	**3.63**	**24.4**	**1310**	**90.5**	**136**
W14×82	137	205	308	82.2	124	2.80	4.21	5.09	49.0	870	78.6	118

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

F_y = 30 ksi

Table 2-1 (continued)

W-Shapes (Welded)

Selection by Z_x

Z_x

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W24×55	**132**	**198**	**297**	**75.4**	**113**	**7.83**	**11.8**	**2.75**	**18.4**	**1320**	**100**	**151**
W18×65	132	198	297	78.1	117	5.20	7.82	3.46	26.4	1060	89.2	134
W12×87	130	195	293	78.8	118	1.98	2.98	6.29	64.7	731	69.4	104
W16×67	129	193	290	78.1	117	3.64	5.47	5.03	36.6	947	69.4	104
W21×57	126	189	284	73.4	110	6.93	10.4	2.77	19.4	1150	92.1	138
W14×74	124	186	279	74.8	112	2.75	4.13	5.07	45.4	784	68.9	104
W18×60	122	183	275	72.1	108	5.06	7.60	3.44	25.3	974	81.4	122
W12×79	117	175	263	71.4	107	1.96	2.94	6.25	59.3	654	62.8	94.4
W14×68	113	169	254	68.0	102	2.69	4.04	5.05	42.6	711	62.6	94.1
W10×88	112	168	252	65.8	98.9	1.37	2.06	5.38	79.5	530	70.4	106
W18×55	**111**	**166**	**250**	**65.5**	**98.4**	**4.87**	**7.31**	**3.40**	**24.1**	**881**	**76.1**	**114**
W21×50	**108**	**162**	**243**	**62.4**	**93.8**	**6.43**	**9.66**	**2.67**	**18.1**	**964**	**85.2**	**128**
W12×72	106	159	239	64.7	97.2	1.93	2.90	6.23	55.0	588	57.0	85.7
W16×57	104	156	234	61.5	92.4	4.15	6.24	3.28	26.0	750	76.0	114
W14×61	100	150	225	61.0	91.6	2.59	3.89	5.03	39.3	628	56.2	84.4
W18×50	**99.6**	**149**	**224**	**59.1**	**88.9**	**4.58**	**6.88**	**3.38**	**23.0**	**790**	**68.9**	**104**
W10×77	96.7	145	218	57.4	86.3	1.35	2.03	5.34	69.9	451	60.6	91.0
W12×65	95.2	143	214	58.3	87.6	1.89	2.84	6.21	50.8	524	50.9	76.4
W21×44	**93.3**	**140**	**210**	**53.6**	**80.6**	**5.87**	**8.82**	**2.59**	**17.2**	**822**	**78.1**	**117**
W16×50	91.0	136	205	54.0	81.1	3.96	5.95	3.26	24.0	651	66.8	100
W18×46	89.5	134	201	52.4	78.8	5.10	7.66	2.65	18.7	702	70.2	106
W14×53	85.2	128	192	51.3	77.1	2.75	4.13	3.95	31.7	530	55.4	83.3
W12×58	84.7	127	191	51.6	77.6	1.96	2.95	5.15	43.5	467	47.3	71.2
W10×68	84.3	126	190	50.5	75.8	1.34	2.01	5.30	62.0	390	52.7	79.2
W16×45	81.3	122	183	48.4	72.7	3.77	5.67	3.22	22.7	579	59.9	90.0
W18×40	**77.2**	**116**	**174**	**45.3**	**68.1**	**4.68**	**7.04**	**2.61**	**17.6**	**602**	**60.8**	**91.3**
W14×48	76.5	115	172	46.2	69.5	2.66	3.99	3.93	29.7	473	50.6	76.0
W12×53	76.3	114	172	46.5	70.0	1.92	2.88	5.09	40.4	417	45.0	67.6
W10×60	73.6	110	166	44.4	66.7	1.32	1.98	5.25	55.3	337	46.2	69.4
W16×40	**71.9**	**108**	**162**	**43.0**	**64.6**	**3.53**	**5.30**	**3.20**	**21.5**	**511**	**52.6**	**79.1**
W12×50	70.7	106	159	42.6	64.0	2.06	3.10	4.03	34.7	385	48.7	73.1
W8×67	69.7	104	157	40.4	60.8	0.910	1.37	4.34	74.6	270	55.3	83.1
W14×43	67.7	101	152	41.1	61.8	2.53	3.80	3.89	27.7	416	45.0	67.7
W10×54	65.7	98.4	148	39.9	59.9	1.30	1.95	5.23	50.3	299	40.3	60.5

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Table 2-1 (continued)
W-Shapes (Welded)
Selection by Z_x

F_y = 30 ksi

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W18×35	**65.3**	**97.8**	**147**	**38.1**	**57.2**	**4.28**	**6.43**	**2.51**	**16.5**	**500**	**57.2**	**86.0**
W12×45	63.1	94.5	142	38.1	57.3	2.00	3.01	4.01	32.2	342	43.7	65.7
W16×36	62.9	94.2	142	37.5	56.3	3.28	4.93	3.12	20.4	441	50.6	76.0
W14×38	60.6	90.7	136	36.2	54.5	2.83	4.25	3.18	22.4	380	47.1	70.8
W10×49	59.4	88.9	134	36.2	54.5	1.27	1.92	5.21	46.5	268	36.6	55.0
W8×58	59.3	88.8	133	34.8	52.3	0.893	1.34	4.28	64.7	226	48.1	72.3
W12×40	56.1	84.0	126	34.2	51.3	1.92	2.88	4.01	30.0	303	37.8	56.9
W10×45	54.0	80.8	122	32.5	48.9	1.34	2.02	4.11	40.0	244	38.1	57.3
W14×34	**53.7**	**80.4**	**121**	**32.2**	**48.4**	**2.66**	**4.00**	**3.14**	**21.2**	**334**	**43.0**	**64.6**
W16×31	**53.0**	**79.3**	**119**	**31.1**	**46.8**	**3.56**	**5.35**	**2.38**	**15.9**	**367**	**47.1**	**70.8**
W12×35	50.7	75.9	114	30.4	45.8	2.23	3.35	3.14	23.5	283	40.4	60.8
W8×48	48.5	72.6	109	28.9	43.4	0.874	1.31	4.26	54.3	182	36.6	55.1
W14×30	**46.4**	**69.5**	**104**	**27.8**	**41.7**	**2.47**	**3.71**	**3.06**	**19.9**	**285**	**40.2**	**60.4**
W10×39	45.9	68.7	103	27.8	41.8	1.31	1.97	4.07	35.3	205	33.7	50.6
W16×26	**43.2**	**64.7**	**97.2**	**25.2**	**37.9**	**3.15**	**4.73**	**2.30**	**14.8**	**294**	**42.3**	**63.6**
W12×30	42.7	63.9	96.1	25.7	38.7	2.08	3.12	3.12	21.5	236	34.5	51.8
W14×26	**39.4**	**59.0**	**88.7**	**23.2**	**34.8**	**2.81**	**4.22**	**2.22**	**15.0**	**240**	**38.2**	**57.4**
W8×40	39.3	58.8	88.4	23.6	35.5	0.858	1.29	4.20	45.2	145	32.0	48.1
W10×33	37.9	56.7	85.3	23.0	34.6	1.25	1.88	3.99	30.9	166	30.4	45.7
W12×26	**36.8**	**55.1**	**82.8**	**22.2**	**33.4**	**1.92**	**2.89**	**3.08**	**20.2**	**202**	**30.2**	**45.5**
W10×30	36.2	54.2	81.5	21.6	32.5	1.58	2.38	2.81	23.4	168	34.0	51.0
W8×35	34.2	51.2	77.0	20.7	31.2	0.841	1.26	4.18	40.4	125	27.1	40.8
W14×22	**32.3**	**48.4**	**72.7**	**18.9**	**28.5**	**2.50**	**3.76**	**2.14**	**13.9**	**193**	**34.0**	**51.0**
W10×26	30.9	46.3	69.5	18.6	27.9	1.51	2.27	2.79	21.1	143	28.9	43.4
W8×31	29.9	44.8	67.3	18.3	27.4	0.823	1.24	4.13	36.3	108	24.6	36.9
W12×22	**28.9**	**43.3**	**65.0**	**16.8**	**25.3**	**2.44**	**3.67**	**1.74**	**12.6**	**154**	**34.5**	**51.8**
W8×28	26.7	40.0	60.1	16.1	24.2	0.863	1.30	3.32	31.0	96.4	24.8	37.2
W10×22	**25.7**	**38.5**	**57.8**	**15.4**	**23.2**	**1.41**	**2.12**	**2.71**	**19.0**	**117**	**26.4**	**39.7**
W12×19	**24.3**	**36.4**	**54.7**	**14.1**	**21.2**	**2.24**	**3.37**	**1.68**	**11.6**	**127**	**30.9**	**46.4**
W8×24	22.7	34.0	51.1	13.8	20.8	0.837	1.26	3.30	27.4	81.1	20.9	31.5

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

F_y = 30 ksi

Table 2-1 (continued)
W-Shapes (Welded)
Selection by Z_x

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W10×19	**21.2**	**31.7**	**47.7**	**12.5**	**18.7**	**1.64**	**2.47**	**1.79**	**13.5**	**94.6**	**27.5**	**41.3**
W8×21	20.1	30.1	45.2	12.1	18.1	0.962	1.45	2.59	21.3	74.2	22.3	33.5
W12×16	**19.6**	**29.3**	**44.1**	**11.3**	**16.9**	**1.99**	**2.99**	**1.59**	**10.7**	**100**	**28.5**	**42.8**
W6×25	18.8	28.1	42.3	11.2	16.8	0.510	0.767	3.12	36.4	53.0	22.0	33.1
W10×17	18.3	27.4	41.2	10.7	16.1	1.55	2.33	1.73	12.5	80.2	26.1	39.3
W12×14	**17.0**	**25.4**	**38.3**	**9.77**	**14.7**	**1.81**	**2.72**	**1.55**	**10.2**	**86.1**	**25.7**	**38.6**
W8×18	16.7	25.0	37.6	10.1	15.2	0.911	1.37	2.53	18.9	60.9	20.2	30.3
W10×15	15.6	23.4	35.1	9.09	13.7	1.43	2.16	1.66	11.6	67.2	24.8	37.2
W6×20	14.8	22.2	33.3	8.89	13.4	0.498	0.748	3.08	29.7	41.0	17.4	26.1
W8×15	13.3	19.9	29.9	7.81	11.7	0.988	1.48	1.80	14.0	47.0	21.4	32.2
W10×12	**12.3**	**18.4**	**27.7**	**7.14**	**10.7**	**1.24**	**1.87**	**1.62**	**10.7**	**52.2**	**20.2**	**30.4**
W6×16	11.5	17.2	25.9	6.80	10.2	0.542	0.815	1.98	21.2	31.8	17.6	26.5
W5×19	11.5	17.2	25.9	6.80	10.2	0.320	0.481	2.63	35.2	25.9	15.0	22.5
W8×13	11.1	16.6	25.0	6.50	9.77	0.915	1.37	1.74	12.8	38.5	19.8	29.8
W5×18.9	10.9	16.3	24.5	6.42	9.65	0.297	0.446	2.57	35.9	23.8	17.0	25.6
W6x15 [f1]	10.6	13.9	20.9	6.46	9.71	0.457	0.687	7.26	23.6	28.7	14.8	22.3
W5×16	9.47	14.2	21.3	5.67	8.52	0.311	0.467	2.59	30.0	21.1	13.0	19.5
W8×10	**8.59**	**12.9**	**19.3**	**5.09**	**7.64**	**0.798**	**1.20**	**1.73**	**11.5**	**29.8**	**14.5**	**21.7**
W6×12	8.16	12.2	18.4	4.84	7.28	0.514	0.773	1.88	16.2	21.7	14.9	22.5
W4×13	6.19	9.27	13.9	3.62	5.45	0.207	0.311	2.06	29.3	11.2	12.6	18.9
W6×9	**6.09**	**9.12**	**13.7**	**3.66**	**5.50**	**0.470**	**0.706**	**1.86**	**13.5**	**16.0**	**10.8**	**16.2**

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Z_y

Table 2-2
W-Shapes (Welded)
Selection by Z_y

F_y = 30 ksi

Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$	Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$	Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$
		kip-ft	*kip-ft*			*kip-ft*	*kip-ft*			*kip-ft*	*kip-ft*
	in.^{3}	ASD	LRFD		in.^{3}	ASD	LRFD		in.^{3}	ASD	LRFD
W14×120	**102**	**153**	**230**	**W10×60**	**34.9**	**52.2**	**78.5**	**W10×39**	**17.1**	**25.6**	**38.5**
				W21×93	34.6	51.8	77.9	W12×40	16.9	25.3	38.0
W14×109	**92.6**	**139**	**208**	W14×61	32.7	49.0	73.6	W18×50	16.5	24.7	37.1
				W24×84	32.6	48.8	73.4	W16×50	16.3	24.4	36.7
W14×99	**83.5**	**125**	**188**	W8×67	32.6	48.8	73.4				
W24×131	81.4	122	183					**W8×35**	**16.1**	**24.1**	**36.2**
W21×122	75.5	113	170	**W12×58**	**32.4**	**48.5**	**72.9**	W24×62	15.7	23.4	35.2
								W21×57	14.8	22.2	33.3
W14×90 [f1]	**75.5**	**111**	**167**	**W10×54**	**31.2**	**46.7**	**70.2**	W16×45	14.4	21.6	32.4
W12×106	74.9	112	169	W21×83	30.3	45.4	68.2				
W24×117	71.3	107	160					**W10×33**	**14.0**	**21.0**	**31.5**
W21×111	68.1	102	153	**W12×53**	**29.0**	**43.4**	**65.3**				
W12×96	67.4	101	152	W24×76	28.6	42.8	64.4	**W8×31**	**14.0**	**21.0**	**31.5**
W24×104	62.4	93.4	140					W24×55	13.3	19.9	29.8
W21×101	61.7	92.4	139	**W10×49**	**28.3**	**42.4**	**63.7**	W16×40	12.7	19.0	28.6
W18×106	60.4	90.4	136	W8×58	27.8	41.6	62.6	W21×50	12.1	18.1	27.2
				W21×73	26.5	39.7	59.6	W14×38	12.1	18.1	27.2
W12×87	**60.3**	**90.3**	**136**	W18×71	24.6	36.8	55.4	W18×46	11.7	17.5	26.3
W18×97	55.2	82.6	124	W24×68	24.5	36.7	55.1	W12×35	11.4	17.1	25.7
W16×100	54.8	82.0	123	W21×68	24.3	36.4	54.7	W16×36	10.8	16.2	24.3
								W14×34	10.6	15.9	23.9
W12×79	**54.2**	**81.1**	**122**	**W8×48**	**22.8**	**34.1**	**51.3**	W21×44	10.1	15.1	22.7
W10×88	53.0	79.3	119	W18×65	22.5	33.7	50.6				
				W14×53	21.9	32.8	49.3	**W8×28**	**10.1**	**15.1**	**22.7**
W12×72	**49.1**	**73.5**	**110**	W21×62	21.7	32.5	48.8	W18×40	9.92	14.9	22.3
W18×86	48.3	72.3	109	W12×50	21.3	31.9	47.9	W12×30	9.55	14.3	21.5
W16×89	48.0	71.9	108	W18×60	20.6	30.8	46.4	W14×30	8.96	13.4	20.2
W10×77	45.8	68.6	103					W10×30	8.82	13.2	19.8
W14×82	44.7	66.9	101	**W10×45**	**20.2**	**30.2**	**45.5**				
				W14×48	19.5	29.2	43.9	**W6×25**	**8.55**	**12.8**	**19.2**
W12×65	**44.0**	**65.9**	**99.0**								
W18×76	42.2	63.2	95.0	**W12×45**	**18.9**	**28.3**	**42.5**	**W8×24**	**8.54**	**12.8**	**19.2**
W16×77	41.1	61.5	92.5	W16×57	18.8	28.1	42.3	W12×26	8.15	12.2	18.3
W14×74	40.4	60.5	90.9	W18×55	18.5	27.7	41.6	W18×35	8.03	12.0	18.1
W10×68	40.0	59.9	90.0					W10×26	7.48	11.2	16.8
W24×94	37.4	56.0	84.2	**W8×40**	**18.5**	**27.7**	**41.6**	W16×31	7.00	10.5	15.8
W14×68	36.8	55.1	82.8	W14×43	17.2	25.7	38.7				
W16×67	35.4	53.0	79.7					**W6×20**	**6.71**	**10.0**	**15.1**
								W10×22	6.09	9.12	13.7
								W8×21	5.67	8.49	12.8
								W14×26	5.52	8.26	12.4

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

F_y = 30 ksi

Table 2-2 (continued)

W-Shapes (Welded)

Selection by Z_y

Z_y

Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$
		kip-ft	kip-ft
	in.^{3}	ASD	LRFD
W5×19	**5.52**	**8.26**	**12.4**
W16×26	5.45	8.16	12.3
W5×18.9	**5.31**	**7.95**	**11.9**
W6x15 [f1]	**4.74**	**5.81**	**8.73**
W8×18	4.65	6.96	10.5
W5×16	4.56	6.83	10.3
W14×22	4.36	6.53	9.81
W12×22	3.64	5.45	8.19
W6×16	3.38	5.06	7.61
W10×19	3.34	5.00	7.52
W12×19	2.97	4.45	6.68
W4×13	**2.91**	**4.36**	**6.55**
W10×17	2.79	4.18	6.28
W8×15	2.65	3.97	5.96
W6×12	**2.31**	**3.46**	**5.20**
W10×15	2.28	3.41	5.13
W12×16	2.25	3.37	5.06
W8×13	2.14	3.20	4.82
W12×14	1.89	2.83	4.25
W10×12	**1.73**	**2.59**	**3.89**
W6×9	**1.71**	**2.56**	**3.85**
W8×10	1.65	2.47	3.71

ASD	LFRD
Ω_b = 1.67 **Ω_v = 1.67**	**φ_b = 0.90** **φ_v = 0.90**

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

W24

Table 2-3
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W24×											
		131		117		104		94		84		76	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8												
	9												
	10									244	366	226	340
	11							270	406	242	363	216	324
	12							250	377	222	333	198	297
	13	320	480	288	434	260	390	231	348	205	307	182	274
	14	314	472	278	418	246	369	215	323	190	285	169	255
	15	293	440	259	390	229	344	200	301	177	266	158	238
	16	275	413	243	366	215	323	188	282	166	250	148	223
	17	259	389	229	344	202	304	177	266	156	235	139	210
	18	244	367	216	325	191	287	167	251	148	222	132	198
	19	231	348	205	308	181	272	158	238	140	210	125	188
	20	220	330	195	293	172	258	150	226	133	200	119	178
	21	209	315	185	279	164	246	143	215	127	190	113	170
	22	200	300	177	266	156	235	137	205	121	182	108	162
	23	191	287	169	254	149	225	131	196	116	174	103	155
	24	183	275	162	244	143	215	125	188	111	167	98.8	149
	25	176	264	156	234	137	207	120	181	106	160	94.9	143
	26	169	254	150	225	132	199	116	174	102	154	91.2	137
	27	163	245	144	217	127	191	111	167	98.5	148	87.8	132
	28	157	236	139	209	123	185	107	161	95.0	143	84.7	127
	29	152	228	134	202	119	178	104	156	91.7	138	81.8	123
	30	147	220	130	195	115	172	100	151	88.6	133	79.0	119
	32	137	206	122	183	107	161	93.9	141	83.1	125	74.1	111
	34	129	194	114	172	101	152	88.4	133	78.2	118	69.7	105
	36	122	184	108	163	95.5	144	83.5	126	73.9	111	65.9	99.0
	38	116	174	102	154	90.5	136	79.1	119	70.0	105	62.4	93.8
	40	110	165	97.3	146	85.9	129	75.1	113	66.5	99.9	59.3	89.1
	42	105	157	92.7	139	81.8	123	71.6	108	63.3	95.1	56.5	84.9
	44	99.9	150	88.5	133	78.1	117	68.3	103	60.4	90.8	53.9	81.0
	46	95.5	144	84.6	127	74.7	112	65.3	98.2	57.8	86.9	51.5	77.5
	48	91.6	138	81.1	122	71.6	108	62.6	94.1	55.4	83.3	49.4	74.3
	50	87.9	132	77.8	117	68.7	103	60.1	90.4	53.2	79.9	47.4	71.3
	52	84.5	127	74.9	113	66.1	99.3	57.8	86.9	51.1	76.8	45.6	68.5
	54	81.4	122	72.1	108	63.7	95.7	55.7	83.7	49.2	74.0	43.9	66.0
	56	78.5	118	69.5	104	61.4	92.3	53.7	80.7	47.5	71.4	42.3	63.6
	58	75.8	114	67.1	101	59.3	89.1	51.8	77.9	45.8	68.9	40.9	61.4
	60	73.3	110	64.9	97.5	57.3	86.1	50.1	75.3	44.3	66.6	39.5	59.4
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	4400	6610	3890	5850	3440	5170	3010	4520	2660	4000	2370	3560
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	549	826	487	731	430	646	376	565	332	500	296	446
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	220	330	195	293	172	259	148	223	131	196	117	175
BF/Ω_b	$\varphi_b BF$, kips	8.54	12.8	8.13	12.2	7.64	11.5	9.04	13.6	8.56	12.9	8.04	12.1
V_n/Ω_v	$\varphi_v V_{nx}$, kips	160	240	144	217	130	195	135	203	122	183	113	170
Z_x, in.^{3}		367		325		287		251		222		198	
L_p, ft		6.07		6.01		5.95		4.05		3.99		3.93	
L_r, ft		44.7		41.9		39.6		29.2		27.6		26.3	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W24-W21

Shape		W24×						W21×					
		68		62		55		122		111		101	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7					200	302						
	8			220	330	198	297						
	9	212	318	201	302	176	264						
	10	208	313	181	272	158	238						
	11	189	285	164	247	144	216						
	12	174	261	151	227	132	198						
	13	160	241	139	209	122	183	280	422	254	384	230	346
	14	149	224	129	194	113	170	261	392	236	355	215	323
	15	139	209	121	181	105	158	244	366	220	331	200	301
	16	130	196	113	170	98.8	149	228	343	207	311	188	282
	17	123	184	106	160	93.0	140	215	323	194	292	177	266
	18	116	174	100	151	87.8	132	203	305	184	276	167	251
	19	110	165	95.2	143	83.2	125	192	289	174	261	158	238
	20	104	157	90.4	136	79.0	119	183	275	165	248	150	226
	21	99.2	149	86.1	129	75.3	113	174	261	157	237	143	215
	22	94.7	142	82.2	124	71.9	108	166	250	150	226	137	205
	23	90.6	136	78.6	118	68.7	103	159	239	144	216	131	196
	24	86.8	131	75.3	113	65.9	99.0	152	229	138	207	125	188
	25	83.4	125	72.3	109	63.2	95.0	146	220	132	199	120	181
	26	80.1	120	69.6	105	60.8	91.4	140	211	127	191	116	174
	27	77.2	116	67.0	101	58.5	88.0	135	203	122	184	111	167
	28	74.4	112	64.6	97.1	56.5	84.9	130	196	118	177	107	161
	29	71.9	108	62.4	93.7	54.5	81.9	126	189	114	171	104	156
	30	69.5	104	60.3	90.6	52.7	79.2	122	183	110	166	100	151
	32	65.1	97.9	56.5	84.9	49.4	74.3	114	172	103	155	93.9	141
	34	61.3	92.1	53.2	79.9	46.5	69.9	107	161	97.2	146	88.4	133
	36	57.9	87.0	50.2	75.5	43.9	66.0	101	153	91.8	138	83.5	126
	38	54.8	82.4	47.6	71.5	41.6	62.5	96.1	144	87.0	131	79.1	119
	40	52.1	78.3	45.2	68.0	39.5	59.4	91.3	137	82.6	124	75.1	113
	42	49.6	74.6	43.1	64.7	37.6	56.6	87.0	131	78.7	118	71.6	108
	44	47.4	71.2	41.1	61.8	35.9	54.0	83.0	125	75.1	113	68.3	103
	46	45.3	68.1	39.3	59.1	34.4	51.7	79.4	119	71.9	108	65.3	98.2
	48	43.4	65.3	37.7	56.6	32.9	49.5	76.1	114	68.9	104	62.6	94.1
	50	41.7	62.6	36.2	54.4	31.6	47.5	73.1	110	66.1	99.4	60.1	90.4
	52	40.1	60.2	34.8	52.3	30.4	45.7	70.2	106	63.6	95.5	57.8	86.9
	54	38.6	58.0	33.5	50.3	29.3	44.0	67.6	102	61.2	92.0	55.7	83.7
	56	37.2	55.9	32.3	48.5	28.2	42.4	65.2	98.0	59.0	88.7	53.7	80.7
	58	35.9	54.0	31.2	46.9	27.3	41.0	63.0	94.7	57.0	85.7	51.8	77.9
	60	34.7	52.2	30.1	45.3	26.3	39.6	60.9	91.5	55.1	82.8	50.1	75.3
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2080	3130	1810	2720	1580	2380	3650	5490	3310	4970	3010	4520
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	260	392	226	340	198	297	457	686	413	621	376	565
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	102	154	86.2	130	75.4	113	183	274	166	250	152	228
BF/Ω_b	$\varphi_b BF$, kips	7.44	11.2	8.49	12.8	7.83	11.8	6.71	10.1	6.48	9.74	6.25	9.39
V_n/Ω_v	$\varphi_v V_{nx}$, kips	106	159	110	165	100	151	140	211	127	192	115	173
Z_x, in.^{3}		174		151		132		305		276		251	
L_p, ft		3.83		2.81		2.75		5.95		5.93		5.91	
L_r, ft		25.1		19.3		18.4		46.8		44.0		41.8	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W21

Table 2-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

F_y = 30 ksi

Shape		W21×											
		93		83		73		68		62		57	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8											184	276
	9	270	406	238	358	208	312	196	294	181	272	168	252
	10	262	394	232	349	204	306	189	284	170	256	151	227
	11	238	358	211	317	185	278	172	259	155	232	137	206
	12	219	329	194	291	170	255	158	237	142	213	126	189
	13	202	303	179	269	157	235	146	219	131	197	116	174
	14	187	282	166	249	145	219	135	203	121	183	108	162
	15	175	263	155	233	136	204	126	190	113	170	101	151
	16	164	246	145	218	127	191	118	178	106	160	94.3	142
	17	154	232	137	205	120	180	111	167	100	150	88.8	133
	18	146	219	129	194	113	170	105	158	94.5	142	83.8	126
	19	138	207	122	184	107	161	99.6	150	89.5	135	79.4	119
	20	131	197	116	175	102	153	94.6	142	85.0	128	75.4	113
	21	125	188	111	166	96.9	146	90.1	135	81.0	122	71.9	108
	22	119	179	106	159	92.5	139	86.0	129	77.3	116	68.6	103
	23	114	171	101	152	88.5	133	82.3	124	73.9	111	65.6	98.6
	24	109	164	96.8	146	84.8	128	78.8	119	70.9	107	62.9	94.5
	25	105	158	92.9	140	81.4	122	75.7	114	68.0	102	60.4	90.7
	26	101	152	89.4	134	78.3	118	72.8	109	65.4	98.3	58.0	87.2
	27	97.1	146	86.1	129	75.4	113	70.1	105	63.0	94.7	55.9	84.0
	28	93.7	141	83.0	125	72.7	109	67.6	102	60.7	91.3	53.9	81.0
	29	90.4	136	80.1	120	70.2	106	65.2	98.1	58.6	88.1	52.0	78.2
	30	87.4	131	77.4	116	67.9	102	63.1	94.8	56.7	85.2	50.3	75.6
	32	82.0	123	72.6	109	63.6	95.6	59.1	88.9	53.1	79.9	47.2	70.9
	34	77.1	116	68.3	103	59.9	90.0	55.7	83.6	50.0	75.2	44.4	66.7
	36	72.9	110	64.5	97.0	56.6	85.0	52.6	79.0	47.2	71.0	41.9	63.0
	38	69.0	104	61.1	91.9	53.6	80.5	49.8	74.8	44.8	67.3	39.7	59.7
	40	65.6	98.6	58.1	87.3	50.9	76.5	47.3	71.1	42.5	63.9	37.7	56.7
	42	62.4	93.9	55.3	83.1	48.5	72.9	45.1	67.7	40.5	60.9	35.9	54.0
	44	59.6	89.6	52.8	79.4	46.3	69.5	43.0	64.6	38.6	58.1	34.3	51.5
	46	57.0	85.7	50.5	75.9	44.3	66.5	41.1	61.8	37.0	55.6	32.8	49.3
	48	54.6	82.1	48.4	72.8	42.4	63.8	39.4	59.3	35.4	53.3	31.4	47.3
	50	52.5	78.8	46.5	69.8	40.7	61.2	37.8	56.9	34.0	51.1	30.2	45.4
	52	50.4	75.8	44.7	67.2	39.2	58.8	36.4	54.7	32.7	49.2	29.0	43.6
	54	48.6	73.0	43.0	64.7	37.7	56.7	35.0	52.7	31.5	47.3	27.9	42.0
	56	46.8	70.4	41.5	62.4	36.4	54.6	33.8	50.8	30.4	45.6	26.9	40.5
	58	45.2	68.0	40.1	60.2	35.1	52.8	32.6	49.0	29.3	44.1	26.0	39.1
	60	43.7	65.7	38.7	58.2	33.9	51.0	31.5	47.4	28.3	42.6	25.1	37.8
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2620	3940	2320	3490	2040	3060	1890	2840	1700	2560	1510	2270
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	328	493	290	437	254	383	237	356	213	320	189	284
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	128	192	114	171	100	151	93.0	140	84.2	127	73.4	110
BF/Ω_b	$\varphi_b BF$, kips	7.55	11.4	7.24	10.9	6.78	10.2	6.56	9.86	6.17	9.28	6.93	10.4
V_n/Ω_v	$\varphi_v V_{nx}$, kips	135	203	119	179	104	156	97.8	147	90.5	136	92.1	138
Z_x, in.^{3}		219		194		170		158		142		126	
L_p, ft		3.77		3.73		3.71		3.69		3.63		2.77	
L_r, ft		30.2		28.1		26.4		25.6		24.4		19.4	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W21-W18

Shape		W21×				W18×							
		50		44		106		97		86		76	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7	170	256	156	234								
	8	162	243	140	210								
	9	144	216	124	187								
	10	129	194	112	168								
	11	118	177	102	153	238	358	214	322	190	286	167	250
	12	108	162	93.1	140	229	344	210	315	185	278	162	243
	13	99.5	150	86.0	129	211	317	193	291	170	256	149	224
	14	92.4	139	79.8	120	196	294	180	270	158	238	139	208
	15	86.2	130	74.5	112	183	275	168	252	148	222	129	194
	16	80.8	122	69.8	105	171	258	157	236	138	208	121	182
	17	76.1	114	65.7	98.8	161	242	148	222	130	196	114	172
	18	71.9	108	62.1	93.3	152	229	140	210	123	185	108	162
	19	68.1	102	58.8	88.4	144	217	132	199	117	175	102	153
	20	64.7	97.2	55.9	84.0	137	206	126	189	111	167	97.0	146
	21	61.6	92.6	53.2	80.0	131	196	120	180	106	159	92.4	139
	22	58.8	88.4	50.8	76.3	125	187	114	172	101	151	88.2	133
	23	56.2	84.5	48.6	73.0	119	179	109	164	96.3	145	84.4	127
	24	53.9	81.0	46.6	70.0	114	172	105	158	92.3	139	80.8	122
	25	51.7	77.8	44.7	67.2	110	165	101	151	88.6	133	77.6	117
	26	49.7	74.8	43.0	64.6	105	159	96.7	145	85.2	128	74.6	112
	27	47.9	72.0	41.4	62.2	102	153	93.1	140	82.1	123	71.9	108
	28	46.2	69.4	39.9	60.0	97.9	147	89.8	135	79.1	119	69.3	104
	29	44.6	67.0	38.5	57.9	94.6	142	86.7	130	76.4	115	66.9	101
	30	43.1	64.8	37.2	56.0	91.4	137	83.8	126	73.9	111	64.7	97.2
	32	40.4	60.8	34.9	52.5	85.7	129	78.6	118	69.2	104	60.6	91.1
	34	38.0	57.2	32.9	49.4	80.7	121	74.0	111	65.2	97.9	57.1	85.8
	36	35.9	54.0	31.0	46.7	76.2	115	69.9	105	61.5	92.5	53.9	81.0
	38	34.0	51.2	29.4	44.2	72.2	108	66.2	99.5	58.3	87.6	51.1	76.7
	40	32.3	48.6	27.9	42.0	68.6	103	62.9	94.5	55.4	83.3	48.5	72.9
	42	30.8	46.3	26.6	40.0	65.3	98.1	59.9	90.0	52.8	79.3	46.2	69.4
	44	29.4	44.2	25.4	38.2	62.3	93.7	57.2	85.9	50.4	75.7	44.1	66.3
	46	28.1	42.3	24.3	36.5	59.6	89.6	54.7	82.2	48.2	72.4	42.2	63.4
	48	26.9	40.5	23.3	35.0	57.1	85.9	52.4	78.8	46.2	69.4	40.4	60.8
	50	25.9	38.9	22.3	33.6	54.9	82.4	50.3	75.6	44.3	66.6	38.8	58.3
	52	24.9	37.4	21.5	32.3	52.7	79.3	48.4	72.7	42.6	64.0	37.3	56.1
	54	24.0	36.0	20.7	31.1	50.8	76.3	46.6	70.0	41.0	61.7	35.9	54.0
	56	23.1	34.7	20.0	30.0	49.0	73.6	44.9	67.5	39.6	59.5	34.6	52.1
	58	22.3	33.5	19.3	29.0	47.3	71.1	43.4	65.2	38.2	57.4	33.5	50.3
	60	21.6	32.4	18.6	28.0	45.7	68.7	41.9	63.0	36.9	55.5	32.3	48.6
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1290	1940	1120	1680	2740	4120	2510	3780	2220	3330	1940	2920
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	162	243	140	210	343	515	314	473	277	416	243	365
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	62.4	93.8	53.6	80.6	137	206	126	189	111	167	97.7	147
BF/Ω_b	$\varphi_b BF$, kips	6.43	9.66	5.87	8.82	5.02	7.55	4.91	7.38	4.73	7.11	4.47	6.72
V_n/Ω_v	$\varphi_v V_{nx}$, kips	85.2	128	78.1	117	119	179	107	161	95.2	143	83.4	125
Z_x, in.^{3}		108		93.3		229		210		185		162	
L_p, ft		2.67		2.59		5.44		5.42		5.38		5.34	
L_r, ft		18.1		17.2		46.5		43.8		40.4		37.7	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W18

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W18×											
		71		65		60		55		50		46	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7											140	212
	8	197	296	178	268	163	244	152	228	138	208	134	201
	9	192	288	176	264	162	244	148	222	133	199	119	179
	10	172	259	158	238	146	220	133	200	119	179	107	161
	11	157	236	144	216	133	200	121	182	108	163	97.4	146
	12	144	216	132	198	122	183	111	167	99.4	149	89.3	134
	13	133	199	122	183	112	169	102	154	91.8	138	82.5	124
	14	123	185	113	170	104	157	95.0	143	85.2	128	76.6	115
	15	115	173	105	158	97.4	146	88.6	133	79.5	120	71.5	107
	16	108	162	98.8	149	91.3	137	83.1	125	74.6	112	67.0	101
	17	101	152	93.0	140	85.9	129	78.2	118	70.2	105	63.1	94.8
	18	95.8	144	87.8	132	81.2	122	73.9	111	66.3	99.6	59.5	89.5
	19	90.8	136	83.2	125	76.9	116	70.0	105	62.8	94.4	56.4	84.8
	20	86.2	130	79.0	119	73.1	110	66.5	99.9	59.6	89.6	53.6	80.6
	21	82.1	123	75.3	113	69.6	105	63.3	95.1	56.8	85.4	51.0	76.7
	22	78.4	118	71.9	108	66.4	99.8	60.4	90.8	54.2	81.5	48.7	73.2
	23	75.0	113	68.7	103	63.5	95.5	57.8	86.9	51.9	77.9	46.6	70.0
	24	71.9	108	65.9	99.0	60.9	91.5	55.4	83.3	49.7	74.7	44.7	67.1
	25	69.0	104	63.2	95.0	58.4	87.8	53.2	79.9	47.7	71.7	42.9	64.4
	26	66.3	99.7	60.8	91.4	56.2	84.5	51.1	76.8	45.9	69.0	41.2	62.0
	27	63.9	96.0	58.5	88.0	54.1	81.3	49.2	74.0	44.2	66.4	39.7	59.7
	28	61.6	92.6	56.5	84.9	52.2	78.4	47.5	71.4	42.6	64.0	38.3	57.5
	29	59.5	89.4	54.5	81.9	50.4	75.7	45.8	68.9	41.1	61.8	37.0	55.6
	30	57.5	86.4	52.7	79.2	48.7	73.2	44.3	66.6	39.8	59.8	35.7	53.7
	32	53.9	81.0	49.4	74.3	45.7	68.6	41.5	62.4	37.3	56.0	33.5	50.3
	34	50.7	76.2	46.5	69.9	43.0	64.6	39.1	58.8	35.1	52.7	31.5	47.4
	36	47.9	72.0	43.9	66.0	40.6	61.0	36.9	55.5	33.1	49.8	29.8	44.8
	38	45.4	68.2	41.6	62.5	38.4	57.8	35.0	52.6	31.4	47.2	28.2	42.4
	40	43.1	64.8	39.5	59.4	36.5	54.9	33.2	50.0	29.8	44.8	26.8	40.3
	42	41.1	61.7	37.6	56.6	34.8	52.3	31.7	47.6	28.4	42.7	25.5	38.4
	44	39.2	58.9	35.9	54.0	33.2	49.9	30.2	45.4	27.1	40.7	24.4	36.6
	46	37.5	56.3	34.4	51.7	31.8	47.7	28.9	43.4	25.9	39.0	23.3	35.0
	48	35.9	54.0	32.9	49.5	30.4	45.8	27.7	41.6	24.9	37.4	22.3	33.6
	50	34.5	51.8	31.6	47.5	29.2	43.9	26.6	40.0	23.9	35.9	21.4	32.2
	52	33.2	49.8	30.4	45.7	28.1	42.2	25.6	38.4	22.9	34.5	20.6	31.0
	54	31.9	48.0	29.3	44.0	27.1	40.7	24.6	37.0	22.1	33.2	19.8	29.8
	56	30.8	46.3	28.2	42.4	26.1	39.2	23.7	35.7	21.3	32.0	19.1	28.8
	58	29.7	44.7	27.3	41.0	25.2	37.9	22.9	34.4	20.6	30.9	18.5	27.8
	60	28.7	43.2	26.3	39.6	24.4	36.6	22.2	33.3	19.9	29.9	17.9	26.9
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1720	2590	1580	2380	1460	2200	1330	2000	1190	1790	1070	1610
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	216	324	198	297	183	275	166	250	149	224	134	201
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	84.9	128	78.1	117	72.1	108	65.5	98.4	59.1	88.9	52.4	78.8
BF/Ω_b	$\varphi_b BF$, kips	5.36	8.05	5.20	7.82	5.06	7.60	4.87	7.31	4.58	6.88	5.10	7.66
V_n/Ω_v	$\varphi_v V_{nx}$, kips	98.7	148	89.2	134	81.4	122	76.1	114	68.9	104	70.2	106
Z_x, in.^{3}		144		132		122		111		99.6		89.5	
L_p, ft		3.48		3.46		3.44		3.40		3.38		2.65	
L_r, ft		27.9		26.4		25.3		24.1		23.0		18.7	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W18-W16

Shape		W18×				W16×							
		40		35		100		89		77		67	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6			114	172								
	7	122	183	112	168								
	8	116	174	97.8	147								
	9	103	154	86.9	131								
	10	92.5	139	78.2	118			190	286				
	11	84.1	126	71.1	107	214	322	189	285	162	244	139	208
	12	77.0	116	65.2	98.0	197	296	174	261	149	224	129	194
	13	71.1	107	60.2	90.4	181	273	160	241	137	206	119	179
	14	66.0	99.3	55.9	84.0	169	253	149	224	127	192	110	166
	15	61.6	92.6	52.1	78.4	157	236	139	209	119	179	103	155
	16	57.8	86.9	48.9	73.5	147	222	130	196	112	168	96.6	145
	17	54.4	81.7	46.0	69.1	139	209	123	184	105	158	90.9	137
	18	51.4	77.2	43.4	65.3	131	197	116	174	99.1	149	85.8	129
	19	48.7	73.1	41.2	61.9	124	187	110	165	93.9	141	81.3	122
	20	46.2	69.5	39.1	58.8	118	177	104	157	89.2	134	77.2	116
	21	44.0	66.2	37.2	56.0	112	169	99.2	149	85.0	128	73.6	111
	22	42.0	63.2	35.5	53.4	107	161	94.7	142	81.1	122	70.2	106
	23	40.2	60.4	34.0	51.1	103	154	90.6	136	77.6	117	67.2	101
	24	38.5	57.9	32.6	49.0	98.3	148	86.8	131	74.4	112	64.4	96.8
	25	37.0	55.6	31.3	47.0	94.4	142	83.4	125	71.4	107	61.8	92.9
	26	35.6	53.4	30.1	45.2	90.7	136	80.1	120	68.6	103	59.4	89.3
	27	34.2	51.5	29.0	43.5	87.4	131	77.2	116	66.1	99.3	57.2	86.0
	28	33.0	49.6	27.9	42.0	84.3	127	74.4	112	63.7	95.8	55.2	82.9
	29	31.9	47.9	27.0	40.5	81.4	122	71.9	108	61.5	92.5	53.3	80.1
	30	30.8	46.3	26.1	39.2	78.6	118	69.5	104	59.5	89.4	51.5	77.4
	32	28.9	43.4	24.4	36.7	73.7	111	65.1	97.9	55.8	83.8	48.3	72.6
	34	27.2	40.9	23.0	34.6	69.4	104	61.3	92.1	52.5	78.9	45.4	68.3
	36	25.7	38.6	21.7	32.7	65.5	98.5	57.9	87.0	49.6	74.5	42.9	64.5
	38	24.3	36.6	20.6	30.9	62.1	93.3	54.8	82.4	47.0	70.6	40.7	61.1
	40	23.1	34.7	19.6	29.4	59.0	88.7	52.1	78.3	44.6	67.1	38.6	58.1
	42	22.0	33.1	18.6	28.0	56.2	84.4	49.6	74.6	42.5	63.9	36.8	55.3
	44	21.0	31.6	17.8	26.7	53.6	80.6	47.4	71.2	40.6	61.0	35.1	52.8
	46	20.1	30.2	17.0	25.6	51.3	77.1	45.3	68.1	38.8	58.3	33.6	50.5
	48	19.3	29.0	16.3	24.5	49.2	73.9	43.4	65.3	37.2	55.9	32.2	48.4
	50	18.5	27.8	15.6	23.5	47.2	70.9	41.7	62.6	35.7	53.6	30.9	46.4
	52	17.8	26.7	15.0	22.6	45.4	68.2	40.1	60.2	34.3	51.6	29.7	44.7
	54	17.1	25.7	14.5	21.8	43.7	65.7	38.6	58.0	33.0	49.7	28.6	43.0
	56	16.5	24.8	14.0	21.0	42.1	63.3	37.2	55.9	31.9	47.9	27.6	41.5
	58	15.9	24.0	13.5	20.3	40.7	61.1	35.9	54.0	30.8	46.2	26.6	40.0
	60	15.4	23.2	13.0	19.6	39.3	59.1	34.7	52.2	29.7	44.7	25.7	38.7
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	925	1390	782	1180	2360	3550	2080	3130	1780	2680	1540	2320
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	116	174	97.8	147	295	443	260	392	223	335	193	290
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	45.3	68.1	38.1	57.2	117	176	104	156	89.6	135	78.1	117
BF/Ω_b	$\varphi_b BF$, kips	4.68	7.04	4.28	6.43	4.06	6.10	3.99	5.99	3.82	5.75	3.64	5.47
V_n/Ω_v	$\varphi_v V_{nx}$, kips	60.8	91.3	57.2	86.0	107	161	95.1	143	80.9	122	69.4	104
Z_x, in.^{3}		77.2		65.3		197		174		149		129	
L_p, ft		2.61		2.51		5.13		5.09		5.05		5.03	
L_r, ft		17.6		16.5		48.9		44.4		39.9		36.6	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.


W16

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W16×											
		57		50		45		40		36		31	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6											94.2	142
	7									101	152	90.7	136
	8	152	228	134	200	120	180	105	158	94.2	142	79.3	119
	9	138	208	121	182	108	163	95.7	144	83.7	126	70.5	106
	10	125	187	109	164	97.4	146	86.1	129	75.3	113	63.5	95.4
	11	113	170	99.1	149	88.5	133	78.3	118	68.5	103	57.7	86.7
	12	104	156	90.8	137	81.1	122	71.8	108	62.8	94.4	52.9	79.5
	13	95.8	144	83.8	126	74.9	113	66.2	99.6	57.9	87.1	48.8	73.4
	14	89.0	134	77.8	117	69.5	105	61.5	92.4	53.8	80.9	45.3	68.1
	15	83.0	125	72.7	109	64.9	97.6	57.4	86.3	50.2	75.5	42.3	63.6
	16	77.8	117	68.1	102	60.9	91.5	53.8	80.9	47.1	70.8	39.7	59.6
	17	73.3	110	64.1	96.4	57.3	86.1	50.7	76.1	44.3	66.6	37.3	56.1
	18	69.2	104	60.5	91.0	54.1	81.3	47.8	71.9	41.8	62.9	35.3	53.0
	19	65.6	98.5	57.4	86.2	51.2	77.0	45.3	68.1	39.6	59.6	33.4	50.2
	20	62.3	93.6	54.5	81.9	48.7	73.2	43.1	64.7	37.7	56.6	31.7	47.7
	21	59.3	89.1	51.9	78.0	46.4	69.7	41.0	61.6	35.9	53.9	30.2	45.4
	22	56.6	85.1	49.5	74.5	44.3	66.5	39.1	58.8	34.2	51.5	28.9	43.4
	23	54.2	81.4	47.4	71.2	42.3	63.6	37.4	56.3	32.8	49.2	27.6	41.5
	24	51.9	78.0	45.4	68.3	40.6	61.0	35.9	53.9	31.4	47.2	26.4	39.8
	25	49.8	74.9	43.6	65.5	38.9	58.5	34.4	51.8	30.1	45.3	25.4	38.2
	26	47.9	72.0	41.9	63.0	37.4	56.3	33.1	49.8	29.0	43.5	24.4	36.7
	27	46.1	69.3	40.4	60.7	36.1	54.2	31.9	47.9	27.9	41.9	23.5	35.3
	28	44.5	66.9	38.9	58.5	34.8	52.3	30.8	46.2	26.9	40.4	22.7	34.1
	29	42.9	64.6	37.6	56.5	33.6	50.5	29.7	44.6	26.0	39.0	21.9	32.9
	30	41.5	62.4	36.3	54.6	32.5	48.8	28.7	43.1	25.1	37.7	21.2	31.8
	32	38.9	58.5	34.1	51.2	30.4	45.7	26.9	40.4	23.5	35.4	19.8	29.8
	34	36.6	55.1	32.1	48.2	28.6	43.0	25.3	38.1	22.2	33.3	18.7	28.1
	36	34.6	52.0	30.3	45.5	27.0	40.7	23.9	36.0	20.9	31.5	17.6	26.5
	38	32.8	49.3	28.7	43.1	25.6	38.5	22.7	34.1	19.8	29.8	16.7	25.1
	40	31.1	46.8	27.2	41.0	24.3	36.6	21.5	32.4	18.8	28.3	15.9	23.9
	42	29.7	44.6	25.9	39.0	23.2	34.8	20.5	30.8	17.9	27.0	15.1	22.7
	44	28.3	42.5	24.8	37.2	22.1	33.3	19.6	29.4	17.1	25.7	14.4	21.7
	46	27.1	40.7	23.7	35.6	21.2	31.8	18.7	28.1	16.4	24.6	13.8	20.7
	48	25.9	39.0	22.7	34.1	20.3	30.5	17.9	27.0	15.7	23.6	13.2	19.9
	50	24.9	37.4	21.8	32.8	19.5	29.3	17.2	25.9	15.1	22.6	12.7	19.1
	52	24.0	36.0	21.0	31.5	18.7	28.1	16.6	24.9	14.5	21.8	12.2	18.3
	54	23.1	34.7	20.2	30.3	18.0	27.1	15.9	24.0	13.9	21.0	11.8	17.7
	56	22.2	33.4	19.5	29.3	17.4	26.1	15.4	23.1	13.5	20.2	11.3	17.0
	58	21.5	32.3	18.8	28.2	16.8	25.2	14.8	22.3	13.0	19.5	10.9	16.4
	60	20.8	31.2	18.2	27.3	16.2	24.4	14.4	21.6	12.6	18.9	10.6	15.9
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1250	1870	1090	1640	974	1460	861	1290	753	1130	635	954
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	156	234	136	205	122	183	108	162	94.2	142	79.3	119
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	61.5	92.4	54.0	81.1	48.4	72.7	43.0	64.6	37.5	56.3	31.1	46.8
BF/Ω_b	$\varphi_b BF$, kips	4.15	6.24	3.96	5.95	3.77	5.67	3.53	5.30	3.28	4.93	3.56	5.35
V_n/Ω_v	$\varphi_v V_{nx}$, kips	76.0	114	66.8	100	59.9	90.0	52.6	79.1	50.6	76.0	47.1	70.8
Z_x, in.^{3}		104		91.0		81.3		71.9		62.9		53.0	
L_p, ft		3.28		3.26		3.22		3.20		3.12		2.38	
L_r, ft		26.0		24.0		22.7		21.5		20.4		15.9	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W16-W14

Shape		W16×		W14×									
		26		120		109		99		90 [f1]		82	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6	84.6	127										
	7	73.9	111										
	8	64.7	97.2										
	9	57.5	86.4										
	10	51.7	77.8									157	236
	11	47.0	70.7									149	224
	12	43.1	64.8									137	206
	13	39.8	59.8	184	278			148	224	133	200	126	190
	14	37.0	55.5	180	270	162	244	146	220	131	197	117	176
	15	34.5	51.8	168	252	152	228	137	205	122	184	109	164
	16	32.3	48.6	157	236	142	214	128	192	115	172	103	154
	17	30.4	45.7	148	222	134	201	120	181	108	162	96.5	145
	18	28.7	43.2	140	210	126	190	114	171	102	153	91.2	137
	19	27.2	40.9	132	199	120	180	108	162	96.6	145	86.4	130
	20	25.9	38.9	126	189	114	171	102	154	91.8	138	82.0	123
	21	24.6	37.0	120	180	108	163	97.5	147	87.4	131	78.1	117
	22	23.5	35.3	114	172	103	155	93.1	140	83.4	125	74.6	112
	23	22.5	33.8	109	164	98.9	149	89.0	134	79.8	120	71.3	107
	24	21.6	32.4	105	158	94.8	143	85.3	128	76.5	115	68.4	103
	25	20.7	31.1	101	151	91.0	137	81.9	123	73.4	110	65.6	98.6
	26	19.9	29.9	96.7	145	87.5	132	78.8	118	70.6	106	63.1	94.8
	27	19.2	28.8	93.1	140	84.3	127	75.8	114	68.0	102	60.8	91.3
	28	18.5	27.8	89.8	135	81.3	122	73.1	110	65.6	98.5	58.6	88.1
	29	17.8	26.8	86.7	130	78.5	118	70.6	106	63.3	95.1	56.6	85.0
	30	17.2	25.9	83.8	126	75.8	114	68.3	103	61.2	92.0	54.7	82.2
	32	16.2	24.3	78.6	118	71.1	107	64.0	96.2	57.4	86.2	51.3	77.1
	34	15.2	22.9	74.0	111	66.9	101	60.2	90.5	54.0	81.2	48.3	72.5
	36	14.4	21.6	69.9	105	63.2	95.0	56.9	85.5	51.0	76.6	45.6	68.5
	38	13.6	20.5	66.2	99.5	59.9	90.0	53.9	81.0	48.3	72.6	43.2	64.9
	40	12.9	19.4	62.9	94.5	56.9	85.5	51.2	77.0	45.9	69.0	41.0	61.7
	42	12.3	18.5	59.9	90.0	54.2	81.4	48.8	73.3	43.7	65.7	39.1	58.7
	44	11.8	17.7	57.2	85.9	51.7	77.7	46.5	70.0	41.7	62.7	37.3	56.0
	46	11.2	16.9	54.7	82.2	49.5	74.3	44.5	66.9	39.9	60.0	35.7	53.6
	48	10.8	16.2	52.4	78.8	47.4	71.3	42.7	64.1	38.2	57.5	34.2	51.4
	50	10.3	15.6	50.3	75.6	45.5	68.4	41.0	61.6	36.7	55.2	32.8	49.3
	52	10.0	15.0	48.4	72.7	43.8	65.8	39.4	59.2	35.3	53.1	31.6	47.4
	54	9.58	14.4	46.6	70.0	42.1	63.3	37.9	57.0	34.0	51.1	30.4	45.7
	56	9.24	13.9	44.9	67.5	40.6	61.1	36.6	55.0	32.8	49.3	29.3	44.0
	58	8.92	13.4	43.4	65.2	39.2	59.0	35.3	53.1	31.7	47.6	28.3	42.5
	60	8.62	13.0	41.9	63.0	37.9	57.0	34.1	51.3	30.6	46.0	27.3	41.1
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	517	778	2510	3780	2280	3420	2050	3080	1840	2760	1640	2470
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	64.7	97.2	314	473	284	428	256	385	229	345	205	308
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	25.2	37.9	127	190	115	173	104	157	95.0	143	82.2	124
BF/Ω_b	$\varphi_b BF$, kips	3.15	4.73	2.63	3.96	2.61	3.92	2.55	3.84	2.52	3.78	2.80	4.21
V_n/Ω_v	$\varphi_v V_{nx}$, kips	42.3	63.6	92.2	139	80.9	122	74.2	112	66.4	99.8	78.6	118
Z_x, in.^{3}		43.2		210		190		171		155		137	
L_p, ft		2.30		7.66		7.64		7.60		8.59		5.09	
L_r, ft		14.8		79.0		72.5		67.0		62.0		49.0	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W14

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		**W14×**											
		74		**68**		**61**		**53**		**48**		**43**	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**4**												
	5												
	6												
	7												
	8												
	9							111	167	101	152	90.0	135
	10	138	208	125	188	112	169	102	153	91.6	138	81.1	122
	11	135	203	123	185	109	164	92.8	139	83.3	125	73.7	111
	12	124	186	113	170	99.8	150	85.0	128	76.3	115	67.6	102
	13	114	172	104	156	92.1	138	78.5	118	70.5	106	62.4	93.7
	14	106	159	96.7	145	85.5	129	72.9	110	65.4	98.4	57.9	87.0
	15	99.0	149	90.2	136	79.8	120	68.0	102	61.1	91.8	54.1	81.2
	16	92.8	140	84.6	127	74.9	113	63.8	95.9	57.3	86.1	50.7	76.2
	17	87.4	131	79.6	120	70.4	106	60.0	90.2	53.9	81.0	47.7	71.7
	18	82.5	124	75.2	113	66.5	100	56.7	85.2	50.9	76.5	45.0	67.7
	19	78.2	117	71.2	107	63.0	94.7	53.7	80.7	48.2	72.5	42.7	64.1
	20	74.3	112	67.7	102	59.9	90.0	51.0	76.7	45.8	68.9	40.5	60.9
	21	70.7	106	64.4	96.9	57.0	85.7	48.6	73.0	43.6	65.6	38.6	58.0
	22	67.5	101	61.5	92.5	54.4	81.8	46.4	69.7	41.6	62.6	36.9	55.4
	23	64.6	97.0	58.8	88.4	52.1	78.3	44.4	66.7	39.8	59.9	35.3	53.0
	24	61.9	93.0	56.4	84.8	49.9	75.0	42.5	63.9	38.2	57.4	33.8	50.8
	25	59.4	89.3	54.1	81.4	47.9	72.0	40.8	61.3	36.6	55.1	32.4	48.7
	26	57.1	85.8	52.0	78.2	46.1	69.2	39.2	59.0	35.2	53.0	31.2	46.9
	27	55.0	82.7	50.1	75.3	44.4	66.7	37.8	56.8	33.9	51.0	30.0	45.1
	28	53.0	79.7	48.3	72.6	42.8	64.3	36.4	54.8	32.7	49.2	29.0	43.5
	29	51.2	77.0	46.7	70.1	41.3	62.1	35.2	52.9	31.6	47.5	28.0	42.0
	30	49.5	74.4	45.1	67.8	39.9	60.0	34.0	51.1	30.5	45.9	27.0	40.6
	32	46.4	69.8	42.3	63.6	37.4	56.3	31.9	47.9	28.6	43.0	25.3	38.1
	34	43.7	65.6	39.8	59.8	35.2	52.9	30.0	45.1	26.9	40.5	23.8	35.8
	36	41.3	62.0	37.6	56.5	33.3	50.0	28.3	42.6	25.4	38.3	22.5	33.9
	38	39.1	58.7	35.6	53.5	31.5	47.4	26.9	40.4	24.1	36.2	21.3	32.1
	40	37.1	55.8	33.8	50.9	29.9	45.0	25.5	38.3	22.9	34.4	20.3	30.5
	42	35.4	53.1	32.2	48.4	28.5	42.9	24.3	36.5	21.8	32.8	19.3	29.0
	44	33.8	50.7	30.8	46.2	27.2	40.9	23.2	34.9	20.8	31.3	18.4	27.7
	46	32.3	48.5	29.4	44.2	26.0	39.1	22.2	33.3	19.9	29.9	17.6	26.5
	48	30.9	46.5	28.2	42.4	25.0	37.5	21.3	32.0	19.1	28.7	16.9	25.4
	50	29.7	44.6	27.1	40.7	24.0	36.0	20.4	30.7	18.3	27.5	16.2	24.4
	52	28.6	42.9	26.0	39.1	23.0	34.6	19.6	29.5	17.6	26.5	15.6	23.4
	54	27.5	41.3	25.1	37.7	22.2	33.3	18.9	28.4	17.0	25.5	15.0	22.6
	56	26.5	39.9	24.2	36.3	21.4	32.1	18.2	27.4	16.4	24.6	14.5	21.8
	58	25.6	38.5	23.3	35.1	20.6	31.0	17.6	26.4	15.8	23.7	14.0	21.0
	60	24.8	37.2	22.6	33.9	20.0	30.0	17.0	25.6	15.3	23.0	13.5	20.3
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1490	2230	1350	2030	1200	1800	1020	1530	916	1380	811	1220
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	186	279	169	254	150	225	128	192	115	172	101	152
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	74.8	112	68.0	102	61.0	91.6	51.3	77.1	46.2	69.5	41.1	61.8
BF/Ω_b	$\varphi_b BF$, kips	2.75	4.13	2.69	4.04	2.59	3.89	2.75	4.13	2.66	3.99	2.53	3.80
V_n/Ω_v	$\varphi_v V_{nx}$, kips	68.9	104	62.6	94.1	56.2	84.4	55.4	83.3	50.6	76.0	45.0	67.7
Z_x, in.^{3}		124		113		100		85.2		76.5		67.7	
L_p, ft		5.07		5.05		5.03		3.95		3.93		3.89	
L_r, ft		45.4		42.6		39.3		31.7		29.7		27.7	

ASD	**LFRD**
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W14-W12

Shape		W14×										W12×	
		38		34		30		26		22		106	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5									68.0	102		
	6					80.4	121	76.4	115	64.5	96.9		
	7	94.2	142	86.0	129	79.4	119	67.4	101	55.3	83.1		
	8	90.7	136	80.4	121	69.5	104	59.0	88.7	48.4	72.7		
	9	80.6	121	71.5	107	61.7	92.8	52.4	78.8	43.0	64.6		
	10	72.6	109	64.3	96.7	55.6	83.5	47.2	70.9	38.7	58.1		
	11	66.0	99.2	58.5	87.9	50.5	75.9	42.9	64.5	35.2	52.9	170	254
	12	60.5	90.9	53.6	80.6	46.3	69.6	39.3	59.1	32.2	48.5	162	243
	13	55.8	83.9	49.5	74.4	42.7	64.2	36.3	54.6	29.8	44.7	149	224
	14	51.8	77.9	45.9	69.0	39.7	59.7	33.7	50.7	27.6	41.5	139	208
	15	48.4	72.7	42.9	64.4	37.0	55.7	31.5	47.3	25.8	38.8	129	194
	16	45.4	68.2	40.2	60.4	34.7	52.2	29.5	44.3	24.2	36.3	121	182
	17	42.7	64.2	37.8	56.9	32.7	49.1	27.8	41.7	22.8	34.2	114	172
	18	40.3	60.6	35.7	53.7	30.9	46.4	26.2	39.4	21.5	32.3	108	162
	19	38.2	57.4	33.8	50.9	29.2	44.0	24.8	37.3	20.4	30.6	102	153
	20	36.3	54.5	32.2	48.3	27.8	41.8	23.6	35.5	19.3	29.1	97.0	146
	21	34.6	51.9	30.6	46.0	26.5	39.8	22.5	33.8	18.4	27.7	92.4	139
	22	33.0	49.6	29.2	43.9	25.3	38.0	21.4	32.2	17.6	26.4	88.2	133
	23	31.6	47.4	28.0	42.0	24.2	36.3	20.5	30.8	16.8	25.3	84.4	127
	24	30.2	45.5	26.8	40.3	23.2	34.8	19.7	29.6	16.1	24.2	80.8	122
	25	29.0	43.6	25.7	38.7	22.2	33.4	18.9	28.4	15.5	23.3	77.6	117
	26	27.9	42.0	24.7	37.2	21.4	32.1	18.1	27.3	14.9	22.4	74.6	112
	27	26.9	40.4	23.8	35.8	20.6	30.9	17.5	26.3	14.3	21.5	71.9	108
	28	25.9	39.0	23.0	34.5	19.8	29.8	16.9	25.3	13.8	20.8	69.3	104
	29	25.0	37.6	22.2	33.3	19.2	28.8	16.3	24.5	13.3	20.0	66.9	101
	30	24.2	36.4	21.4	32.2	18.5	27.8	15.7	23.6	12.9	19.4	64.7	97.2
	32	22.7	34.1	20.1	30.2	17.4	26.1	14.7	22.2	12.1	18.2	60.6	91.1
	34	21.3	32.1	18.9	28.4	16.3	24.6	13.9	20.9	11.4	17.1	57.1	85.8
	36	20.2	30.3	17.9	26.9	15.4	23.2	13.1	19.7	10.7	16.2	53.9	81.0
	38	19.1	28.7	16.9	25.4	14.6	22.0	12.4	18.7	10.2	15.3	51.1	76.7
	40	18.1	27.3	16.1	24.2	13.9	20.9	11.8	17.7	9.67	14.5	48.5	72.9
	42	17.3	26.0	15.3	23.0	13.2	19.9	11.2	16.9	9.21	13.8	46.2	69.4
	44	16.5	24.8	14.6	22.0	12.6	19.0	10.7	16.1	8.79	13.2	44.1	66.3
	46	15.8	23.7	14.0	21.0	12.1	18.2	10.3	15.4	8.41	12.6	42.2	63.4
	48	15.1	22.7	13.4	20.1	11.6	17.4	9.83	14.8	8.06	12.1	40.4	60.8
	50	14.5	21.8	12.9	19.3	11.1	16.7	9.44	14.2	7.74	11.6	38.8	58.3
	52	14.0	21.0	12.4	18.6	10.7	16.1	9.07	13.6	7.44	11.2	37.3	56.1
	54	13.4	20.2	11.9	17.9	10.3	15.5	8.74	13.1	7.16	10.8	35.9	54.0
	56	13.0	19.5	11.5	17.3	9.92	14.9	8.43	12.7	6.91	10.4	34.6	52.1
	58	12.5	18.8	11.1	16.7	9.58	14.4	8.14	12.2	6.67	10.0	33.5	50.3
	60	12.1	18.2	10.7	16.1	9.26	13.9	7.86	11.8	6.45	9.69	32.3	48.6

Beam Properties

ASD	LRFD	38 ASD	38 LRFD	34 ASD	34 LRFD	30 ASD	30 LRFD	26 ASD	26 LRFD	22 ASD	22 LRFD	106 ASD	106 LRFD
W_c/Ω_b	$\varphi_b W_c$, kip-ft	726	1090	643	967	556	835	472	709	387	581	1940	2920
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	90.7	136	80.4	121	69.5	104	59.0	88.7	48.4	72.7	243	365
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	36.2	54.5	32.2	48.4	27.8	41.7	23.2	34.8	18.9	28.5	96.3	145
BF/Ω_b	$\varphi_b BF$, kips	2.83	4.25	2.66	4.00	2.47	3.71	2.81	4.22	2.50	3.76	2.04	3.06
V_n/Ω_v	$\varphi_v V_{nx}$, kips	47.1	70.8	43.0	64.6	40.2	60.4	38.2	57.4	34.0	51.0	84.8	127

	38	34	30	26	22	106
Z_x, in.^{3}	60.6	53.7	46.4	39.4	32.3	162
L_p, ft	3.18	3.14	3.06	2.22	2.14	6.37
L_r, ft	22.4	21.2	19.9	15.0	13.9	78.2

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W12

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W12×											
		96		87		79		72		65		58	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8												
	9												
	10											94.6	142
	11	151	226	139	208	126	189	114	171	102	153	92.2	139
	12	146	219	130	195	117	176	106	159	95.0	143	84.5	127
	13	135	202	120	180	108	162	97.7	147	87.7	132	78.0	117
	14	125	188	111	167	100	150	90.7	136	81.4	122	72.5	109
	15	117	175	104	156	93.4	140	84.6	127	76.0	114	67.6	102
	16	109	164	97.3	146	87.6	132	79.3	119	71.3	107	63.4	95.3
	17	103	155	91.6	138	82.4	124	74.7	112	67.1	101	59.7	89.7
	18	97.1	146	86.5	130	77.8	117	70.5	106	63.3	95.2	56.4	84.7
	19	92.0	138	81.9	123	73.7	111	66.8	100	60.0	90.2	53.4	80.2
	20	87.4	131	77.8	117	70.1	105	63.5	95.4	57.0	85.7	50.7	76.2
	21	83.3	125	74.1	111	66.7	100	60.5	90.9	54.3	81.6	48.3	72.6
	22	79.5	119	70.8	106	63.7	95.7	57.7	86.7	51.8	77.9	46.1	69.3
	23	76.0	114	67.7	102	60.9	91.6	55.2	83.0	49.6	74.5	44.1	66.3
	24	72.9	110	64.9	97.5	58.4	87.8	52.9	79.5	47.5	71.4	42.3	63.5
	25	69.9	105	62.3	93.6	56.0	84.2	50.8	76.3	45.6	68.5	40.6	61.0
	26	67.3	101	59.9	90.0	53.9	81.0	48.8	73.4	43.9	65.9	39.0	58.6
	27	64.8	97.3	57.7	86.7	51.9	78.0	47.0	70.7	42.2	63.5	37.6	56.5
	28	62.4	93.9	55.6	83.6	50.0	75.2	45.3	68.1	40.7	61.2	36.2	54.5
	29	60.3	90.6	53.7	80.7	48.3	72.6	43.8	65.8	39.3	59.1	35.0	52.6
	30	58.3	87.6	51.9	78.0	46.7	70.2	42.3	63.6	38.0	57.1	33.8	50.8
	32	54.6	82.1	48.7	73.1	43.8	65.8	39.7	59.6	35.6	53.6	31.7	47.6
	34	51.4	77.3	45.8	68.8	41.2	61.9	37.3	56.1	33.5	50.4	29.8	44.8
	36	48.6	73.0	43.2	65.0	38.9	58.5	35.3	53.0	31.7	47.6	28.2	42.4
	38	46.0	69.2	41.0	61.6	36.9	55.4	33.4	50.2	30.0	45.1	26.7	40.1
	40	43.7	65.7	38.9	58.5	35.0	52.7	31.7	47.7	28.5	42.8	25.4	38.1
	42	41.6	62.6	37.1	55.7	33.4	50.1	30.2	45.4	27.1	40.8	24.2	36.3
	44	39.7	59.7	35.4	53.2	31.8	47.9	28.9	43.4	25.9	38.9	23.1	34.7
	46	38.0	57.1	33.8	50.9	30.5	45.8	27.6	41.5	24.8	37.3	22.1	33.1
	48	36.4	54.8	32.4	48.8	29.2	43.9	26.4	39.8	23.8	35.7	21.1	31.8
	50	35.0	52.6	31.1	46.8	28.0	42.1	25.4	38.2	22.8	34.3	20.3	30.5
	52	33.6	50.5	29.9	45.0	26.9	40.5	24.4	36.7	21.9	33.0	19.5	29.3
	54	32.4	48.7	28.8	43.3	25.9	39.0	23.5	35.3	21.1	31.7	18.8	28.2
	56	31.2	46.9	27.8	41.8	25.0	37.6	22.7	34.1	20.4	30.6	18.1	27.2
	58	30.1	45.3	26.8	40.3	24.2	36.3	21.9	32.9	19.7	29.5	17.5	26.3
	60	29.1	43.8	25.9	39.0	23.4	35.1	21.2	31.8	19.0	28.6	16.9	25.4
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1750	2630	1560	2340	1400	2110	1270	1910	1140	1710	1010	1520
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	219	329	195	293	175	263	159	239	143	214	127	191
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	87.6	132	78.8	118	71.4	107	64.7	97.2	58.3	87.6	51.6	77.6
BF/Ω_b	$\varphi_b BF$, kips	2.03	3.05	1.98	2.98	1.96	2.94	1.93	2.90	1.89	2.84	1.96	2.95
V_n/Ω_v	$\varphi_v V_{nx}$, kips	75.3	113	69.4	104	62.8	94.4	57.0	85.7	50.9	76.4	47.3	71.2
Z_x, in.^{3}		146		130		117		106		95.2		84.7	
L_p, ft		6.33		6.29		6.25		6.23		6.21		5.15	
L_r, ft		70.9		64.7		59.3		55.0		50.8		43.5	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W12

Shape		W12×											
		53		50		45		40		35		30	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7									80.8	122	69.0	104
	8			97.4	146	87.4	131	75.6	114	75.9	114	63.9	96.1
	9			94.1	141	84.0	126	74.7	112	67.5	101	56.8	85.4
	10	90.0	135	84.7	127	75.6	114	67.2	101	60.7	91.3	51.1	76.9
	11	83.1	125	77.0	116	68.7	103	61.1	91.8	55.2	83.0	46.5	69.9
	12	76.1	114	70.6	106	63.0	94.7	56.0	84.2	50.6	76.1	42.6	64.1
	13	70.3	106	65.1	97.9	58.1	87.4	51.7	77.7	46.7	70.2	39.3	59.1
	14	65.3	98.1	60.5	90.9	54.0	81.1	48.0	72.1	43.4	65.2	36.5	54.9
	15	60.9	91.6	56.4	84.8	50.4	75.7	44.8	67.3	40.5	60.8	34.1	51.2
	16	57.1	85.8	52.9	79.5	47.2	71.0	42.0	63.1	37.9	57.0	32.0	48.0
	17	53.8	80.8	49.8	74.9	44.5	66.8	39.5	59.4	35.7	53.7	30.1	45.2
	18	50.8	76.3	47.0	70.7	42.0	63.1	37.3	56.1	33.7	50.7	28.4	42.7
	19	48.1	72.3	44.6	67.0	39.8	59.8	35.4	53.1	32.0	48.0	26.9	40.5
	20	45.7	68.7	42.3	63.6	37.8	56.8	33.6	50.5	30.4	45.6	25.6	38.4
	21	43.5	65.4	40.3	60.6	36.0	54.1	32.0	48.1	28.9	43.5	24.4	36.6
	22	41.5	62.4	38.5	57.8	34.3	51.6	30.5	45.9	27.6	41.5	23.2	34.9
	23	39.7	59.7	36.8	55.3	32.9	49.4	29.2	43.9	26.4	39.7	22.2	33.4
	24	38.1	57.2	35.3	53.0	31.5	47.3	28.0	42.1	25.3	38.0	21.3	32.0
	25	36.6	54.9	33.9	50.9	30.2	45.4	26.9	40.4	24.3	36.5	20.5	30.7
	26	35.1	52.8	32.6	48.9	29.1	43.7	25.8	38.8	23.4	35.1	19.7	29.6
	27	33.8	50.9	31.4	47.1	28.0	42.1	24.9	37.4	22.5	33.8	18.9	28.5
	28	32.6	49.1	30.2	45.5	27.0	40.6	24.0	36.1	21.7	32.6	18.3	27.5
	29	31.5	47.4	29.2	43.9	26.1	39.2	23.2	34.8	20.9	31.5	17.6	26.5
	30	30.5	45.8	28.2	42.4	25.2	37.9	22.4	33.7	20.2	30.4	17.0	25.6
	32	28.6	42.9	26.5	39.8	23.6	35.5	21.0	31.6	19.0	28.5	16.0	24.0
	34	26.9	40.4	24.9	37.4	22.2	33.4	19.8	29.7	17.9	26.8	15.0	22.6
	36	25.4	38.2	23.5	35.4	21.0	31.6	18.7	28.1	16.9	25.4	14.2	21.4
	38	24.0	36.1	22.3	33.5	19.9	29.9	17.7	26.6	16.0	24.0	13.5	20.2
	40	22.8	34.3	21.2	31.8	18.9	28.4	16.8	25.2	15.2	22.8	12.8	19.2
	42	21.8	32.7	20.2	30.3	18.0	27.0	16.0	24.0	14.5	21.7	12.2	18.3
	44	20.8	31.2	19.2	28.9	17.2	25.8	15.3	23.0	13.8	20.7	11.6	17.5
	46	19.9	29.9	18.4	27.7	16.4	24.7	14.6	22.0	13.2	19.8	11.1	16.7
	48	19.0	28.6	17.6	26.5	15.7	23.7	14.0	21.0	12.6	19.0	10.7	16.0
	50	18.3	27.5	16.9	25.5	15.1	22.7	13.4	20.2	12.1	18.3	10.2	15.4
	52	17.6	26.4	16.3	24.5	14.5	21.8	12.9	19.4	11.7	17.6	9.83	14.8
	54	16.9	25.4	15.7	23.6	14.0	21.0	12.4	18.7	11.2	16.9	9.47	14.2
	56	16.3	24.5	15.1	22.7	13.5	20.3	12.0	18.0	10.8	16.3	9.13	13.7
	58	15.8	23.7	14.6	21.9	13.0	19.6	11.6	17.4	10.5	15.7	8.82	13.3
	60	15.2	22.9	14.1	21.2	12.6	18.9	11.2	16.8	10.1	15.2	8.52	12.8
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	914	1370	847	1270	756	1140	672	1010	607	913	511	769
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	114	172	106	159	94.5	142	84.0	126	75.9	114	63.9	96.1
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	46.5	70.0	42.6	64.0	38.1	57.3	34.2	51.3	30.4	45.8	25.7	38.7
BF/Ω_b	$\varphi_b BF$, kips	1.92	2.88	2.06	3.10	2.00	3.01	1.92	2.88	2.23	3.35	2.08	3.12
V_n/Ω_v	$\varphi_v V_{nx}$, kips	45.0	67.6	48.7	73.1	43.7	65.7	37.8	56.9	40.4	60.8	34.5	51.8
Z_x, in.^{3}		76.3		70.7		63.1		56.1		50.7		42.7	
L_p, ft		5.09		4.03		4.01		4.01		3.14		3.12	
L_r, ft		40.4		34.7		32.2		30.0		23.5		21.5	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W12-W10

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W12×										W10×	
		26		22		19		16		14		88	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4					61.8	92.8	57.0	85.6	50.9	76.5		
	5			69.0	104	58.2	87.5	46.9	70.6	40.7	61.2		
	6			57.7	86.7	48.5	72.9	39.1	58.8	33.9	51.0		
	7	60.4	91.0	49.4	74.3	41.6	62.5	33.5	50.4	29.1	43.7		
	8	55.1	82.8	43.3	65.0	36.4	54.7	29.3	44.1	25.4	38.3		
	9	49.0	73.6	38.5	57.8	32.3	48.6	26.1	39.2	22.6	34.0	141	212
	10	44.1	66.2	34.6	52.0	29.1	43.7	23.5	35.3	20.4	30.6	134	202
	11	40.1	60.2	31.5	47.3	26.5	39.8	21.3	32.1	18.5	27.8	122	183
	12	36.7	55.2	28.8	43.4	24.3	36.5	19.6	29.4	17.0	25.5	112	168
	13	33.9	51.0	26.6	40.0	22.4	33.6	18.1	27.1	15.7	23.5	103	155
	14	31.5	47.3	24.7	37.2	20.8	31.2	16.8	25.2	14.5	21.9	95.8	144
	15	29.4	44.2	23.1	34.7	19.4	29.2	15.6	23.5	13.6	20.4	89.4	134
	16	27.5	41.4	21.6	32.5	18.2	27.3	14.7	22.1	12.7	19.1	83.8	126
	17	25.9	39.0	20.4	30.6	17.1	25.7	13.8	20.8	12.0	18.0	78.9	119
	18	24.5	36.8	19.2	28.9	16.2	24.3	13.0	19.6	11.3	17.0	74.5	112
	19	23.2	34.9	18.2	27.4	15.3	23.0	12.4	18.6	10.7	16.1	70.6	106
	20	22.0	33.1	17.3	26.0	14.6	21.9	11.7	17.6	10.2	15.3	67.1	101
	21	21.0	31.5	16.5	24.8	13.9	20.8	11.2	16.8	9.69	14.6	63.9	96.0
	22	20.0	30.1	15.7	23.6	13.2	19.9	10.7	16.0	9.25	13.9	61.0	91.6
	23	19.2	28.8	15.0	22.6	12.7	19.0	10.2	15.3	8.85	13.3	58.3	87.7
	24	18.4	27.6	14.4	21.7	12.1	18.2	9.78	14.7	8.48	12.8	55.9	84.0
	25	17.6	26.5	13.8	20.8	11.6	17.5	9.39	14.1	8.14	12.2	53.7	80.6
	26	17.0	25.5	13.3	20.0	11.2	16.8	9.03	13.6	7.83	11.8	51.6	77.5
	27	16.3	24.5	12.8	19.3	10.8	16.2	8.69	13.1	7.54	11.3	49.7	74.7
	28	15.7	23.7	12.4	18.6	10.4	15.6	8.38	12.6	7.27	10.9	47.9	72.0
	29	15.2	22.8	11.9	17.9	10.0	15.1	8.09	12.2	7.02	10.6	46.3	69.5
	30	14.7	22.1	11.5	17.3	9.70	14.6	7.82	11.8	6.79	10.2	44.7	67.2
	32	13.8	20.7	10.8	16.3	9.09	13.7	7.34	11.0	6.36	9.56	41.9	63.0
	34	13.0	19.5	10.2	15.3	8.56	12.9	6.90	10.4	5.99	9.00	39.5	59.3
	36	12.2	18.4	9.61	14.5	8.08	12.2	6.52	9.80	5.66	8.50	37.3	56.0
	38	11.6	17.4	9.11	13.7	7.66	11.5	6.18	9.28	5.36	8.05	35.3	53.1
	40	11.0	16.6	8.65	13.0	7.28	10.9	5.87	8.82	5.09	7.65	33.5	50.4
	42	10.5	15.8	8.24	12.4	6.93	10.4	5.59	8.40	4.85	7.29	31.9	48.0
	44	10.0	15.1	7.87	11.8	6.61	9.94	5.33	8.02	4.63	6.95	30.5	45.8
	46	9.58	14.4	7.52	11.3	6.33	9.51	5.10	7.67	4.43	6.65	29.2	43.8
	48	9.18	13.8	7.21	10.8	6.06	9.11	4.89	7.35	4.24	6.38	27.9	42.0
	50	8.81	13.2	6.92	10.4	5.82	8.75	4.69	7.06	4.07	6.12	26.8	40.3
	52	8.48	12.7	6.66	10.0	5.60	8.41	4.51	6.78	3.92	5.88	25.8	38.8
	54	8.16	12.3	6.41	9.63	5.39	8.10	4.35	6.53	3.77	5.67	24.8	37.3
	56	7.87	11.8	6.18	9.29	5.20	7.81	4.19	6.30	3.64	5.46	24.0	36.0
	58	7.60	11.4	5.97	8.97	5.02	7.54	4.05	6.08	3.51	5.28	23.1	34.8
	60	7.35	11.0	5.77	8.67	4.85	7.29	3.91	5.88	3.39	5.10	22.4	33.6
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	441	662	346	520	291	437	235	353	204	306	1340	2020
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	55.1	82.8	43.3	65.0	36.4	54.7	29.3	44.1	25.4	38.3	168	252
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	22.2	33.4	16.8	25.3	14.1	21.2	11.3	16.9	9.77	14.7	65.8	98.9
BF/Ω_b	$\varphi_b BF$, kips	1.92	2.89	2.44	3.67	2.24	3.37	1.99	2.99	1.81	2.72	1.37	2.06
V_n/Ω_v	$\varphi_v V_{nx}$, kips	30.2	45.5	34.5	51.8	30.9	46.4	28.5	42.8	25.7	38.6	70.4	106
Z_x, in.^{3}		36.8		28.9		24.3		19.6		17.0		112	
L_p, ft		3.08		1.74		1.68		1.59		1.55		5.38	
L_r, ft		20.2		12.6		11.6		10.7		10.2		79.5	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W10

Shape		W10×											
		77		68		60		54		49		45	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**4**												
	5												
	6												
	7												
	8											76.2	115
	9	121	182	105	158	92.4	139	80.6	121	73.2	110	71.9	108
	10	116	174	101	152	88.1	132	78.7	118	71.1	107	64.7	97.2
	11	105	158	91.8	138	80.1	120	71.5	108	64.7	97.2	58.8	88.4
	12	96.5	145	84.1	126	73.5	110	65.6	98.6	59.3	89.1	53.9	81.0
	13	89.1	134	77.7	117	67.8	102	60.5	91.0	54.7	82.2	49.7	74.8
	14	82.7	124	72.1	108	63.0	94.6	56.2	84.5	50.8	76.4	46.2	69.4
	15	77.2	116	67.3	101	58.8	88.3	52.5	79	47.4	71.3	43.1	64.8
	16	72.4	109	63.1	94.8	55.1	82.8	49.2	73.9	44.5	66.8	40.4	60.8
	17	68.1	102	59.4	89.3	51.8	77.9	46.3	69.6	41.8	62.9	38.0	57.2
	18	64.3	96.7	56.1	84.3	49.0	73.6	43.7	65.7	39.5	59.4	35.9	54.0
	19	61.0	91.6	53.1	79.9	46.4	69.7	41.4	62.2	37.4	56.3	34.0	51.2
	20	57.9	87.0	50.5	75.9	44.1	66.2	39.3	59.1	35.6	53.5	32.3	48.6
	21	55.1	82.9	48.1	72.3	42.0	63.1	37.5	56.3	33.9	50.9	30.8	46.3
	22	52.6	79.1	45.9	69.0	40.1	60.2	35.8	53.8	32.3	48.6	29.4	44.2
	23	50.4	75.7	43.9	66.0	38.3	57.6	34.2	51.4	30.9	46.5	28.1	42.3
	24	48.3	72.5	42.1	63.2	36.7	55.2	32.8	49.3	29.6	44.6	26.9	40.5
	25	46.3	69.6	40.4	60.7	35.3	53.0	31.5	47.3	28.5	42.8	25.9	38.9
	26	44.5	66.9	38.8	58.4	33.9	51.0	30.3	45.5	27.4	41.1	24.9	37.4
	27	42.9	64.5	37.4	56.2	32.6	49.1	29.1	43.8	26.3	39.6	24.0	36.0
	28	41.4	62.2	36.1	54.2	31.5	47.3	28.1	42.2	25.4	38.2	23.1	34.7
	29	39.9	60.0	34.8	52.3	30.4	45.7	27.1	40.8	24.5	36.9	22.3	33.5
	30	38.6	58.0	33.7	50.6	29.4	44.2	26.2	39.4	23.7	35.6	21.6	32.4
	32	36.2	54.4	31.5	47.4	27.5	41.4	24.6	37.0	22.2	33.4	20.2	30.4
	34	34.1	51.2	29.7	44.6	25.9	39.0	23.1	34.8	20.9	31.4	19.0	28.6
	36	32.2	48.4	28.0	42.2	24.5	36.8	21.9	32.9	19.8	29.7	18.0	27.0
	38	30.5	45.8	26.6	39.9	23.2	34.9	20.7	31.1	18.7	28.1	17.0	25.6
	40	29.0	43.5	25.2	37.9	22.0	33.1	19.7	29.6	17.8	26.7	16.2	24.3
	42	27.6	41.4	24.0	36.1	21.0	31.5	18.7	28.2	16.9	25.5	15.4	23.1
	44	26.3	39.6	22.9	34.5	20.0	30.1	17.9	26.9	16.2	24.3	14.7	22.1
	46	25.2	37.8	21.9	33.0	19.2	28.8	17.1	25.7	15.5	23.2	14.1	21.1
	48	24.1	36.3	21.0	31.6	18.4	27.6	16.4	24.6	14.8	22.3	13.5	20.3
	50	23.2	34.8	20.2	30.3	17.6	26.5	15.7	23.7	14.2	21.4	12.9	19.4
	52	22.3	33.5	19.4	29.2	17.0	25.5	15.1	22.7	13.7	20.6	12.4	18.7
	54	21.4	32.2	18.7	28.1	16.3	24.5	14.6	21.9	13.2	19.8	12.0	18.0
	56	20.7	31.1	18.0	27.1	15.7	23.7	14.1	21.1	12.7	19.1	11.5	17.4
	58	20.0	30.0	17.4	26.2	15.2	22.8	13.6	20.4	12.3	18.4	11.2	16.8
	60	19.3	29.0	16.8	25.3	14.7	22.1	13.1	19.7	11.9	17.8	10.8	16.2
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1160	1740	1010	1520	881	1320	787	1180	711	1070	647	972
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	145	218	126	190	110	166	98.4	148	88.9	134	80.8	122
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	57.4	86.3	50.5	75.8	44.4	66.7	39.9	59.9	36.2	54.5	32.5	48.9
BF/Ω_b	$\varphi_b BF$, kips	1.35	2.03	1.34	2.01	1.32	1.98	1.30	1.95	1.27	1.92	1.34	2.02
V_n/Ω_v	$\varphi_v V_{nx}$, kips	60.6	91.0	52.7	79.2	46.2	69.4	40.3	60.5	36.6	55.0	38.1	57.3
Z_x, in.^{3}		96.7		84.3		73.6		65.7		59.4		54.0	
L_p, ft		5.34		5.30		5.25		5.23		5.21		4.11	
L_r, ft		69.9		62.0		55.3		50.3		46.5		40.0	

ASD	**LRFD**
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W10

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W10×											
		39		33		30		26		22		19	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4											55.0	82.6
	5									52.8	79.4	50.8	76.3
	6					68.0	102	57.8	86.8	51.3	77.1	42.3	63.6
	7			60.8	91.4	61.9	93.1	52.9	79.5	44.0	66.1	36.3	54.5
	8	67.4	101	56.7	85.3	54.2	81.5	46.3	69.5	38.5	57.8	31.7	47.7
	9	61.1	91.8	50.4	75.8	48.2	72.4	41.1	61.8	34.2	51.4	28.2	42.4
	10	55.0	82.6	45.4	68.2	43.4	65.2	37.0	55.6	30.8	46.3	25.4	38.2
	11	50.0	75.1	41.3	62.0	39.4	59.2	33.6	50.6	28.0	42.1	23.1	34.7
	12	45.8	68.9	37.8	56.9	36.1	54.3	30.8	46.4	25.6	38.6	21.2	31.8
	13	42.3	63.6	34.9	52.5	33.3	50.1	28.5	42.8	23.7	35.6	19.5	29.4
	14	39.3	59.0	32.4	48.7	31.0	46.5	26.4	39.7	22.0	33.0	18.1	27.3
	15	36.6	55.1	30.3	45.5	28.9	43.4	24.7	37.1	20.5	30.8	16.9	25.4
	16	34.4	51.6	28.4	42.6	27.1	40.7	23.1	34.8	19.2	28.9	15.9	23.9
	17	32.3	48.6	26.7	40.1	25.5	38.3	21.8	32.7	18.1	27.2	14.9	22.4
	18	30.5	45.9	25.2	37.9	24.1	36.2	20.6	30.9	17.1	25.7	14.1	21.2
	19	28.9	43.5	23.9	35.9	22.8	34.3	19.5	29.3	16.2	24.3	13.4	20.1
	20	27.5	41.3	22.7	34.1	21.7	32.6	18.5	27.8	15.4	23.1	12.7	19.1
	21	26.2	39.3	21.6	32.5	20.6	31.0	17.6	26.5	14.7	22.0	12.1	18.2
	22	25.0	37.6	20.6	31.0	19.7	29.6	16.8	25.3	14.0	21.0	11.5	17.3
	23	23.9	35.9	19.7	29.7	18.8	28.3	16.1	24.2	13.4	20.1	11.0	16.6
	24	22.9	34.4	18.9	28.4	18.1	27.2	15.4	23.2	12.8	19.3	10.6	15.9
	25	22.0	33.0	18.2	27.3	17.3	26.1	14.8	22.2	12.3	18.5	10.2	15.3
	26	21.1	31.8	17.5	26.2	16.7	25.1	14.2	21.4	11.8	17.8	9.77	14.7
	27	20.4	30.6	16.8	25.3	16.1	24.1	13.7	20.6	11.4	17.1	9.40	14.1
	28	19.6	29.5	16.2	24.4	15.5	23.3	13.2	19.9	11.0	16.5	9.07	13.6
	29	19.0	28.5	15.7	23.5	14.9	22.5	12.8	19.2	10.6	16.0	8.75	13.2
	30	18.3	27.5	15.1	22.7	14.5	21.7	12.3	18.5	10.3	15.4	8.46	12.7
	32	17.2	25.8	14.2	21.3	13.5	20.4	11.6	17.4	9.62	14.5	7.93	11.9
	34	16.2	24.3	13.3	20.1	12.8	19.2	10.9	16.4	9.05	13.6	7.47	11.2
	36	15.3	23.0	12.6	19.0	12.0	18.1	10.3	15.5	8.55	12.9	7.05	10.6
	38	14.5	21.7	11.9	18.0	11.4	17.1	9.74	14.6	8.10	12.2	6.68	10.0
	40	13.7	20.7	11.3	17.1	10.8	16.3	9.25	13.9	7.69	11.6	6.35	9.54
	42	13.1	19.7	10.8	16.2	10.3	15.5	8.81	13.2	7.33	11.0	6.05	9.09
	44	12.5	18.8	10.3	15.5	9.85	14.8	8.41	12.6	7.00	10.5	5.77	8.67
	46	12.0	18.0	9.87	14.8	9.42	14.2	8.04	12.1	6.69	10.1	5.52	8.30
	48	11.5	17.2	9.46	14.2	9.03	13.6	7.71	11.6	6.41	9.64	5.29	7.95
	50	11.0	16.5	9.08	13.6	8.67	13.0	7.40	11.1	6.16	9.25	5.08	7.63
	52	10.6	15.9	8.73	13.1	8.34	12.5	7.12	10.7	5.92	8.90	4.88	7.34
	54	10.2	15.3	8.41	12.6	8.03	12.1	6.85	10.3	5.70	8.57	4.70	7.07
	56	9.82	14.8	8.11	12.2	7.74	11.6	6.61	9.93	5.50	8.26	4.53	6.81
	58	9.48	14.2	7.83	11.8	7.47	11.2	6.38	9.59	5.31	7.98	4.38	6.58
	60	9.16	13.8	7.56	11.4	7.23	10.9	6.17	9.27	5.13	7.71	4.23	6.36
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	550	826	454	682	434	652	370	556	308	463	254	382
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	68.7	103	56.7	85.3	54.2	81.5	46.3	69.5	38.5	57.8	31.7	47.7
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	27.8	41.8	23.0	34.6	21.6	32.5	18.6	27.9	15.4	23.2	12.5	18.7
BF/Ω_b	$\varphi_b BF$, kips	1.31	1.97	1.25	1.88	1.58	2.38	1.51	2.27	1.41	2.12	1.64	2.47
V_n/Ω_v	$\varphi_v V_{nx}$, kips	33.7	50.6	30.4	45.7	34.0	51.0	28.9	43.4	26.4	39.7	27.5	41.3
Z_x, in.^{3}		45.9		37.9		36.2		30.9		25.7		21.2	
L_p, ft		4.07		3.99		2.81		2.79		2.71		1.79	
L_r, ft		35.3		30.9		23.4		21.1		19.0		13.5	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W10-W8

Shape		W10×						W8×					
		17		15		12		67		58		48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4	52.2	78.6	46.7	70.2	36.8	55.4						
	5	43.8	65.9	37.4	56.2	29.5	44.3						
	6	36.5	54.9	31.1	46.8	24.6	36.9						
	7	31.3	47.1	26.7	40.1	21.0	31.6	111	166	96.2	145	73.2	110
	8	27.4	41.2	23.4	35.1	18.4	27.7	104	157	88.8	133	72.6	109
	9	24.4	36.6	20.8	31.2	16.4	24.6	92.7	139	78.9	119	64.5	97.0
	10	21.9	32.9	18.7	28.1	14.7	22.1	83.5	125	71.0	107	58.1	87.3
	11	19.9	29.9	17.0	25.5	13.4	20.1	75.9	114	64.6	97.0	52.8	79.4
	12	18.3	27.5	15.6	23.4	12.3	18.5	69.6	105	59.2	89.0	48.4	72.8
	13	16.9	25.3	14.4	21.6	11.3	17.0	64.2	96.5	54.6	82.1	44.7	67.2
	14	15.7	23.5	13.3	20.1	10.5	15.8	59.6	89.6	50.7	76.2	41.5	62.4
	15	14.6	22.0	12.5	18.7	9.82	14.8	55.6	83.6	47.3	71.2	38.7	58.2
	16	13.7	20.6	11.7	17.6	9.21	13.8	52.2	78.4	44.4	66.7	36.3	54.6
	17	12.9	19.4	11.0	16.5	8.67	13.0	49.1	73.8	41.8	62.8	34.2	51.4
	18	12.2	18.3	10.4	15.6	8.18	12.3	46.4	69.7	39.5	59.3	32.3	48.5
	19	11.5	17.3	9.83	14.8	7.75	11.7	43.9	66.0	37.4	56.2	30.6	45.9
	20	11.0	16.5	9.34	14.0	7.37	11.1	41.7	62.7	35.5	53.4	29.0	43.7
	21	10.4	15.7	8.90	13.4	7.01	10.5	39.7	59.7	33.8	50.8	27.7	41.6
	22	10.0	15.0	8.49	12.8	6.70	10.1	37.9	57.0	32.3	48.5	26.4	39.7
	23	9.53	14.3	8.12	12.2	6.40	9.63	36.3	54.5	30.9	46.4	25.3	38.0
	24	9.13	13.7	7.78	11.7	6.14	9.23	34.8	52.3	29.6	44.5	24.2	36.4
	25	8.77	13.2	7.47	11.2	5.89	8.86	33.4	50.2	28.4	42.7	23.2	34.9
	26	8.43	12.7	7.19	10.8	5.67	8.52	32.1	48.3	27.3	41.1	22.3	33.6
	27	8.12	12.2	6.92	10.4	5.46	8.20	30.9	46.5	26.3	39.5	21.5	32.3
	28	7.83	11.8	6.67	10.0	5.26	7.91	29.8	44.8	25.4	38.1	20.7	31.2
	29	7.56	11.4	6.44	9.68	5.08	7.63	28.8	43.3	24.5	36.8	20.0	30.1
	30	7.31	11.0	6.23	9.36	4.91	7.38	27.8	41.8	23.7	35.6	19.4	29.1
	32	6.85	10.3	5.84	8.78	4.60	6.92	26.1	39.2	22.2	33.4	18.2	27.3
	34	6.45	9.69	5.49	8.26	4.33	6.51	24.6	36.9	20.9	31.4	17.1	25.7
	36	6.09	9.15	5.19	7.80	4.09	6.15	23.2	34.9	19.7	29.7	16.1	24.3
	38	5.77	8.67	4.92	7.39	3.88	5.83	22.0	33.0	18.7	28.1	15.3	23.0
	40	5.48	8.24	4.67	7.02	3.68	5.54	20.9	31.4	17.8	26.7	14.5	21.8
	42	5.22	7.84	4.45	6.69	3.51	5.27	19.9	29.9	16.9	25.4	13.8	20.8
	44	4.98	7.49	4.25	6.38	3.35	5.03	19.0	28.5	16.1	24.3	13.2	19.8
	46	4.76	7.16	4.06	6.10	3.20	4.81	18.1	27.3	15.4	23.2	12.6	19.0
	48	4.57	6.86	3.89	5.85	3.07	4.61	17.4	26.1	14.8	22.2	12.1	18.2
	50	4.38	6.59	3.74	5.62	2.95	4.43	16.7	25.1	14.2	21.3	11.6	17.5
	52	4.21	6.33	3.59	5.40	2.83	4.26	16.1	24.1	13.7	20.5	11.2	16.8
	54	4.06	6.10	3.46	5.20	2.73	4.10	15.5	23.2	13.2	19.8	10.8	16.2
	56	3.91	5.88	3.34	5.01	2.63	3.95	14.9	22.4	12.7	19.1	10.4	15.6
	58	3.78	5.68	3.22	4.84	2.54	3.82	14.4	21.6	12.2	18.4	10.0	15.1
	60	3.65	5.49	3.11	4.68	2.46	3.69	13.9	20.9	11.8	17.8	9.68	14.6
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	219	329	187	281	147	221	835	1250	710	1070	581	873
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	27.4	41.2	23.4	35.1	18.4	27.7	104	157	88.8	133	72.6	109
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	10.7	16.1	9.09	13.7	7.14	10.7	40.4	60.8	34.8	52.3	28.9	43.4
BF/Ω_b	$\varphi_b BF$, kips	1.55	2.33	1.43	2.16	1.24	1.87	0.910	1.37	0.893	1.34	0.874	1.31
V_n/Ω_v	$\varphi_v V_{nx}$, kips	26.1	39.3	24.8	37.2	20.2	30.4	55.3	83.1	48.1	72.3	36.6	55.1
Z_x, in.^{3}		18.3		15.6		12.3		69.7		59.3		48.5	
L_p, ft		1.73		1.66		1.62		4.34		4.28		4.26	
L_r, ft		12.5		11.6		10.7		74.6		64.7		54.3	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W8

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W8×											
		40		35		31		28		24		21	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5											44.6	67.0
	6							49.6	74.4	41.8	63.0	40.1	60.3
	7	64.0	96.2	54.2	81.6	49.2	73.8	45.7	68.7	38.8	58.4	34.4	51.7
	8	58.8	88.4	51.2	77.0	44.8	67.3	40.0	60.1	34.0	51.1	30.1	45.2
	9	52.3	78.6	45.5	68.4	39.8	59.8	35.5	53.4	30.2	45.4	26.7	40.2
	10	47.1	70.7	41.0	61.6	35.8	53.8	32.0	48.1	27.2	40.9	24.1	36.2
	11	42.8	64.3	37.2	56.0	32.6	48.9	29.1	43.7	24.7	37.1	21.9	32.9
	12	39.2	59.0	34.1	51.3	29.8	44.9	26.6	40.1	22.7	34.1	20.1	30.2
	13	36.2	54.4	31.5	47.4	27.5	41.4	24.6	37.0	20.9	31.4	18.5	27.8
	14	33.6	50.5	29.3	44.0	25.6	38.4	22.8	34.3	19.4	29.2	17.2	25.8
	15	31.4	47.2	27.3	41.0	23.9	35.9	21.3	32.0	18.1	27.2	16.0	24.1
	16	29.4	44.2	25.6	38.5	22.4	33.6	20.0	30.0	17.0	25.5	15.0	22.6
	17	27.7	41.6	24.1	36.2	21.1	31.7	18.8	28.3	16.0	24.0	14.2	21.3
	18	26.1	39.3	22.8	34.2	19.9	29.9	17.8	26.7	15.1	22.7	13.4	20.1
	19	24.8	37.2	21.6	32.4	18.8	28.3	16.8	25.3	14.3	21.5	12.7	19.0
	20	23.5	35.4	20.5	30.8	17.9	26.9	16.0	24.0	13.6	20.4	12.0	18.1
	21	22.4	33.7	19.5	29.3	17.1	25.6	15.2	22.9	12.9	19.5	11.5	17.2
	22	21.4	32.2	18.6	28.0	16.3	24.5	14.5	21.8	12.4	18.6	10.9	16.4
	23	20.5	30.8	17.8	26.8	15.6	23.4	13.9	20.9	11.8	17.8	10.5	15.7
	24	19.6	29.5	17.1	25.7	14.9	22.4	13.3	20.0	11.3	17.0	10.0	15.1
	25	18.8	28.3	16.4	24.6	14.3	21.5	12.8	19.2	10.9	16.3	9.63	14.5
	26	18.1	27.2	15.8	23.7	13.8	20.7	12.3	18.5	10.5	15.7	9.26	13.9
	27	17.4	26.2	15.2	22.8	13.3	19.9	11.8	17.8	10.1	15.1	8.92	13.4
	28	16.8	25.3	14.6	22.0	12.8	19.2	11.4	17.2	9.71	14.6	8.60	12.9
	29	16.2	24.4	14.1	21.2	12.3	18.6	11.0	16.6	9.37	14.1	8.30	12.5
	30	15.7	23.6	13.7	20.5	11.9	17.9	10.7	16.0	9.06	13.6	8.02	12.1
	32	14.7	22.1	12.8	19.2	11.2	16.8	10.0	15.0	8.50	12.8	7.52	11.3
	34	13.8	20.8	12.0	18.1	10.5	15.8	9.40	14.1	8.00	12.0	7.08	10.6
	36	13.1	19.7	11.4	17.1	10.0	15.0	8.88	13.4	7.55	11.4	6.69	10.1
	38	12.4	18.6	10.8	16.2	9.42	14.2	8.41	12.6	7.15	10.8	6.33	9.52
	40	11.8	17.7	10.2	15.4	8.95	13.5	7.99	12.0	6.80	10.2	6.02	9.05
	42	11.2	16.8	9.75	14.7	8.53	12.8	7.61	11.4	6.47	9.73	5.73	8.61
	44	10.7	16.1	9.31	14.0	8.14	12.2	7.27	10.9	6.18	9.29	5.47	8.22
	46	10.2	15.4	8.90	13.4	7.78	11.7	6.95	10.4	5.91	8.88	5.23	7.87
	48	9.81	14.7	8.53	12.8	7.46	11.2	6.66	10.0	5.66	8.51	5.01	7.54
	50	9.41	14.1	8.19	12.3	7.16	10.8	6.40	9.61	5.44	8.17	4.81	7.24
	52	9.05	13.6	7.88	11.8	6.89	10.4	6.15	9.24	5.23	7.86	4.63	6.96
	54	8.72	13.1	7.58	11.4	6.63	10.0	5.92	8.90	5.03	7.57	4.46	6.70
	56	8.40	12.6	7.31	11.0	6.39	9.61	5.71	8.58	4.85	7.30	4.30	6.46
	58	8.11	12.2	7.06	10.6	6.17	9.28	5.51	8.29	4.69	7.04	4.15	6.24
	60	7.84	11.8	6.83	10.3	5.97	8.97	5.33	8.01	4.53	6.81	4.01	6.03
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	471	707	410	616	358	538	320	481	272	409	241	362
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	58.8	88.4	51.2	77.0	44.8	67.3	40.0	60.1	34.0	51.1	30.1	45.2
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	23.6	35.5	20.7	31.2	18.3	27.4	16.1	24.2	13.8	20.8	12.1	18.1
BF/Ω_b	$\varphi_b BF$, kips	0.858	1.29	0.841	1.26	0.823	1.24	0.863	1.30	0.837	1.26	0.962	1.45
V_n/Ω_v	$\varphi_v V_{nx}$, kips	32.0	48.1	27.1	40.8	24.6	36.9	24.8	37.2	20.9	31.5	22.3	33.5
Z_x, in.^{3}		39.3		34.2		29.9		26.7		22.7		20.1	
L_p, ft		4.20		4.18		4.13		3.32		3.30		2.59	
L_r, ft		45.2		40.4		36.3		31.0		27.4		21.3	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

W8-W6

Shape		W8×								W6×			
		18		15		13		10		25		20	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**4**	40.4	60.6	39.8	59.9	33.2	50.0	25.7	38.7				
	5	40.0	60.1	31.9	47.9	26.6	40.0	20.6	30.9	44.0	66.2	34.8	52.2
	6	33.3	50.1	26.5	39.9	22.2	33.3	17.1	25.8	37.5	56.4	29.5	44.4
	7	28.6	42.9	22.8	34.2	19.0	28.5	14.7	22.1	32.2	48.3	25.3	38.1
	8	25.0	37.6	19.9	29.9	16.6	25.0	12.9	19.3	28.1	42.3	22.2	33.3
	9	22.2	33.4	17.7	26.6	14.8	22.2	11.4	17.2	25.0	37.6	19.7	29.6
	10	20.0	30.1	15.9	23.9	13.3	20.0	10.3	15.5	22.5	33.8	17.7	26.6
	11	18.2	27.3	14.5	21.8	12.1	18.2	9.35	14.1	20.5	30.8	16.1	24.2
	12	16.7	25.1	13.3	20.0	11.1	16.7	8.57	12.9	18.8	28.2	14.8	22.2
	13	15.4	23.1	12.3	18.4	10.2	15.4	7.91	11.9	17.3	26.0	13.6	20.5
	14	14.3	21.5	11.4	17.1	9.50	14.3	7.35	11.0	16.1	24.2	12.7	19.0
	15	13.3	20.0	10.6	16.0	8.86	13.3	6.86	10.3	15.0	22.6	11.8	17.8
	16	12.5	18.8	10.0	15.0	8.31	12.5	6.43	9.66	14.1	21.2	11.1	16.7
	17	11.8	17.7	9.37	14.1	7.82	11.8	6.05	9.10	13.2	19.9	10.4	15.7
	18	11.1	16.7	8.85	13.3	7.39	11.1	5.72	8.59	12.5	18.8	9.85	14.8
	19	10.5	15.8	8.38	12.6	7.00	10.5	5.41	8.14	11.8	17.8	9.33	14.0
	20	10.0	15.0	7.96	12.0	6.65	10.0	5.14	7.73	11.3	16.9	8.86	13.3
	21	9.52	14.3	7.58	11.4	6.33	9.51	4.90	7.36	10.7	16.1	8.44	12.7
	22	9.09	13.7	7.24	10.9	6.04	9.08	4.68	7.03	10.2	15.4	8.06	12.1
	23	8.70	13.1	6.93	10.4	5.78	8.69	4.47	6.72	9.79	14.7	7.71	11.6
	24	8.33	12.5	6.64	10.0	5.54	8.33	4.29	6.44	9.38	14.1	7.39	11.1
	25	8.00	12.0	6.37	9.58	5.32	7.99	4.11	6.18	9.01	13.5	7.09	10.7
	26	7.69	11.6	6.13	9.21	5.11	7.68	3.96	5.95	8.66	13.0	6.82	10.2
	27	7.41	11.1	5.90	8.87	4.92	7.40	3.81	5.73	8.34	12.5	6.56	9.87
	28	7.14	10.7	5.69	8.55	4.75	7.14	3.67	5.52	8.04	12.1	6.33	9.51
	29	6.90	10.4	5.49	8.26	4.58	6.89	3.55	5.33	7.76	11.7	6.11	9.19
	30	6.67	10.0	5.31	7.98	4.43	6.66	3.43	5.15	7.50	11.3	5.91	8.88
	32	6.25	9.39	4.98	7.48	4.15	6.24	3.21	4.83	7.04	10.6	5.54	8.33
	34	5.88	8.84	4.68	7.04	3.91	5.88	3.03	4.55	6.62	10.0	5.21	7.84
	36	5.56	8.35	4.42	6.65	3.69	5.55	2.86	4.30	6.25	9.40	4.92	7.40
	38	5.26	7.91	4.19	6.30	3.50	5.26	2.71	4.07	5.92	8.91	4.66	7.01
	40	5.00	7.52	3.98	5.99	3.32	5.00	2.57	3.87	5.63	8.46	4.43	6.66
	42	4.76	7.16	3.79	5.70	3.17	4.76	2.45	3.68	5.36	8.06	4.22	6.34
	44	4.55	6.83	3.62	5.44	3.02	4.54	2.34	3.51	5.12	7.69	4.03	6.05
	46	4.35	6.53	3.46	5.20	2.89	4.34	2.24	3.36	4.89	7.36	3.85	5.79
	48	4.17	6.26	3.32	4.99	2.77	4.16	2.14	3.22	4.69	7.05	3.69	5.55
	50	4.00	6.01	3.19	4.79	2.66	4.00	2.06	3.09	4.50	6.77	3.54	5.33
	52	3.85	5.78	3.06	4.60	2.56	3.84	1.98	2.97	4.33	6.51	3.41	5.12
	54	3.70	5.57	2.95	4.43	2.46	3.70	1.91	2.86	4.17	6.27	3.28	4.93
	56	3.57	5.37	2.84	4.28	2.37	3.57	1.84	2.76	4.02	6.04	3.17	4.76
	58	3.45	5.18	2.75	4.13	2.29	3.44	1.77	2.67	3.88	5.83	3.06	4.59
	60	3.33	5.01	2.65	3.99	2.22	3.33	1.71	2.58	3.75	5.64	2.95	4.44
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	200	301	159	239	133	200	103	155	225	338	177	266
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	25.0	37.6	19.9	29.9	16.6	25.0	12.9	19.3	28.1	42.3	22.2	33.3
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	10.1	15.2	7.81	11.7	6.50	9.77	5.09	7.64	11.2	16.8	8.89	13.4
BF/Ω_b	$\varphi_b BF$, kips	0.911	1.37	0.988	1.48	0.915	1.37	0.798	1.20	0.510	0.767	0.498	0.748
V_n/Ω_v	$\varphi_v V_{nx}$, kips	20.2	30.3	21.4	32.2	19.8	29.8	14.5	21.7	22.0	33.1	17.4	26.1
Z_x, in.^{3}		16.7		13.3		11.1		8.59		18.8		14.8	
L_p, ft		2.53		1.80		1.74		1.73		3.12		3.08	
L_r, ft		18.9		14.0		12.8		11.5		36.4		29.7	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W6-W5

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W6×								W5×			
		16		15 ^{f1}		12		9		19		18.9	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4	34.4	51.8	27.8	41.8	24.4	36.7	18.2	27.4	30.0	45.0	32.6	49.1
	5	27.5	41.4	22.3	33.5	19.5	29.4	14.6	21.9	27.5	41.4	26.1	39.2
	6	23.0	34.5	18.5	27.9	16.3	24.5	12.2	18.3	23.0	34.5	21.8	32.7
	7	19.7	29.6	15.9	23.9	14.0	21.0	10.4	15.7	19.7	29.6	18.6	28.0
	8	17.2	25.9	13.9	20.9	12.2	18.4	9.12	13.7	17.2	25.9	16.3	24.5
	9	15.3	23.0	12.4	18.6	10.9	16.3	8.10	12.2	15.3	23.0	14.5	21.8
	10	13.8	20.7	11.1	16.7	9.77	14.7	7.29	11.0	13.8	20.7	13.1	19.6
	11	12.5	18.8	10.1	15.2	8.88	13.4	6.63	9.97	12.5	18.8	11.9	17.8
	12	11.5	17.3	9.27	13.9	8.14	12.2	6.08	9.14	11.5	17.3	10.9	16.4
	13	10.6	15.9	8.56	12.9	7.52	11.3	5.61	8.43	10.6	15.9	10.0	15.1
	14	9.84	14.8	7.95	11.9	6.98	10.5	5.21	7.83	9.84	14.8	9.32	14.0
	15	9.18	13.8	7.42	11.2	6.51	9.79	4.86	7.31	9.18	13.8	8.70	13.1
	16	8.61	12.9	6.96	10.5	6.11	9.18	4.56	6.85	8.61	12.9	8.16	12.3
	17	8.10	12.2	6.55	9.84	5.75	8.64	4.29	6.45	8.10	12.2	7.68	11.5
	18	7.65	11.5	6.18	9.29	5.43	8.16	4.05	6.09	7.65	11.5	7.25	10.9
	19	7.25	10.9	5.86	8.80	5.14	7.73	3.84	5.77	7.25	10.9	6.87	10.3
	20	6.89	10.4	5.56	8.36	4.89	7.34	3.65	5.48	6.89	10.4	6.53	9.81
	21	6.56	9.86	5.30	7.97	4.65	6.99	3.47	5.22	6.56	9.86	6.22	9.34
	22	6.26	9.41	5.06	7.60	4.44	6.68	3.32	4.98	6.26	9.41	5.93	8.92
	23	5.99	9.00	4.84	7.27	4.25	6.39	3.17	4.77	5.99	9.00	5.68	8.53
	24	5.74	8.63	4.64	6.97	4.07	6.12	3.04	4.57	5.74	8.63	5.44	8.18
	25	5.51	8.28	4.45	6.69	3.91	5.88	2.92	4.38	5.51	8.28	5.22	7.85
	26	5.30	7.96	4.28	6.43	3.76	5.65	2.81	4.22	5.30	7.96	5.02	7.55
	27	5.10	7.67	4.12	6.20	3.62	5.44	2.70	4.06	5.10	7.67	4.83	7.27
	28	4.92	7.39	3.97	5.97	3.49	5.25	2.60	3.92	4.92	7.39	4.66	7.01
	29	4.75	7.14	3.84	5.77	3.37	5.06	2.51	3.78	4.75	7.14	4.50	6.77
	30	4.59	6.90	3.71	5.58	3.26	4.90	2.43	3.65	4.59	6.90	4.35	6.54
	32	4.30	6.47	3.48	5.23	3.05	4.59	2.28	3.43	4.30	6.47	4.08	6.13
	34	4.05	6.09	3.27	4.92	2.87	4.32	2.15	3.22	4.05	6.09	3.84	5.77
	36	3.83	5.75	3.09	4.65	2.71	4.08	2.03	3.05	3.83	5.75	3.63	5.45
	38	3.62	5.45	2.93	4.40	2.57	3.87	1.92	2.88	3.62	5.45	3.44	5.16
	40	3.44	5.18	2.78	4.18	2.44	3.67	1.82	2.74	3.44	5.18	3.26	4.91
	42	3.28	4.93	2.65	3.98	2.33	3.50	1.74	2.61	3.28	4.93	3.11	4.67
	44	3.13	4.70	2.53	3.80	2.22	3.34	1.66	2.49	3.13	4.70	2.97	4.46
	46	2.99	4.50	2.42	3.64	2.12	3.19	1.59	2.38	2.99	4.50	2.84	4.27
	48	2.87	4.31	2.32	3.49	2.04	3.06	1.52	2.28	2.87	4.31	2.72	4.09
	50	2.75	4.14	2.23	3.35	1.95	2.94	1.46	2.19	2.75	4.14	2.61	3.92
	52	2.65	3.98	2.14	3.22	1.88	2.82	1.40	2.11	2.65	3.98	2.51	3.77
	54	2.55	3.83	2.06	3.10	1.81	2.72	1.35	2.03	2.55	3.83	2.42	3.63
	56	2.46	3.70	1.99	2.99	1.75	2.62	1.30	1.96	2.46	3.70	2.33	3.50
	58	2.37	3.57	1.92	2.88	1.68	2.53	1.26	1.89	2.37	3.57	2.25	3.38
	60	2.30	3.45	1.85	2.79	1.63	2.45	1.22	1.83	2.30	3.45	2.18	3.27
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	138	207	111	167	97.7	147	72.9	110	138	207	131	196
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	17.2	25.9	13.9	20.9	12.2	18.4	9.12	13.7	17.2	25.9	16.3	24.5
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	6.80	10.2	6.46	9.71	4.84	7.28	3.66	5.50	6.80	10.2	6.42	9.65
BF/Ω_b	$\varphi_b BF$, kips	0.542	0.815	0.457	0.687	0.514	0.773	0.470	0.706	0.320	0.481	0.297	0.446
V_n/Ω_v	$\varphi_v V_{nx}$, kips	17.6	26.5	14.8	22.3	14.9	22.5	10.8	16.2	15.0	22.5	17.0	25.6
Z_x, in.^{3}		11.5		10.6		8.16		6.09		11.5		10.9	
L_p, ft		1.98		7.26		1.88		1.86		2.63		2.57	
L_r, ft		21.2		23.6		16.2		13.5		35.2		35.9	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W5-W4

Shape		W5×		W4×	
		16		13	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	4	26.0	39.0	18.5	27.9
	5	22.7	34.1	14.8	22.3
	6	18.9	28.4	12.4	18.6
	7	16.2	24.4	10.6	15.9
	8	14.2	21.3	9.27	13.9
	9	12.6	18.9	8.24	12.4
	10	11.3	17.0	7.41	11.1
	11	10.3	15.5	6.74	10.1
	12	9.45	14.2	6.18	9.29
	13	8.72	13.1	5.70	8.57
	14	8.10	12.2	5.30	7.96
	15	7.56	11.4	4.94	7.43
	16	7.09	10.7	4.63	6.96
	17	6.67	10.0	4.36	6.55
	18	6.30	9.47	4.12	6.19
	19	5.97	8.97	3.90	5.86
	20	5.67	8.52	3.71	5.57
	21	5.40	8.12	3.53	5.31
	22	5.16	7.75	3.37	5.06
	23	4.93	7.41	3.22	4.84
	24	4.73	7.10	3.09	4.64
	25	4.54	6.82	2.97	4.46
	26	4.36	6.56	2.85	4.29
	27	4.20	6.31	2.75	4.13
	28	4.05	6.09	2.65	3.98
	29	3.91	5.88	2.56	3.84
	30	3.78	5.68	2.47	3.71
	32	3.54	5.33	2.32	3.48
	34	3.34	5.01	2.18	3.28
	36	3.15	4.74	2.06	3.10
	38	2.98	4.49	1.95	2.93
	40	2.84	4.26	1.85	2.79
	42	2.70	4.06	1.77	2.65
	44	2.58	3.87	1.68	2.53
	46	2.47	3.71	1.61	2.42
	48	2.36	3.55	1.54	2.32
	50	2.27	3.41	1.48	2.23
	52	2.18	3.28	1.43	2.14
	54	2.10	3.16	1.37	2.06
	56	2.03	3.04	1.32	1.99
	58	1.96	2.94	1.28	1.92
	60	1.89	2.84	1.24	1.86
Beam Properties					
W_c/Ω_b	$\varphi_b W_c$, kip-ft	113	170	74.1	111
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	14.2	21.3	9.27	13.9
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	5.67	8.52	3.62	5.45
BF/Ω_b	$\varphi_b BF$, kips	0.311	0.467	0.207	0.311
V_n/Ω_v	$\varphi_v V_{nx}$, kips	13.0	19.5	12.6	18.9
Z_x, in.^{3}		9.47		6.19	
L_p, ft		2.59		2.06	
L_r, ft		30.0		29.3	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

S15-S12

Table 2-4
Maximum Total Uniform Load, kips
S-Shapes (Welded)

F_y = 30 ksi

Shape		S15×				S12×							
		50		42.9		50		40.8		35		31.8	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**6**	153	230	133	200	121	182	105	158	88.6	133	83.0	125
	7	131	197	117	176	104	156	90.2	136	76.0	114	71.2	107
	8	115	172	103	154	90.7	136	78.9	119	66.5	99.9	62.3	93.6
	9	102	153	91.3	137	80.6	121	70.1	105	59.1	88.8	55.4	83.2
	10	91.6	138	82.2	123	72.6	109	63.1	94.9	53.2	79.9	49.8	74.9
	11	83.3	125	74.7	112	66.0	99.2	57.4	86.2	48.3	72.7	45.3	68.1
	12	76.3	115	68.5	103	60.5	90.9	52.6	79.1	44.3	66.6	41.5	62.4
	13	70.5	106	63.2	95.0	55.8	83.9	48.5	73.0	40.9	61.5	38.3	57.6
	14	65.4	98.4	58.7	88.2	51.8	77.9	45.1	67.8	38.0	57.1	35.6	53.5
	15	61.1	91.8	54.8	82.3	48.4	72.7	42.1	63.2	35.4	53.3	33.2	49.9
	16	57.3	86.1	51.3	77.2	45.4	68.2	39.4	59.3	33.2	50.0	31.1	46.8
	17	53.9	81.0	48.3	72.6	42.7	64.2	37.1	55.8	31.3	47.0	29.3	44.0
	18	50.9	76.5	45.6	68.6	40.3	60.6	35.1	52.7	29.5	44.4	27.7	41.6
	19	48.2	72.5	43.2	65.0	38.2	57.4	33.2	49.9	28.0	42.1	26.2	39.4
	20	45.8	68.9	41.1	61.7	36.3	54.5	31.6	47.4	26.6	40.0	24.9	37.4
	21	43.6	65.6	39.1	58.8	34.6	51.9	30.1	45.2	25.3	38.1	23.7	35.7
	22	41.6	62.6	37.3	56.1	33.0	49.6	28.7	43.1	24.2	36.3	22.6	34.0
	23	39.8	59.9	35.7	53.7	31.6	47.4	27.4	41.2	23.1	34.7	21.7	32.6
	24	38.2	57.4	34.2	51.5	30.2	45.5	26.3	39.5	22.2	33.3	20.8	31.2
	25	36.6	55.1	32.9	49.4	29.0	43.6	25.2	37.9	21.3	32.0	19.9	30.0
	26	35.2	53.0	31.6	47.5	27.9	42.0	24.3	36.5	20.5	30.7	19.2	28.8
	27	33.9	51.0	30.4	45.7	26.9	40.4	23.4	35.1	19.7	29.6	18.5	27.7
	28	32.7	49.2	29.3	44.1	25.9	39.0	22.5	33.9	19.0	28.5	17.8	26.7
	29	31.6	47.5	28.3	42.6	25.0	37.6	21.8	32.7	18.3	27.6	17.2	25.8
	30	30.5	45.9	27.4	41.2	24.2	36.4	21.0	31.6	17.7	26.6	16.6	25.0
	32	28.6	43.0	25.7	38.6	22.7	34.1	19.7	29.6	16.6	25.0	15.6	23.4
	34	26.9	40.5	24.2	36.3	21.3	32.1	18.6	27.9	15.6	23.5	14.7	22.0
	36	25.4	38.3	22.8	34.3	20.2	30.3	17.5	26.4	14.8	22.2	13.8	20.8
	38	24.1	36.2	21.6	32.5	19.1	28.7	16.6	25.0	14.0	21.0	13.1	19.7
	40	22.9	34.4	20.5	30.9	18.1	27.3	15.8	23.7	13.3	20.0	12.5	18.7
	42	21.8	32.8	19.6	29.4	17.3	26.0	15.0	22.6	12.7	19.0	11.9	17.8
	44	20.8	31.3	18.7	28.1	16.5	24.8	14.3	21.6	12.1	18.2	11.3	17.0
	46	19.9	29.9	17.9	26.8	15.8	23.7	13.7	20.6	11.6	17.4	10.8	16.3
	48	19.1	28.7	17.1	25.7	15.1	22.7	13.1	19.8	11.1	16.7	10.4	15.6
	50	18.3	27.5	16.4	24.7	14.5	21.8	12.6	19.0	10.6	16.0	10.0	15.0
	52	17.6	26.5	15.8	23.7	14.0	21.0	12.1	18.2	10.2	15.4	9.58	14.4
	54	17.0	25.5	15.2	22.9	13.4	20.2	11.7	17.6	9.85	14.8	9.23	13.9
	56	16.4	24.6	14.7	22.1	13.0	19.5	11.3	16.9	9.50	14.3	8.90	13.4
	58	15.8	23.7	14.2	21.3	12.5	18.8	10.9	16.4	9.17	13.8	8.59	12.9
	60	15.3	23.0	13.7	20.6	12.1	18.2	10.5	15.8	8.86	13.3	8.30	12.5
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	916	1380	822	1230	726	1090	631	949	532	799	498	749
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	115	172	103	154	90.7	136	78.9	119	66.5	99.9	62.3	93.6
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	43.3	65.1	39.8	59.8	33.9	50.9	30.4	45.8	25.6	38.5	24.4	36.7
BF/Ω_b	$\varphi_b BF$, kips	3.82	5.74	3.73	5.60	2.17	3.27	2.28	3.43	2.33	3.50	2.30	3.45
V_n/Ω_v	$\varphi_v V_{nx}$, kips	88.9	134	66.4	99.9	88.9	134	61.0	91.8	55.4	83.2	45.3	68.0
Z_x, in.^{3}		76.5		68.6		60.6		52.7		44.4		41.6	
L_p, ft		2.30		2.40		2.28		2.34		2.20		2.26	
L_r, ft		20.9		19.3		28.4		23.6		19.7		18.8	

ASD	**LRFD**
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

S10-S7

Shape		S10×				S8×				S7×			
		35		25.4		23		18.4		20		15.3	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	6	70.1	105	56.1	84.3	38.1	57.3	32.5	48.9	28.5	42.9	23.8	35.7
	7	60.1	90.3	48.1	72.3	32.7	49.1	27.9	41.9	24.5	36.8	20.4	30.6
	8	52.5	79.0	42.1	63.2	28.6	43.0	24.4	36.7	21.4	32.2	17.8	26.8
	9	46.7	70.2	37.4	56.2	25.4	38.2	21.7	32.6	19.0	28.6	15.8	23.8
	10	42.0	63.2	33.7	50.6	22.9	34.4	19.5	29.3	17.1	25.7	14.3	21.4
	11	38.2	57.4	30.6	46.0	20.8	31.3	17.7	26.7	15.6	23.4	13.0	19.5
	12	35.0	52.7	28.0	42.2	19.1	28.7	16.3	24.5	14.3	21.5	11.9	17.9
	13	32.3	48.6	25.9	38.9	17.6	26.4	15.0	22.6	13.2	19.8	11.0	16.5
	14	30.0	45.1	24.0	36.1	16.3	24.6	13.9	21.0	12.2	18.4	10.2	15.3
	15	28.0	42.1	22.4	33.7	15.2	22.9	13.0	19.6	11.4	17.2	9.50	14.3
	16	26.3	39.5	21.0	31.6	14.3	21.5	12.2	18.3	10.7	16.1	8.91	13.4
	17	24.7	37.2	19.8	29.8	13.5	20.2	11.5	17.3	10.1	15.1	8.38	12.6
	18	23.4	35.1	18.7	28.1	12.7	19.1	10.8	16.3	9.51	14.3	7.92	11.9
	19	22.1	33.3	17.7	26.6	12.0	18.1	10.3	15.4	9.01	13.5	7.50	11.3
	20	21.0	31.6	16.8	25.3	11.4	17.2	9.76	14.7	8.56	12.9	7.13	10.7
	21	20.0	30.1	16.0	24.1	10.9	16.4	9.30	14.0	8.16	12.3	6.79	10.2
	22	19.1	28.7	15.3	23.0	10.4	15.6	8.87	13.3	7.78	11.7	6.48	9.74
	23	18.3	27.5	14.6	22.0	9.95	14.9	8.49	12.8	7.45	11.2	6.20	9.31
	24	17.5	26.3	14.0	21.1	9.53	14.3	8.13	12.2	7.14	10.7	5.94	8.93
	25	16.8	25.3	13.5	20.2	9.15	13.8	7.81	11.7	6.85	10.3	5.70	8.57
	26	16.2	24.3	12.9	19.5	8.80	13.2	7.51	11.3	6.59	9.90	5.48	8.24
	27	15.6	23.4	12.5	18.7	8.47	12.7	7.23	10.9	6.34	9.53	5.28	7.93
	28	15.0	22.6	12.0	18.1	8.17	12.3	6.97	10.5	6.12	9.19	5.09	7.65
	29	14.5	21.8	11.6	17.4	7.89	11.9	6.73	10.1	5.91	8.88	4.91	7.39
	30	14.0	21.1	11.2	16.9	7.62	11.5	6.51	9.78	5.71	8.58	4.75	7.14
	32	13.1	19.7	10.5	15.8	7.15	10.7	6.10	9.17	5.35	8.04	4.45	6.69
	34	12.4	18.6	9.90	14.9	6.73	10.1	5.74	8.63	5.04	7.57	4.19	6.30
	36	11.7	17.6	9.35	14.1	6.35	9.55	5.42	8.15	4.76	7.15	3.96	5.95
	38	11.1	16.6	8.86	13.3	6.02	9.05	5.14	7.72	4.51	6.77	3.75	5.64
	40	10.5	15.8	8.41	12.6	5.72	8.60	4.88	7.34	4.28	6.44	3.56	5.36
	42	10.0	15.0	8.01	12.0	5.45	8.19	4.65	6.99	4.08	6.13	3.39	5.10
	44	9.55	14.4	7.65	11.5	5.20	7.81	4.44	6.67	3.89	5.85	3.24	4.87
	46	9.14	13.7	7.32	11.0	4.97	7.47	4.24	6.38	3.72	5.60	3.10	4.66
	48	8.76	13.2	7.01	10.5	4.77	7.16	4.07	6.11	3.57	5.36	2.97	4.46
	50	8.41	12.6	6.73	10.1	4.57	6.88	3.90	5.87	3.43	5.15	2.85	4.28
	52	8.08	12.2	6.47	9.73	4.40	6.61	3.75	5.64	3.29	4.95	2.74	4.12
	54	7.78	11.7	6.23	9.37	4.24	6.37	3.61	5.43	3.17	4.77	2.64	3.97
	56	7.51	11.3	6.01	9.03	4.08	6.14	3.49	5.24	3.06	4.60	2.54	3.83
	58	7.25	10.9	5.80	8.72	3.94	5.93	3.37	5.06	2.95	4.44	2.46	3.69
	60	7.01	10.5	5.61	8.43	3.81	5.73	3.25	4.89	2.85	4.29	2.38	3.57
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	420	632	337	506	229	344	195	293	171	257	143	214
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	52.5	79.0	42.1	63.2	28.6	43.0	24.4	36.7	21.4	32.2	17.8	26.8
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	19.7	29.6	16.6	24.9	10.8	16.3	9.63	14.5	8.08	12.2	7.01	10.5
BF/Ω_b	$\varphi_b BF$, kips	1.45	2.18	1.54	2.32	0.942	1.42	0.962	1.45	0.677	1.02	0.727	1.09
V_n/Ω_v	$\varphi_v V_{nx}$, kips	64.0	96.2	33.5	50.4	38.0	57.2	23.4	35.1	34.0	51.0	19.0	28.6
Z_x, in.^{3}		35.1		28.1		19.1		16.3		14.3		11.9	
L_p, ft		2.02		2.16		1.79		1.88		1.65		1.73	
L_r, ft		24.7		18.7		20.6		17.2		21.3		16.6	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

S6-S4

Table 2-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

F_y = 30 ksi

Shape		**S6×**				**S5×**				**S4×**			
		17.25		**12.5**		**14.75**		**10**		**9.5**		**7.7**	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**6**	21.0	31.5	16.7	25.1	14.6	22.0	11.1	16.7	7.96	12.0	6.89	10.4
	7	18.0	27.0	14.3	21.5	12.5	18.8	9.55	14.3	6.83	10.3	5.90	8.87
	8	15.7	23.6	12.5	18.8	11.0	16.5	8.35	12.6	5.97	8.98	5.16	7.76
	9	14.0	21.0	11.1	16.7	9.75	14.7	7.43	11.2	5.31	7.98	4.59	6.90
	10	12.6	18.9	10.0	15.0	8.78	13.2	6.68	10.0	4.78	7.18	4.13	6.21
	11	11.4	17.2	9.10	13.7	7.98	12.0	6.08	9.13	4.34	6.53	3.76	5.65
	12	10.5	15.8	8.34	12.5	7.32	11.0	5.57	8.37	3.98	5.99	3.44	5.18
	13	9.67	14.5	7.70	11.6	6.75	10.1	5.14	7.73	3.68	5.52	3.18	4.78
	14	8.98	13.5	7.15	10.7	6.27	9.42	4.77	7.17	3.41	5.13	2.95	4.44
	15	8.38	12.6	6.67	10.0	5.85	8.80	4.46	6.70	3.19	4.79	2.75	4.14
	16	7.86	11.8	6.26	9.41	5.49	8.25	4.18	6.28	2.99	4.49	2.58	3.88
	17	7.40	11.1	5.89	8.85	5.16	7.76	3.93	5.91	2.81	4.22	2.43	3.65
	18	6.99	10.5	5.56	8.36	4.88	7.33	3.71	5.58	2.65	3.99	2.30	3.45
	19	6.62	9.95	5.27	7.92	4.62	6.94	3.52	5.29	2.51	3.78	2.17	3.27
	20	6.29	9.45	5.01	7.52	4.39	6.60	3.34	5.02	2.39	3.59	2.07	3.11
	21	5.99	9.00	4.77	7.17	4.18	6.28	3.18	4.78	2.28	3.42	1.97	2.96
	22	5.72	8.59	4.55	6.84	3.99	6.00	3.04	4.57	2.17	3.26	1.88	2.82
	23	5.47	8.22	4.35	6.54	3.82	5.74	2.91	4.37	2.08	3.12	1.80	2.70
	24	5.24	7.88	4.17	6.27	3.66	5.50	2.78	4.19	1.99	2.99	1.72	2.59
	25	5.03	7.56	4.00	6.02	3.51	5.28	2.67	4.02	1.91	2.87	1.65	2.48
	26	4.84	7.27	3.85	5.79	3.38	5.07	2.57	3.86	1.84	2.76	1.59	2.39
	27	4.66	7.00	3.71	5.57	3.25	4.89	2.48	3.72	1.77	2.66	1.53	2.30
	28	4.49	6.75	3.58	5.37	3.14	4.71	2.39	3.59	1.71	2.57	1.48	2.22
	29	4.34	6.52	3.45	5.19	3.03	4.55	2.30	3.46	1.65	2.48	1.42	2.14
	30	4.19	6.30	3.34	5.02	2.93	4.40	2.23	3.35	1.59	2.39	1.38	2.07
	32	3.93	5.91	3.13	4.70	2.74	4.12	2.09	3.14	1.49	2.24	1.29	1.94
	34	3.70	5.56	2.94	4.43	2.58	3.88	1.97	2.95	1.41	2.11	1.22	1.83
	36	3.49	5.25	2.78	4.18	2.44	3.67	1.86	2.79	1.33	2.00	1.15	1.73
	38	3.31	4.97	2.63	3.96	2.31	3.47	1.76	2.64	1.26	1.89	1.09	1.63
	40	3.14	4.73	2.50	3.76	2.19	3.30	1.67	2.51	1.19	1.80	1.03	1.55
	42	2.99	4.50	2.38	3.58	2.09	3.14	1.59	2.39	1.14	1.71	0.984	1.48
	44	2.86	4.30	2.28	3.42	2.00	3.00	1.52	2.28	1.09	1.63	0.939	1.41
	46	2.73	4.11	2.18	3.27	1.91	2.87	1.45	2.18	1.04	1.56	0.898	1.35
	48	2.62	3.94	2.09	3.14	1.83	2.75	1.39	2.09	1.00	1.50	0.861	1.29
	50	2.51	3.78	2.00	3.01	1.76	2.64	1.34	2.01	0.956	1.44	0.826	1.24
	52	2.42	3.63	1.93	2.89	1.69	2.54	1.29	1.93	0.919	1.38	0.795	1.19
	54	2.33	3.50	1.85	2.79	1.63	2.44	1.24	1.86	0.885	1.33	0.765	1.15
	56	2.25	3.38	1.79	2.69	1.57	2.36	1.19	1.79	0.853	1.28	0.738	1.11
	58	2.17	3.26	1.73	2.59	1.51	2.27	1.15	1.73	0.824	1.24	0.712	1.07
	60	2.10	3.15	1.67	2.51	1.46	2.20	1.11	1.67	0.796	1.20	0.689	1.04
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	126	189	100	150	87.8	132	66.8	100	47.8	71.8	41.3	62.1
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	15.7	23.6	12.5	18.8	11.0	16.5	8.35	12.6	5.97	8.98	5.16	7.76
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	5.86	8.81	4.92	7.39	4.07	6.12	3.29	4.94	2.27	3.41	2.03	3.05
BF/Ω_b	$\varphi_b BF$, kips	0.462	0.694	0.523	0.787	0.282	0.423	0.351	0.528	0.198	0.297	0.214	0.322
V_n/Ω_v	$\varphi_v V_{nx}$, kips	30.1	45.2	15.0	22.6	26.6	40.0	11.5	17.3	14.1	21.1	8.32	12.5
Z_x, in.^{3}		10.5		8.36		7.33		5.58		3.99		3.45	
L_p, ft		1.51		1.59		1.38		1.45		1.28		1.31	
L_r, ft		22.9		16.1		25.9		15.9		20.0		16.0	

ASD	**LRFD**
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

S3

Shape		S3×			
		7.5		5.7	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	6	4.63	6.96	3.83	5.76
	7	3.97	5.97	3.28	4.94
	8	3.47	5.22	2.87	4.32
	9	3.09	4.64	2.55	3.84
	10	2.78	4.18	2.30	3.46
	11	2.53	3.80	2.09	3.14
	12	2.32	3.48	1.92	2.88
	13	2.14	3.21	1.77	2.66
	14	1.98	2.98	1.64	2.47
	15	1.85	2.78	1.53	2.30
	16	1.74	2.61	1.44	2.16
	17	1.63	2.46	1.35	2.03
	18	1.54	2.32	1.28	1.92
	19	1.46	2.20	1.21	1.82
	20	1.39	2.09	1.15	1.73
	21	1.32	1.99	1.09	1.65
	22	1.26	1.90	1.05	1.57
	23	1.21	1.82	1.00	1.50
	24	1.16	1.74	0.958	1.44
	25	1.11	1.67	0.920	1.38
	26	1.07	1.61	0.884	1.33
	27	1.03	1.55	0.852	1.28
	28	0.992	1.49	0.821	1.23
	29	0.958	1.44	0.793	1.19
	30	0.926	1.39	0.766	1.15
	32	0.868	1.31	0.719	1.08
	34	0.817	1.23	0.676	1.02
	36	0.772	1.16	0.639	0.960
	38	0.731	1.10	0.605	0.909
	40	0.695	1.04	0.575	0.864
	42	0.662	0.994	0.547	0.823
	44	0.631	0.949	0.523	0.785
	46	0.604	0.908	0.500	0.751
	48	0.579	0.870	0.479	0.720
	50	0.556	0.835	0.460	0.691
	52	0.534	0.803	0.442	0.665
	54	0.515	0.773	0.426	0.640
	56	0.496	0.746	0.411	0.617
	58	0.479	0.720	0.396	0.596
	60	0.463	0.696	0.383	0.576
Beam Properties					
W_c/Ω_b	$\varphi_b W_c$, kip-ft	27.8	41.8	23.0	34.6
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	3.47	5.22	2.87	4.32
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	1.30	1.95	1.13	1.69
BF/Ω_b	$\varphi_b BF$, kips	0.094	0.141	0.111	0.167
V_n/Ω_v	$\varphi_v V_{nx}$, kips	11.3	17.0	5.50	8.26
Z_x, in.^{3}		2.32		1.92	
L_p, ft		1.15		1.18	
L_r, ft		24.4		16.9	

ASD	**LRFD**
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

S6-S3

Table 2-5
Maximum Total Uniform Load, kips
S-Shapes (Hot Rolled)

F_y = 30 ksi

Shape		S6×		S5×		S4×		S3×	
		12.5		10		7.7		5.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	6	16.9	25.4	11.3	17.0	6.99	10.5	3.87	5.82
	7	14.5	21.7	9.68	14.6	5.99	9.00	3.32	4.99
	8	12.6	19.0	8.47	12.7	5.24	7.88	2.90	4.37
	9	11.2	16.9	7.53	11.3	4.66	7.00	2.58	3.88
	10	10.1	15.2	6.78	10.2	4.19	6.30	2.32	3.49
	11	9.20	13.8	6.16	9.26	3.81	5.73	2.11	3.17
	12	8.43	12.7	5.65	8.49	3.49	5.25	1.94	2.91
	13	7.78	11.7	5.21	7.84	3.22	4.85	1.79	2.69
	14	7.23	10.9	4.84	7.28	2.99	4.50	1.66	2.49
	15	6.75	10.1	4.52	6.79	2.79	4.20	1.55	2.33
	16	6.32	9.51	4.24	6.37	2.62	3.94	1.45	2.18
	17	5.95	8.95	3.99	5.99	2.47	3.71	1.37	2.05
	18	5.62	8.45	3.77	5.66	2.33	3.50	1.29	1.94
	19	5.33	8.01	3.57	5.36	2.21	3.32	1.22	1.84
	20	5.06	7.61	3.39	5.09	2.10	3.15	1.16	1.75
	21	4.82	7.24	3.23	4.85	2.00	3.00	1.11	1.66
	22	4.60	6.91	3.08	4.63	1.91	2.86	1.06	1.59
	23	4.40	6.61	2.95	4.43	1.82	2.74	1.01	1.52
	24	4.22	6.34	2.82	4.25	1.75	2.63	0.968	1.46
	25	4.05	6.08	2.71	4.08	1.68	2.52	0.929	1.40
	26	3.89	5.85	2.61	3.92	1.61	2.42	0.894	1.34
	27	3.75	5.63	2.51	3.77	1.55	2.33	0.861	1.29
	28	3.61	5.43	2.42	3.64	1.50	2.25	0.830	1.25
	29	3.49	5.24	2.34	3.51	1.45	2.17	0.801	1.20
	30	3.37	5.07	2.26	3.40	1.40	2.10	0.774	1.16
	32	3.16	4.75	2.12	3.18	1.31	1.97	0.726	1.09
	34	2.98	4.47	1.99	3.00	1.23	1.85	0.683	1.03
	36	2.81	4.23	1.88	2.83	1.16	1.75	0.645	0.970
	38	2.66	4.00	1.78	2.68	1.10	1.66	0.611	0.919
	40	2.53	3.80	1.69	2.55	1.05	1.58	0.581	0.873
	42	2.41	3.62	1.61	2.43	1.00	1.50	0.553	0.831
	44	2.30	3.46	1.54	2.32	0.953	1.43	0.528	0.794
	46	2.20	3.31	1.47	2.21	0.911	1.37	0.505	0.759
	48	2.11	3.17	1.41	2.12	0.873	1.31	0.484	0.728
	50	2.02	3.04	1.36	2.04	0.838	1.26	0.465	0.698
	52	1.95	2.93	1.30	1.96	0.806	1.21	0.447	0.672
	54	1.87	2.82	1.26	1.89	0.776	1.17	0.430	0.647
	56	1.81	2.72	1.21	1.82	0.749	1.13	0.415	0.624
	58	1.74	2.62	1.17	1.76	0.723	1.09	0.401	0.602
	60	1.69	2.54	1.13	1.70	0.699	1.05	0.387	0.582
Beam Properties									
W_c/Ω_b	$\varphi_b W_c$, kip-ft	101	152	67.8	102	41.9	63.0	23.2	34.9
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	12.6	19.0	8.47	12.7	5.24	7.88	2.90	4.37
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	4.94	7.43	3.30	4.96	2.04	3.07	1.13	1.69
BF/Ω_b	$\varphi_b BF$, kips	0.507	0.762	0.338	0.508	0.203	0.305	0.104	0.157
V_n/Ω_v	$\varphi_v V_{nx}$, kips	15.0	22.6	11.5	17.3	8.32	12.5	5.50	8.26
Z_x, in.^{3}		8.45		5.66		3.50		1.94	
L_p, ft		1.43		1.30		1.17		1.06	
L_r, ft		16.6		16.6		16.9		18.1	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

C15-C12

Table 2-6
Maximum Total Uniform Load, kips
C-Shapes (Welded)

***F_y* = 30 ksi**

Shape		C15×						C12×					
		50		40		33.9		30		25		20.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	232	348					132	198	100	150		
	4	204	307	168	252	129	194	101	152	87.7	132	73.0	110
	5	164	246	137	206	121	182	80.7	121	70.2	105	61.1	91.8
	6	136	205	114	172	101	152	67.3	101	58.5	87.9	50.9	76.5
	7	117	176	97.9	147	86.4	130	57.7	86.7	50.1	75.3	43.6	65.6
	8	102	154	85.6	129	75.6	114	50.4	75.8	43.9	65.9	38.2	57.4
	9	90.9	137	76.1	114	67.2	101	44.8	67.4	39.0	58.6	33.9	51.0
	10	81.8	123	68.5	103	60.5	90.9	40.4	60.7	35.1	52.7	30.5	45.9
	11	74.4	112	62.3	93.6	55.0	82.6	36.7	55.1	31.9	47.9	27.8	41.7
	12	68.2	102	57.1	85.8	50.4	75.8	33.6	50.6	29.2	44.0	25.4	38.3
	13	62.9	94.6	52.7	79.2	46.5	69.9	31.0	46.7	27.0	40.6	23.5	35.3
	14	58.4	87.8	48.9	73.5	43.2	64.9	28.8	43.3	25.1	37.7	21.8	32.8
	15	54.5	82.0	45.7	68.6	40.3	60.6	26.9	40.4	23.4	35.2	20.4	30.6
	16	51.1	76.8	42.8	64.4	37.8	56.8	25.2	37.9	21.9	33.0	19.1	28.7
	17	48.1	72.3	40.3	60.6	35.6	53.5	23.7	35.7	20.6	31.0	18.0	27.0
	18	45.4	68.3	38.1	57.2	33.6	50.5	22.4	33.7	19.5	29.3	17.0	25.5
	19	43.1	64.7	36.1	54.2	31.8	47.8	21.2	31.9	18.5	27.8	16.1	24.2
	20	40.9	61.5	34.3	51.5	30.2	45.5	20.2	30.3	17.5	26.4	15.3	23.0
	21	39.0	58.5	32.6	49.0	28.8	43.3	19.2	28.9	16.7	25.1	14.5	21.9
	22	37.2	55.9	31.1	46.8	27.5	41.3	18.3	27.6	15.9	24.0	13.9	20.9
	23	35.6	53.5	29.8	44.8	26.3	39.5	17.5	26.4	15.3	22.9	13.3	20.0
	24	34.1	51.2	28.5	42.9	25.2	37.9	16.8	25.3	14.6	22.0	12.7	19.1
	25	32.7	49.2	27.4	41.2	24.2	36.4	16.1	24.3	14.0	21.1	12.2	18.4
	26	31.5	47.3	26.3	39.6	23.3	35.0	15.5	23.3	13.5	20.3	11.7	17.7
	27	30.3	45.5	25.4	38.1	22.4	33.7	14.9	22.5	13.0	19.5	11.3	17.0
	28	29.2	43.9	24.5	36.8	21.6	32.5	14.4	21.7	12.5	18.8	10.9	16.4
	29	28.2	42.4	23.6	35.5	20.9	31.3	13.9	20.9	12.1	18.2	10.5	15.8
	30	27.3	41.0	22.8	34.3	20.2	30.3	13.5	20.2	11.7	17.6	10.2	15.3
	31	26.4	39.7	22.1	33.2	19.5	29.3	13.0	19.6	11.3	17.0	9.85	14.8
	32	25.6	38.4	21.4	32.2	18.9	28.4	12.6	19.0	11.0	16.5	9.54	14.3
	33	24.8	37.3	20.8	31.2	18.3	27.5	12.2	18.4	10.6	16.0	9.25	13.9
	34	24.1	36.2	20.1	30.3	17.8	26.7	11.9	17.8	10.3	15.5	8.98	13.5
	35	23.4	35.1	19.6	29.4	17.3	26.0	11.5	17.3	10.0	15.1	8.73	13.1
	36	22.7	34.2	19.0	28.6	16.8	25.3	11.2	16.9	9.75	14.7	8.48	12.8
	37	22.1	33.2	18.5	27.8	16.3	24.6	10.9	16.4	9.48	14.3	8.25	12.4
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	818	1230	685	1030	605	909	404	607	351	527	305	459
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	102	154	85.6	129	75.6	114	50.4	75.8	43.9	65.9	38.2	57.4
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	36.2	54.4	31.2	46.9	28.1	42.2	18.2	27.3	16.2	24.3	14.5	21.8
BF/Ω_b	$\varphi_b BF$, kips	3.12	4.68	3.27	4.91	3.22	4.84	1.96	2.95	2.01	3.02	1.95	2.93
V_n/Ω_v	$\varphi_v V_{nx}$, kips	116	174	84.1	126	64.7	97.2	66.0	99.1	50.1	75.2	36.5	54.8
Z_x, in.^{3}		68.3		57.2		50.5		33.7		29.3		25.5	
L_p, ft		1.94		1.99		2.03		1.73		1.78		1.82	
L_r, ft		23.1		18.7		16.8		18.2		15.6		14.0	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 2-6 (continued)

Maximum Total Uniform Load, kips

C-Shapes (Welded)

C10-C9

Shape		C10×								C9×			
		30		25		20		15.3		20		15	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	107	160	91.8	138	77.0	116	51.8	77.8	67.5	101	54.3	81.6
	4	79.9	120	68.9	104	57.8	86.9	47.3	71.1	50.6	76.1	40.7	61.2
	5	64.0	96.1	55.1	82.8	46.2	69.5	37.8	56.9	40.5	60.8	32.6	49.0
	6	53.3	80.1	45.9	69.0	38.5	57.9	31.5	47.4	33.7	50.7	27.1	40.8
	7	45.7	68.7	39.3	59.1	33.0	49.6	27.0	40.6	28.9	43.5	23.3	35.0
	8	40.0	60.1	34.4	51.8	28.9	43.4	23.7	35.6	25.3	38.0	20.4	30.6
	9	35.5	53.4	30.6	46.0	25.7	38.6	21.0	31.6	22.5	33.8	18.1	27.2
	10	32.0	48.1	27.5	41.4	23.1	34.7	18.9	28.4	20.2	30.4	16.3	24.5
	11	29.1	43.7	25.0	37.6	21.0	31.6	17.2	25.9	18.4	27.7	14.8	22.3
	12	26.6	40.1	23.0	34.5	19.3	29.0	15.8	23.7	16.9	25.4	13.6	20.4
	13	24.6	37.0	21.2	31.8	17.8	26.7	14.6	21.9	15.6	23.4	12.5	18.8
	14	22.8	34.3	19.7	29.6	16.5	24.8	13.5	20.3	14.5	21.7	11.6	17.5
	15	21.3	32.0	18.4	27.6	15.4	23.2	12.6	19.0	13.5	20.3	10.9	16.3
	16	20.0	30.0	17.2	25.9	14.4	21.7	11.8	17.8	12.6	19.0	10.2	15.3
	17	18.8	28.3	16.2	24.4	13.6	20.4	11.1	16.7	11.9	17.9	9.58	14.4
	18	17.8	26.7	15.3	23.0	12.8	19.3	10.5	15.8	11.2	16.9	9.05	13.6
	19	16.8	25.3	14.5	21.8	12.2	18.3	10.0	15.0	10.7	16.0	8.57	12.9
	20	16.0	24.0	13.8	20.7	11.6	17.4	9.46	14.2	10.1	15.2	8.14	12.2
	21	15.2	22.9	13.1	19.7	11.0	16.5	9.01	13.5	9.64	14.5	7.76	11.7
	22	14.5	21.8	12.5	18.8	10.5	15.8	8.60	12.9	9.20	13.8	7.40	11.1
	23	13.9	20.9	12.0	18.0	10.0	15.1	8.23	12.4	8.80	13.2	7.08	10.6
	24	13.3	20.0	11.5	17.3	9.63	14.5	7.88	11.9	8.43	12.7	6.79	10.2
	25	12.8	19.2	11.0	16.6	9.25	13.9	7.57	11.4	8.10	12.2	6.51	9.79
	26	12.3	18.5	10.6	15.9	8.89	13.4	7.28	10.9	7.78	11.7	6.26	9.42
	27	11.8	17.8	10.2	15.3	8.56	12.9	7.01	10.5	7.50	11.3	6.03	9.07
	28	11.4	17.2	9.84	14.8	8.25	12.4	6.76	10.2	7.23	10.9	5.82	8.74
	29	11.0	16.6	9.50	14.3	7.97	12.0	6.52	9.81	6.98	10.5	5.62	8.44
	30	10.7	16.0	9.18	13.8	7.70	11.6	6.31	9.48	6.75	10.1	5.43	8.16
	31	10.3	15.5	8.89	13.4	7.46	11.2	6.10	9.17	6.53	9.81	5.25	7.90
	32	10.0	15.0	8.61	12.9	7.22	10.9	5.91	8.89	6.32	9.51	5.09	7.65
	33	9.69	14.6	8.35	12.5	7.00	10.5	5.73	8.62	6.13	9.22	4.94	7.42
	34	9.40	14.1	8.10	12.2	6.80	10.2	5.57	8.36	5.95	8.95	4.79	7.20
	35	9.14	13.7	7.87	11.8	6.60	9.93	5.41	8.13	5.78	8.69	4.65	6.99
	36	8.88	13.4	7.65	11.5	6.42	9.65	5.26	7.90	5.62	8.45	4.52	6.80
	37	8.64	13.0	7.44	11.2	6.25	9.39	5.11	7.69	5.47	8.22	4.40	6.62
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	320	481	275	414	231	347	189	284	202	304	163	245
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	40.0	60.1	34.4	51.8	28.9	43.4	23.7	35.6	25.3	38.0	20.4	30.6
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	13.9	20.9	12.3	18.4	10.6	15.9	9.03	13.6	9.09	13.7	7.61	11.4
BF/Ω_b	$\varphi_b BF$, kips	1.15	1.73	1.27	1.90	1.36	2.04	1.32	1.99	1.04	1.57	1.10	1.65
V_n/Ω_v	$\varphi_v V_{nx}$, kips	72.5	109	56.7	85.2	40.9	61.4	25.9	38.9	43.5	65.3	27.6	41.6
Z_x, in.^{3}		26.7		23.0		19.3		15.8		16.9		13.6	
L_p, ft		1.51		1.54		1.58		1.63		1.46		1.51	
L_r, ft		24.2		19.0		15.1		12.7		17.0		13.1	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

C9-C7

Table 2-6 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Welded)

F_y = 30 ksi

Shape		C9×		C8×						C7×			
		13.4		18.75		13.75		11.5		14.75		12.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	45.2	68.0	55.5	83.4	43.5	65.4	38.0	57.0	38.7	58.2	33.5	50.4
	4	37.4	56.3	41.6	62.6	32.6	49.1	28.7	43.1	29.0	43.7	25.1	37.8
	5	29.9	45.0	33.3	50.0	26.1	39.2	22.9	34.5	23.2	34.9	20.1	30.2
	6	25.0	37.5	27.7	41.7	21.8	32.7	19.1	28.7	19.4	29.1	16.8	25.2
	7	21.4	32.1	23.8	35.7	18.6	28.0	16.4	24.6	16.6	24.9	14.4	21.6
	8	18.7	28.1	20.8	31.3	16.3	24.5	14.3	21.5	14.5	21.8	12.6	18.9
	9	16.6	25.0	18.5	27.8	14.5	21.8	12.7	19.1	12.9	19.4	11.2	16.8
	10	15.0	22.5	16.6	25.0	13.1	19.6	11.5	17.2	11.6	17.5	10.1	15.1
	11	13.6	20.5	15.1	22.7	11.9	17.8	10.4	15.7	10.6	15.9	9.15	13.7
	12	12.5	18.8	13.9	20.9	10.9	16.4	9.55	14.4	9.68	14.6	8.38	12.6
	13	11.5	17.3	12.8	19.2	10.0	15.1	8.82	13.3	8.94	13.4	7.74	11.6
	14	10.7	16.1	11.9	17.9	9.32	14.0	8.19	12.3	8.30	12.5	7.19	10.8
	15	9.98	15.0	11.1	16.7	8.70	13.1	7.64	11.5	7.74	11.6	6.71	10.1
	16	9.36	14.1	10.4	15.6	8.16	12.3	7.16	10.8	7.26	10.9	6.29	9.45
	17	8.81	13.2	9.79	14.7	7.68	11.5	6.74	10.1	6.83	10.3	5.92	8.89
	18	8.32	12.5	9.25	13.9	7.25	10.9	6.37	9.57	6.45	9.70	5.59	8.40
	19	7.88	11.8	8.76	13.2	6.87	10.3	6.03	9.07	6.11	9.19	5.29	7.96
	20	7.49	11.3	8.32	12.5	6.53	9.81	5.73	8.61	5.81	8.73	5.03	7.56
	21	7.13	10.7	7.93	11.9	6.22	9.34	5.46	8.20	5.53	8.31	4.79	7.20
	22	6.80	10.2	7.57	11.4	5.93	8.92	5.21	7.83	5.28	7.94	4.57	6.87
	23	6.51	9.78	7.24	10.9	5.68	8.53	4.98	7.49	5.05	7.59	4.37	6.57
	24	6.24	9.38	6.94	10.4	5.44	8.18	4.78	7.18	4.84	7.28	4.19	6.30
	25	5.99	9.00	6.66	10.0	5.22	7.85	4.58	6.89	4.65	6.98	4.02	6.05
	26	5.76	8.65	6.40	9.62	5.02	7.55	4.41	6.63	4.47	6.72	3.87	5.82
	27	5.54	8.33	6.17	9.27	4.83	7.27	4.24	6.38	4.30	6.47	3.73	5.60
	28	5.35	8.04	5.95	8.94	4.66	7.01	4.09	6.15	4.15	6.24	3.59	5.40
	29	5.16	7.76	5.74	8.63	4.50	6.77	3.95	5.94	4.01	6.02	3.47	5.21
	30	4.99	7.50	5.55	8.34	4.35	6.54	3.82	5.74	3.87	5.82	3.35	5.04
	31	4.83	7.26	5.37	8.07	4.21	6.33	3.70	5.56	3.75	5.63	3.25	4.88
	32	4.68	7.03	5.20	7.82	4.08	6.13	3.58	5.38	3.63	5.46	3.14	4.73
	33	4.54	6.82	5.04	7.58	3.96	5.95	3.47	5.22	3.52	5.29	3.05	4.58
	34	4.40	6.62	4.90	7.36	3.84	5.77	3.37	5.07	3.42	5.14	2.96	4.45
	35	4.28	6.43	4.76	7.15	3.73	5.61	3.27	4.92	3.32	4.99	2.87	4.32
	36	4.16	6.25	4.62	6.95	3.63	5.45	3.18	4.79	3.23	4.85	2.79	4.20
	37	4.05	6.08	4.50	6.76	3.53	5.30	3.10	4.66	3.14	4.72	2.72	4.09
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	150	225	166	250	131	196	115	172	116	175	101	151
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	18.7	28.1	20.8	31.3	16.3	24.5	14.3	21.5	14.5	21.8	12.6	18.9
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	7.14	10.7	7.41	11.1	6.06	9.11	5.46	8.20	5.21	7.84	4.64	6.98
BF/Ω_b	$\varphi_b BF$, kips	1.08	1.62	0.770	1.16	0.856	1.29	0.842	1.27	0.588	0.884	0.635	0.954
V_n/Ω_v	$\varphi_v V_{nx}$, kips	22.6	34.0	42.0	63.1	26.1	39.3	19.0	28.5	31.6	47.5	23.7	35.6
Z_x, in.^{3}		12.5		13.9		10.9		9.57		9.70		8.40	
L_p, ft		1.52		1.36		1.39		1.42		1.27		1.29	
L_r, ft		12.3		18.8		13.4		12.0		17.1		13.8	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-6 (continued)

Maximum Total Uniform Load, kips

C-Shapes (Welded)

C7-C5

Shape		C7×		C6×						C5×			
		9.8		13		10.5		8.2		9		6.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	28.5	42.8	29.1	43.7	24.6	37.0	20.5	30.8	17.4	26.2	14.1	21.1
	4	21.4	32.1	21.8	32.8	18.4	27.7	15.4	23.1	13.1	19.7	10.5	15.8
	5	17.1	25.7	17.4	26.2	14.8	22.2	12.3	18.5	10.5	15.7	8.43	12.7
	6	14.3	21.4	14.5	21.8	12.3	18.5	10.3	15.4	8.72	13.1	7.03	10.6
	7	12.2	18.4	12.5	18.7	10.5	15.8	8.79	13.2	7.48	11.2	6.02	9.05
	8	10.7	16.1	10.9	16.4	9.22	13.9	7.69	11.6	6.54	9.83	5.27	7.92
	9	9.50	14.3	9.69	14.6	8.20	12.3	6.84	10.3	5.82	8.74	4.68	7.04
	10	8.55	12.9	8.72	13.1	7.38	11.1	6.16	9.25	5.23	7.87	4.22	6.34
	11	7.77	11.7	7.93	11.9	6.71	10.1	5.60	8.41	4.76	7.15	3.83	5.76
	12	7.13	10.7	7.27	10.9	6.15	9.24	5.13	7.71	4.36	6.56	3.51	5.28
	13	6.58	9.89	6.71	10.1	5.67	8.53	4.74	7.12	4.03	6.05	3.24	4.87
	14	6.11	9.18	6.23	9.36	5.27	7.92	4.40	6.61	3.74	5.62	3.01	4.53
	15	5.70	8.57	5.81	8.74	4.92	7.39	4.10	6.17	3.49	5.24	2.81	4.22
	16	5.34	8.03	5.45	8.19	4.61	6.93	3.85	5.78	3.27	4.92	2.63	3.96
	17	5.03	7.56	5.13	7.71	4.34	6.52	3.62	5.44	3.08	4.63	2.48	3.73
	18	4.75	7.14	4.84	7.28	4.10	6.16	3.42	5.14	2.91	4.37	2.34	3.52
	19	4.50	6.76	4.59	6.90	3.88	5.84	3.24	4.87	2.75	4.14	2.22	3.33
	20	4.28	6.43	4.36	6.55	3.69	5.54	3.08	4.63	2.62	3.93	2.11	3.17
	21	4.07	6.12	4.15	6.24	3.51	5.28	2.93	4.41	2.49	3.75	2.01	3.02
	22	3.89	5.84	3.96	5.96	3.35	5.04	2.80	4.21	2.38	3.58	1.92	2.88
	23	3.72	5.59	3.79	5.70	3.21	4.82	2.68	4.02	2.28	3.42	1.83	2.75
	24	3.56	5.36	3.63	5.46	3.07	4.62	2.56	3.86	2.18	3.28	1.76	2.64
	25	3.42	5.14	3.49	5.24	2.95	4.44	2.46	3.70	2.09	3.15	1.69	2.53
	26	3.29	4.94	3.35	5.04	2.84	4.26	2.37	3.56	2.01	3.03	1.62	2.44
	27	3.17	4.76	3.23	4.85	2.73	4.11	2.28	3.43	1.94	2.91	1.56	2.35
	28	3.05	4.59	3.11	4.68	2.63	3.96	2.20	3.30	1.87	2.81	1.51	2.26
	29	2.95	4.43	3.01	4.52	2.54	3.82	2.12	3.19	1.80	2.71	1.45	2.18
	30	2.85	4.28	2.91	4.37	2.46	3.70	2.05	3.08	1.74	2.62	1.41	2.11
	31	2.76	4.15	2.81	4.23	2.38	3.58	1.99	2.98	1.69	2.54	1.36	2.04
	32	2.67	4.02	2.72	4.10	2.31	3.47	1.92	2.89	1.64	2.46	1.32	1.98
	33	2.59	3.89	2.64	3.97	2.24	3.36	1.87	2.80	1.59	2.38	1.28	1.92
	34	2.51	3.78	2.56	3.85	2.17	3.26	1.81	2.72	1.54	2.31	1.24	1.86
	35	2.44	3.67	2.49	3.74	2.11	3.17	1.76	2.64	1.50	2.25	1.20	1.81
	36	2.38	3.57	2.42	3.64	2.05	3.08	1.71	2.57	1.45	2.19	1.17	1.76
	37	2.31	3.47	2.36	3.54	1.99	3.00	1.66	2.50	1.41	2.13	1.14	1.71
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	85.5	129	87.2	131	73.8	111	61.6	92.5	52.3	78.7	42.2	63.4
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	10.7	16.1	10.9	16.4	9.22	13.9	7.69	11.6	6.54	9.83	5.27	7.92
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	4.08	6.14	3.89	5.84	3.39	5.09	2.94	4.42	2.39	3.59	2.01	3.02
BF/Ω_b	$\varphi_b BF$, kips	0.640	0.963	0.400	0.602	0.447	0.671	0.463	0.695	0.288	0.432	0.310	0.466
V_n/Ω_v	$\varphi_v V_{nx}$, kips	15.8	23.8	28.3	42.5	20.3	30.5	12.9	19.4	17.5	26.3	10.2	15.4
Z_x, in.^{3}		7.14		7.28		6.16		5.14		4.37		3.52	
L_p, ft		1.32		1.18		1.19		1.21		1.11		1.11	
L_r, ft		11.6		18.7		14.3		11.5		15.5		11.6	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Table 2-6 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Welded)

F_y = 30 ksi

Shape		C4×				C3×					
		7.25		5.4		6		5		4.1	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	11.3	16.9	9.06	13.6	6.91	10.4	6.03	9.06	5.23	7.86
	4	8.44	12.7	6.80	10.2	5.18	7.79	4.52	6.80	3.92	5.90
	5	6.75	10.2	5.44	8.17	4.14	6.23	3.62	5.44	3.14	4.72
	6	5.63	8.46	4.53	6.81	3.45	5.19	3.01	4.53	2.61	3.93
	7	4.82	7.25	3.88	5.84	2.96	4.45	2.58	3.88	2.24	3.37
	8	4.22	6.35	3.40	5.11	2.59	3.89	2.26	3.40	1.96	2.95
	9	3.75	5.64	3.02	4.54	2.30	3.46	2.01	3.02	1.74	2.62
	10	3.38	5.08	2.72	4.09	2.07	3.11	1.81	2.72	1.57	2.36
	11	3.07	4.61	2.47	3.71	1.88	2.83	1.64	2.47	1.43	2.14
	12	2.81	4.23	2.27	3.41	1.73	2.60	1.51	2.27	1.31	1.97
	13	2.60	3.90	2.09	3.14	1.59	2.40	1.39	2.09	1.21	1.81
	14	2.41	3.63	1.94	2.92	1.48	2.22	1.29	1.94	1.12	1.68
	15	2.25	3.38	1.81	2.72	1.38	2.08	1.21	1.81	1.05	1.57
	16	2.11	3.17	1.70	2.55	1.29	1.95	1.13	1.70	0.981	1.47
	17	1.99	2.99	1.60	2.40	1.22	1.83	1.06	1.60	0.923	1.39
	18	1.88	2.82	1.51	2.27	1.15	1.73	1.00	1.51	0.872	1.31
	19	1.78	2.67	1.43	2.15	1.09	1.64	0.952	1.43	0.826	1.24
	20	1.69	2.54	1.36	2.04	1.04	1.56	0.904	1.36	0.784	1.18
	21	1.61	2.42	1.29	1.95	0.987	1.48	0.861	1.29	0.747	1.12
	22	1.54	2.31	1.24	1.86	0.942	1.42	0.822	1.24	0.713	1.07
	23	1.47	2.21	1.18	1.78	0.901	1.35	0.786	1.18	0.682	1.03
	24	1.41	2.12	1.13	1.70	0.863	1.30	0.753	1.13	0.654	0.983
	25	1.35	2.03	1.09	1.63	0.829	1.25	0.723	1.09	0.628	0.943
	26	1.30	1.95	1.05	1.57	0.797	1.20	0.696	1.05	0.603	0.907
	27	1.25	1.88	1.01	1.51	0.767	1.15	0.670	1.01	0.581	0.873
	28	1.21	1.81	0.971	1.46	0.740	1.11	0.646	0.971	0.560	0.842
	29	1.16	1.75	0.937	1.41	0.714	1.07	0.624	0.937	0.541	0.813
	30	1.13	1.69	0.906	1.36	0.691	1.04	0.603	0.906	0.523	0.786
	31	1.09	1.64	0.877	1.32	0.668	1.00	0.583	0.877	0.506	0.761
	32	1.06	1.59	0.850	1.28	0.647	0.973	0.565	0.849	0.490	0.737
	33	1.02	1.54	0.824	1.24	0.628	0.944	0.548	0.824	0.475	0.715
	34	0.993	1.49	0.800	1.20	0.609	0.916	0.532	0.799	0.461	0.694
	35	0.965	1.45	0.777	1.17	0.592	0.890	0.517	0.777	0.448	0.674
	36	0.938	1.41	0.755	1.14	0.576	0.865	0.502	0.755	0.436	0.655
	37	0.913	1.37	0.735	1.10	0.560	0.842	0.489	0.735	0.424	0.637
Beam Properties											
W_c/Ω_b	$\varphi_b W_c$, kip-ft	33.8	50.8	27.2	40.9	20.7	31.1	18.1	27.2	15.7	23.6
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	4.22	6.35	3.40	5.11	2.59	3.89	2.26	3.40	1.96	2.95
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	1.54	2.31	1.29	1.93	0.930	1.40	0.829	1.25	0.741	1.11
BF/Ω_b	$\varphi_b BF$, kips	0.171	0.257	0.190	0.285	0.083	0.125	0.093	0.140	0.099	0.149
V_n/Ω_v	$\varphi_v V_{nx}$, kips	13.8	20.8	7.93	11.9	11.5	17.3	8.34	12.5	5.50	8.26
Z_x, in.^{3}		2.82		2.27		1.73		1.51		1.31	
L_p, ft		1.01		1.00		0.931		0.919		0.900	
L_r, ft		16.7		12.1		20.9		16.3		13.2	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

C8-C4

Table 2-7
Maximum Total Uniform Load, kips
C-Shapes (Hot Rolled)

F_y = 30 ksi

Shape		C8×		C6×				C5×				C4×	
		18.75		10.5		8.2		9		6.7		7.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	55.5	83.4	24.7	37.1	20.6	31.0	17.5	26.3	14.2	21.3	11.3	17.0
	4	41.6	62.6	18.5	27.8	15.4	23.2	13.1	19.8	10.6	16.0	8.50	12.8
	5	33.3	50.0	14.8	22.2	12.4	18.6	10.5	15.8	8.50	12.8	6.80	10.2
	6	27.7	41.7	12.3	18.5	10.3	15.5	8.76	13.2	7.09	10.7	5.67	8.52
	7	23.8	35.7	10.6	15.9	8.83	13.3	7.51	11.3	6.07	9.13	4.86	7.30
	8	20.8	31.3	9.25	13.9	7.72	11.6	6.57	9.88	5.31	7.99	4.25	6.39
	9	18.5	27.8	8.22	12.4	6.87	10.3	5.84	8.78	4.72	7.10	3.78	5.68
	10	16.6	25.0	7.40	11.1	6.18	9.29	5.26	7.90	4.25	6.39	3.40	5.11
	11	15.1	22.7	6.73	10.1	5.62	8.44	4.78	7.18	3.86	5.81	3.09	4.65
	12	13.9	20.9	6.17	9.27	5.15	7.74	4.38	6.59	3.54	5.33	2.83	4.26
	13	12.8	19.2	5.69	8.56	4.75	7.14	4.04	6.08	3.27	4.92	2.62	3.93
	14	11.9	17.9	5.29	7.95	4.41	6.63	3.76	5.64	3.04	4.56	2.43	3.65
	15	11.1	16.7	4.93	7.42	4.12	6.19	3.50	5.27	2.83	4.26	2.27	3.41
	16	10.4	15.6	4.63	6.95	3.86	5.81	3.29	4.94	2.66	3.99	2.13	3.20
	17	9.79	14.7	4.35	6.54	3.64	5.46	3.09	4.65	2.50	3.76	2.00	3.01
	18	9.25	13.9	4.11	6.18	3.43	5.16	2.92	4.39	2.36	3.55	1.89	2.84
	19	8.76	13.2	3.90	5.85	3.25	4.89	2.77	4.16	2.24	3.36	1.79	2.69
	20	8.32	12.5	3.70	5.56	3.09	4.64	2.63	3.95	2.13	3.20	1.70	2.56
	21	7.93	11.9	3.52	5.30	2.94	4.42	2.50	3.76	2.02	3.04	1.62	2.43
	22	7.57	11.4	3.36	5.06	2.81	4.22	2.39	3.59	1.93	2.90	1.55	2.32
	23	7.24	10.9	3.22	4.84	2.69	4.04	2.29	3.44	1.85	2.78	1.48	2.22
	24	6.94	10.4	3.08	4.64	2.57	3.87	2.19	3.29	1.77	2.66	1.42	2.13
	25	6.66	10.0	2.96	4.45	2.47	3.72	2.10	3.16	1.70	2.56	1.36	2.04
	26	6.40	9.62	2.85	4.28	2.38	3.57	2.02	3.04	1.64	2.46	1.31	1.97
	27	6.17	9.27	2.74	4.12	2.29	3.44	1.95	2.93	1.57	2.37	1.26	1.89
	28	5.95	8.94	2.64	3.97	2.21	3.32	1.88	2.82	1.52	2.28	1.21	1.83
	29	5.74	8.63	2.55	3.84	2.13	3.20	1.81	2.72	1.47	2.20	1.17	1.76
	30	5.55	8.34	2.47	3.71	2.06	3.10	1.75	2.63	1.42	2.13	1.13	1.70
	31	5.37	8.07	2.39	3.59	1.99	3.00	1.70	2.55	1.37	2.06	1.10	1.65
	32	5.20	7.82	2.31	3.48	1.93	2.90	1.64	2.47	1.33	2.00	1.06	1.60
	33	5.04	7.58	2.24	3.37	1.87	2.81	1.59	2.39	1.29	1.94	1.03	1.55
	34	4.90	7.36	2.18	3.27	1.82	2.73	1.55	2.32	1.25	1.88	1.00	1.50
	35	4.76	7.15	2.11	3.18	1.77	2.65	1.50	2.26	1.21	1.83	0.972	1.46
	36	4.62	6.95	2.06	3.09	1.72	2.58	1.46	2.20	1.18	1.78	0.945	1.42
	37	4.50	6.76	2.00	3.01	1.67	2.51	1.42	2.14	1.15	1.73	0.919	1.38
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	166	250	74.0	111	61.8	92.9	52.6	79.0	42.5	63.9	34.0	51.1
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	20.8	31.3	9.25	13.9	7.72	11.6	6.57	9.88	5.31	7.99	4.25	6.39
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	7.41	11.1	3.40	5.10	2.93	4.40	2.40	3.60	2.01	3.03	1.54	2.32
BF/Ω_b	$\varphi_b BF$, kips	0.776	1.17	0.435	0.654	0.454	0.682	0.278	0.417	0.302	0.454	0.161	0.242
V_n/Ω_v	$\varphi_v V_{nx}$, kips	42.0	63.1	20.3	30.5	12.9	19.4	17.5	26.3	10.2	15.4	13.8	20.8
Z_x, in.^{3}		13.9		6.18		5.16		4.39		3.55		2.84	
L_p, ft		1.22		1.08		1.09		0.990		0.996		0.910	
L_r, ft		18.5		14.5		11.7		16.0		11.9		17.7	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-7 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-7 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Hot Rolled)

C4-C3

Shape		C4×		C3×	
		5.4		4.1	
Design		ASD	LRFD	ASD	LRFD
Span, ft	3	9.14	13.7	5.27	7.92
	4	6.86	10.3	3.95	5.94
	5	5.49	8.24	3.16	4.75
	6	4.57	6.87	2.63	3.96
	7	3.92	5.89	2.26	3.39
	8	3.43	5.15	1.98	2.97
	9	3.05	4.58	1.76	2.64
	10	2.74	4.12	1.58	2.38
	11	2.49	3.75	1.44	2.16
	12	2.29	3.44	1.32	1.98
	13	2.11	3.17	1.22	1.83
	14	1.96	2.94	1.13	1.70
	15	1.83	2.75	1.05	1.58
	16	1.71	2.58	0.988	1.49
	17	1.61	2.42	0.930	1.40
	18	1.52	2.29	0.878	1.32
	19	1.44	2.17	0.832	1.25
	20	1.37	2.06	0.790	1.19
	21	1.31	1.96	0.753	1.13
	22	1.25	1.87	0.719	1.08
	23	1.19	1.79	0.687	1.03
	24	1.14	1.72	0.659	0.990
	25	1.10	1.65	0.632	0.950
	26	1.05	1.59	0.608	0.914
	27	1.02	1.53	0.585	0.880
	28	0.979	1.47	0.565	0.849
	29	0.946	1.42	0.545	0.819
	30	0.914	1.37	0.527	0.792
	31	0.885	1.33	0.510	0.766
	32	0.857	1.29	0.494	0.743
	33	0.831	1.25	0.479	0.720
	34	0.807	1.21	0.465	0.699
	35	0.784	1.18	0.452	0.679
	36	0.762	1.15	0.439	0.660
	37	0.741	1.11	0.427	0.642
Beam Properties					
W_c/Ω_b	$\varphi_b W_c$, kip-ft	27.4	41.2	15.8	23.8
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	3.43	5.15	1.98	2.97
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	1.29	1.94	0.741	1.11
BF/Ω_b	$\varphi_b BF$, kips	0.180	0.271	0.092	0.139
V_n/Ω_v	$\varphi_v V_{nx}$, kips	7.93	11.9	5.50	8.26
Z_x, in.^{3}		2.29		1.32	
L_p, ft		0.904		0.811	
L_r, ft		12.7		14.2	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 2-7 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

MC8-MC4

Table 2-8
Maximum Total Uniform Load, kips
MC-Shapes (Welded)

F_y = 30 ksi

Shape		MC8×				MC6×				MC4×			
		19.8 [f1]		13.5 [f1]		14.6		10 [f1]		6.5		6.1	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	61.8	92.9	21.9	32.9	35.6	53.5	20.3	30.5	10.5	15.8	9.62	14.5
	4	46.4	69.7	16.4	24.7	26.7	40.1	15.2	22.9	7.90	11.9	7.22	10.8
	5	37.1	55.8	13.1	19.7	21.3	32.1	12.2	18.3	6.32	9.50	5.77	8.68
	6	30.9	46.5	10.9	16.4	17.8	26.7	10.1	15.2	5.27	7.92	4.81	7.23
	7	26.5	39.8	9.38	14.1	15.2	22.9	8.70	13.1	4.52	6.79	4.12	6.20
	8	23.2	34.8	8.21	12.3	13.3	20.0	7.61	11.4	3.95	5.94	3.61	5.42
	9	20.6	31.0	7.29	11.0	11.9	17.8	6.76	10.2	3.51	5.28	3.21	4.82
	10	18.5	27.9	6.56	9.87	10.7	16.0	6.09	9.15	3.16	4.75	2.89	4.34
	11	16.9	25.3	5.97	8.97	9.70	14.6	5.53	8.32	2.87	4.32	2.62	3.94
	12	15.5	23.2	5.47	8.22	8.89	13.4	5.07	7.62	2.63	3.96	2.41	3.62
	13	14.3	21.4	5.05	7.59	8.21	12.3	4.68	7.04	2.43	3.66	2.22	3.34
	14	13.2	19.9	4.69	7.05	7.62	11.5	4.35	6.54	2.26	3.39	2.06	3.10
	15	12.4	18.6	4.38	6.58	7.11	10.7	4.06	6.10	2.11	3.17	1.92	2.89
	16	11.6	17.4	4.10	6.17	6.67	10.0	3.80	5.72	1.98	2.97	1.80	2.71
	17	10.9	16.4	3.86	5.80	6.28	9.43	3.58	5.38	1.86	2.80	1.70	2.55
	18	10.3	15.5	3.65	5.48	5.93	8.91	3.38	5.08	1.76	2.64	1.60	2.41
	19	9.76	14.7	3.46	5.19	5.62	8.44	3.20	4.82	1.66	2.50	1.52	2.28
	20	9.27	13.9	3.28	4.93	5.34	8.02	3.04	4.57	1.58	2.38	1.44	2.17
	21	8.83	13.3	3.13	4.70	5.08	7.64	2.90	4.36	1.51	2.26	1.37	2.07
	22	8.43	12.7	2.98	4.48	4.85	7.29	2.77	4.16	1.44	2.16	1.31	1.97
	23	8.06	12.1	2.85	4.29	4.64	6.97	2.65	3.98	1.37	2.07	1.25	1.89
	24	7.73	11.6	2.74	4.11	4.45	6.68	2.54	3.81	1.32	1.98	1.20	1.81
	25	7.42	11.2	2.63	3.95	4.27	6.42	2.44	3.66	1.26	1.90	1.15	1.74
	26	7.13	10.7	2.52	3.79	4.10	6.17	2.34	3.52	1.22	1.83	1.11	1.67
	27	6.87	10.3	2.43	3.65	3.95	5.94	2.25	3.39	1.17	1.76	1.07	1.61
	28	6.62	9.96	2.34	3.52	3.81	5.73	2.17	3.27	1.13	1.70	1.03	1.55
	29	6.40	9.61	2.26	3.40	3.68	5.53	2.10	3.16	1.09	1.64	0.995	1.50
	30	6.18	9.29	2.19	3.29	3.56	5.35	2.03	3.05	1.05	1.58	0.962	1.45
	32	5.80	8.71	2.05	3.08	3.33	5.01	1.90	2.86	0.988	1.49	0.902	1.36
	34	5.46	8.20	1.93	2.90	3.14	4.72	1.79	2.69	0.930	1.40	0.849	1.28
	36	5.15	7.74	1.82	2.74	2.96	4.46	1.69	2.54	0.878	1.32	0.802	1.21
	38	4.88	7.34	1.73	2.60	2.81	4.22	1.60	2.41	0.832	1.25	0.760	1.14
	40	4.64	6.97	1.64	2.47	2.67	4.01	1.52	2.29	0.790	1.19	0.722	1.08
	42	4.42	6.64	1.56	2.35	2.54	3.82	1.45	2.18	0.753	1.13	0.687	1.03
	44	4.22	6.34	1.49	2.24	2.43	3.65	1.38	2.08	0.719	1.08	0.656	0.986
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	185	279	65.6	98.7	107	160	60.9	91.5	31.6	47.5	28.9	43.4
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	23.2	34.8	8.21	12.30	13.3	20.0	7.61	11.4	3.95	5.94	3.61	5.42
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	9.36	14.1	6.53	9.82	5.01	7.52	3.57	5.37	1.49	2.24	1.34	2.01
BF/Ω_b	$\varphi_b BF$, kips	0.694	1.04	N/A	N/A	0.380	0.571	0.393	0.591	0.173	0.261	0.181	0.272
V_n/Ω_v	$\varphi_v V_{nx}$, kips	32.3	48.6	21.6	32.4	24.3	36.5	16.2	24.3	10.8	16.2	10.8	16.2
Z_x, in.^{3}		16.4		11.3		8.91		6.20		2.64		2.41	
L_p, ft		4.47		N/A		1.86		6.14		1.24		1.06	
L_r, ft		24.4		18.3		23.8		16.4		15.4		13.6	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-8 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 30 ksi

Table 2-8 (continued)
Maximum Total Uniform Load, kips
MC-Shapes (Welded)

MC3-MC2

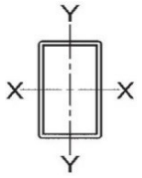
Shape		MC3×				MC2×					
		4.8		3.5		3		2.4		1.6	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	3	5.67	8.52	4.19	6.30	2.31	3.47	1.86	2.79	1.32	1.98
	4	4.25	6.39	3.14	4.73	1.73	2.60	1.39	2.09	0.988	1.49
	5	3.40	5.11	2.51	3.78	1.38	2.08	1.11	1.67	0.790	1.19
	6	2.83	4.26	2.10	3.15	1.15	1.73	0.928	1.40	0.659	0.990
	7	2.43	3.65	1.80	2.70	0.989	1.49	0.796	1.20	0.565	0.849
	8	2.13	3.20	1.57	2.36	0.865	1.30	0.696	1.05	0.494	0.743
	9	1.89	2.84	1.40	2.10	0.769	1.16	0.619	0.930	0.439	0.660
	10	1.70	2.56	1.26	1.89	0.692	1.04	0.557	0.837	0.395	0.594
	11	1.55	2.32	1.14	1.72	0.629	0.946	0.506	0.761	0.359	0.540
	12	1.42	2.13	1.05	1.58	0.577	0.867	0.464	0.698	0.329	0.495
	13	1.31	1.97	0.967	1.45	0.532	0.800	0.428	0.644	0.304	0.457
	14	1.21	1.83	0.898	1.35	0.494	0.743	0.398	0.598	0.282	0.424
	15	1.13	1.70	0.838	1.26	0.461	0.694	0.371	0.558	0.263	0.396
	16	1.06	1.60	0.786	1.18	0.433	0.650	0.348	0.523	0.247	0.371
	17	1.00	1.50	0.740	1.11	0.407	0.612	0.328	0.492	0.232	0.349
	18	0.945	1.42	0.699	1.05	0.385	0.578	0.309	0.465	0.220	0.330
	19	0.895	1.35	0.662	0.995	0.364	0.548	0.293	0.441	0.208	0.313
	20	0.850	1.28	0.629	0.945	0.346	0.520	0.278	0.419	0.198	0.297
	21	0.810	1.22	0.599	0.900	0.330	0.495	0.265	0.399	0.188	0.283
	22	0.773	1.16	0.572	0.859	0.315	0.473	0.253	0.380	0.180	0.270
	23	0.739	1.11	0.547	0.822	0.301	0.452	0.242	0.364	0.172	0.258
	24	0.709	1.07	0.524	0.788	0.288	0.434	0.232	0.349	0.165	0.248
	25	0.680	1.02	0.503	0.756	0.277	0.416	0.223	0.335	0.158	0.238
	26	0.654	0.983	0.484	0.727	0.266	0.400	0.214	0.322	0.152	0.228
	27	0.630	0.947	0.466	0.700	0.256	0.385	0.206	0.310	0.146	0.220
	28	0.607	0.913	0.449	0.675	0.247	0.372	0.199	0.299	0.141	0.212
	29	0.586	0.881	0.434	0.652	0.239	0.359	0.192	0.289	0.136	0.205
	30	0.567	0.852	0.419	0.630	0.231	0.347	0.186	0.279	0.132	0.198
	32	0.531	0.799	0.393	0.591	0.216	0.325	0.174	0.262	0.124	0.186
	34	0.500	0.752	0.370	0.556	0.204	0.306	0.164	0.246	0.116	0.175
	36	0.472	0.710	0.349	0.525	0.192	0.289	0.155	0.233	0.110	0.165
	38	0.448	0.673	0.331	0.497	0.182	0.274	0.147	0.220	0.104	0.156
	40	0.425	0.639	0.314	0.473	0.173	0.260	0.139	0.209	0.099	0.149
	42	0.405	0.609	0.299	0.450	0.165	0.248	0.133	0.199	0.094	0.141
	44	0.386	0.581	0.286	0.430	0.157	0.236	0.127	0.190	0.090	0.135
Beam Properties											
W_c/Ω_b	$\varphi_b W_c$, kip-ft	17.0	25.6	12.6	18.9	6.92	10.4	5.57	8.37	3.95	5.94
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	2.13	3.20	1.57	2.36	0.865	1.30	0.696	1.05	0.494	0.743
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	0.788	1.18	0.588	0.884	0.307	0.462	0.254	0.382	0.186	0.279
BF/Ω_b	$\varphi_b BF$, kips	0.094	0.141	0.102	0.154	0.039	0.058	0.043	0.065	0.047	0.071
V_n/Ω_v	$\varphi_v V_{nx}$, kips	8.08	12.2	6.08	9.14	5.39	8.10	4.05	6.09	2.69	4.05
Z_x, in.^{3}		1.42		1.05		0.578		0.465		0.330	
L_p, ft		0.912		0.845		0.591		0.605		0.619	
L_r, ft		15.2		10.5		15.0		10.9		7.12	

ASD	**LRFD**
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Note 1: Beams must be laterally supported if Table 2-8 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.



HSS16-HSS8

Table 2-9

Available Flexural Strength, kip-ft

Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		X-Axis		Y-Axis		Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$			M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD
HSS16×8×	0.500	168	252	103	155	HSS10×8×	0.500	81.1	122	69.6	105
	0.375	131	197	71.3	107		0.375	64.5	97.0	55.4	83.3
	0.312	110	165	54.1	81.3		0.312	54.3	81.7	46.7	70.2
	0.250	90.3	136	38.4	57.8		0.250	44.9	67.5	36.3	54.6
HSS14×10×	0.500	156	234	124	186	HSS10×6×	0.500	66.9	101	47.0	70.7
	0.375	122	183	97.0	146		0.375	53.7	80.8	37.7	56.7
	0.312	102	154	69.7	105		0.312	45.4	68.2	31.9	47.9
	0.250 [f1]	77.5	116	50.0	75.1		0.250	37.6	56.5	25.0	37.5
							0.180	27.7	41.6	14.7	22.2
HSS14×8×	0.500	136	204	92.1	138						
	0.375	107	160	72.6	109	HSS10×4×	0.500	52.7	79.2	27.2	41.0
	0.312	89.7	135	52.5	79.0		0.375	43.0	64.6	22.3	33.5
	0.250	73.7	111	37.4	56.3		0.312	36.2	54.5	19.0	28.6
							0.250	30.2	45.5	15.0	22.5
HSS14×6×	0.500	115	173	63.5	95.4						
	0.375	91.5	137	50.3	75.6	HSS10×2×	0.375	32.2	48.4	9.06	13.6
	0.312	76.8	115	36.6	55.1		0.250	23.1	34.7	6.26	9.41
	0.250	63.3	95.2	26.0	39.1		0.180	17.2	25.9	3.69	5.54
HSS12×10×	0.500	124	187	110	165	HSS9×5×	0.500	50.3	75.6	33.4	50.2
	0.375	97.6	147	86.2	130		0.375	40.9	61.4	27.1	40.7
	0.312	82.0	123	72.5	109		0.250	28.9	43.4	19.2	28.8
	0.250 [f1]	62.4	93.8	48.2	72.5						
						HSS9×3×	0.500	37.6	56.5	16.6	25.0
HSS12×8×	0.500	107	161	80.8	122		0.375	31.3	47.0	13.9	20.9
	0.375	84.6	127	63.9	96.1		0.250	22.3	33.5	10.1	15.1
	0.312	71.1	107	53.9	81.0		0.180	16.6	25.0	6.01	9.04
	0.250	58.5	88.0	36.2	54.4						
						HSS8×6×	0.500	47.2	70.9	38.8	58.3
HSS12×6×	0.500	89.7	135	55.2	83.0		0.375	38.3	57.6	31.4	47.3
	0.375	71.4	107	44.0	66.2		0.312	32.3	48.6	26.6	40.1
	0.312	60.2	90.5	37.3	56.0		0.250	26.9	40.5	22.2	33.3
	0.250	49.7	74.7	25.2	37.9		0.180	19.9	29.9	14.0	21.0
HSS12×4×	0.500	72.5	109	32.5	48.8	HSS8×4×	0.500	35.9	54.0	22.0	33.1
	0.375	58.4	87.8	26.3	39.6		0.375	29.8	44.8	18.3	27.5
	0.312	49.3	74.0	22.5	33.8		0.312	25.1	37.8	15.6	23.4
	0.250	40.9	61.4	15.2	22.8		0.250	21.1	31.7	13.1	19.6
	0.180	30.2	45.5	9.14	13.7		0.180	15.7	23.6	8.37	12.6
							0.120	10.9	16.4	4.51	6.78

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

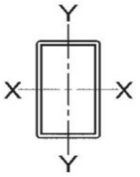
[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

F_y = 30 ksi

Table 2-9 (continued)

Available Flexural Strength, kip-ft

Rectangular HSS (Roll Formed)

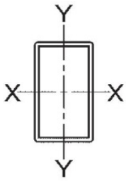


HSS8-HSS3

Shape		X-Axis		Y-Axis		Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$			M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD
HSS8×2×	0.375	21.3	32.0	7.23	10.9	HSS5×4×	0.500	16.5	24.8	14.1	21.2
	0.312	18.0	27.0	6.29	9.45		0.375	14.1	21.2	12.1	18.2
	0.250	15.4	23.2	5.43	8.17		0.312	12.1	18.1	10.3	15.5
	0.180	11.6	17.4	3.51	5.27		0.250	10.3	15.5	8.83	13.3
	0.120	8.04	12.1	1.88	2.83		0.180	7.77	11.7	6.68	10.0
							0.120	5.42	8.15	4.07	6.11
HSS7×5×	0.500	33.7	50.6	26.6	40.1						
	0.375	27.7	41.6	21.9	32.9	HSS5×3×	0.500	13.1	19.7	9.10	13.7
	0.250	19.8	29.7	15.6	23.4		0.375	11.5	17.3	8.01	12.0
	0.180	14.7	22.1	11.5	17.2		0.312	9.87	14.8	6.90	10.4
							0.250	8.53	12.8	5.96	8.96
HSS7×4×	0.500	28.7	43.2	19.3	29.0		0.180	6.47	9.72	4.55	6.84
	0.375	24.0	36.0	16.2	24.3		0.120	4.55	6.84	2.83	4.25
	0.250	17.2	25.9	11.6	17.5						
						HSS5×2×	0.250	6.75	10.1	3.47	5.22
HSS7×3×	0.500	24.0	36.0	12.8	19.3		0.180	5.18	7.79	2.68	4.03
	0.375	20.2	30.4	11.0	16.5		0.120	3.67	5.51	1.70	2.56
	0.250	14.7	22.0	8.02	12.1						
	0.180	11.0	16.5	5.97	8.97	HSS4×3×	0.250	6.03	9.07	4.94	7.43
							0.180	4.61	6.93	3.79	5.69
HSS6×4×	0.500	22.3	33.5	16.8	25.2		0.120	3.26	4.91	2.68	4.03
	0.375	18.7	28.1	14.1	21.2		0.080	2.25	3.38	1.47	2.20
	0.312	16.0	24.1	12.1	18.1						
	0.250	13.6	20.4	10.2	15.4	HSS4×2×	0.375	5.99	9.00	3.58	5.38
	0.180	10.2	15.3	7.69	11.6		0.312	5.18	7.79	3.14	4.73
	0.120	7.07	10.6	4.26	6.40		0.250	4.63	6.95	2.81	4.23
							0.180	3.58	5.38	2.20	3.31
HSS6×3×	0.500	18.1	27.2	11.0	16.5		0.120	2.56	3.85	1.59	2.39
	0.375	15.6	23.4	9.49	14.3		0.080	1.78	2.68	0.874	1.31
	0.312	13.3	20.0	8.16	12.3						
	0.250	11.4	17.1	6.99	10.5	HSS4×1.5×	0.250	3.92	5.90	1.89	2.84
	0.180	8.59	12.9	5.30	7.97		0.180	3.07	4.61	1.50	2.25
	0.120	6.00	9.02	2.96	4.44		0.120	2.22	3.33	1.10	1.65
							0.083	1.60	2.41	0.644	0.968
HSS6×2×	0.375	12.5	18.7	5.40	8.12		0.063	1.22	1.84	0.417	0.627
	0.312	10.7	16.0	4.72	7.09						
	0.250	9.25	13.9	4.12	6.19	HSS3×2×	0.250	2.87	4.32	2.16	3.24
	0.180	7.04	10.6	3.17	4.77		0.180	2.26	3.40	1.71	2.57
	0.120	4.94	7.43	1.77	2.67		0.120	1.65	2.48	1.24	1.87
							0.080	1.15	1.73	0.873	1.31

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.



HSS3-HSS1.5

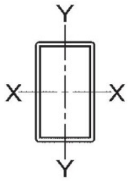
Table 2-9 (continued)
Available Flexural Strength, kip-ft
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD
HSS3×1.5×	0.250	2.37	3.56	1.42	2.14
	0.180	1.89	2.84	1.15	1.73
	0.120	1.39	2.09	0.850	1.28
	0.083	1.01	1.52	0.623	0.936
	0.060	0.747	1.12	0.371	0.558
HSS3×1×	0.180	1.51	2.27	0.656	0.986
	0.120	1.13	1.70	0.503	0.756
	0.080	0.802	1.21	0.362	0.545
	0.060	0.615	0.925	0.223	0.335
HSS2.5×1.5×	0.250	1.72	2.59	1.19	1.78
	0.180	1.39	2.09	0.970	1.46
	0.120	1.04	1.56	0.728	1.09
	0.083	0.763	1.15	0.536	0.806
	0.063	0.587	0.882	0.390	0.586
HSS2.5×1×	0.120	0.826	1.24	0.424	0.637
	0.083	0.612	0.920	0.317	0.477
	0.063	0.473	0.711	0.234	0.352
HSS2×1.5×	0.120	0.737	1.11	0.603	0.907
	0.080	0.527	0.792	0.433	0.650
	0.060	0.406	0.610	0.334	0.502
HSS2×1×	0.180	0.725	1.09	0.436	0.655
	0.120	0.569	0.855	0.344	0.518
	0.080	0.412	0.619	0.253	0.380
	0.060	0.319	0.479	0.196	0.295
HSS1.5×1×	0.120	0.355	0.533	0.266	0.401
	0.080	0.262	0.394	0.198	0.297
	0.060	0.204	0.306	0.154	0.232

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.



HSS32-HSS12

Table 2-10

Available Flexural Strength, kip-ft

Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		X-Axis		Y-Axis		Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$			M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD
HSS32×16×	0.375 ^{f1}	454	682	201	302	HSS16×12×	0.625	259	389	213	320
							0.500	213	320	175	263
HSS32×8×	0.375 ^{f1}	370	556	81.9	123		0.375	165	248	120	180
							0.312 ^{f1}	139	209	91.2	137
HSS28×8×	0.375	322	484	80.5	121		0.250 ^{f1}	91.1	137	65.8	98.8
	0.312 ^{f1}	234	352	60.0	90.2						
						HSS16×4×	0.375	94.6	142	30.2	45.4
HSS24×16×	0.375 ^{f1}	301	453	190	286		0.312	80.5	121	22.8	34.3
	0.312 ^{f1}	233	350	145	217		0.250	66.0	99.2	16.2	24.3
							0.180 ^{f1}	42.3	63.6	9.58	14.4
HSS24×8×	0.375	249	374	78.3	118						
	0.312	210	315	58.6	88.1	HSS14×10×	0.625	187	281	149	224
							0.500	156	234	124	186
HSS20×16×	0.625	434	653	374	563		0.375	121	182	96.1	144
	0.500	356	536	297	447		0.312	102	154	69.9	105
	0.375 ^{f1}	234	352	183	276		0.250 ^{f1}	80.6	121	50.4	75.7
	0.312 ^{f1}	180	270	140	210						
						HSS14×6×	0.625	137	206	75.1	113
HSS20×12×	0.625	362	545	254	383		0.500	115	173	63.2	95.0
	0.500	298	448	204	307		0.375	90.1	135	49.9	74.9
	0.375	229	344	126	190		0.312	76.6	115	36.7	55.2
	0.312 ^{f1}	193	290	95.5	144		0.250	62.7	94.3	26.2	39.4
	0.250 ^{f1}	124	187	68.5	103		0.180 ^{f1}	46.3	69.5	15.8	23.7
HSS20×8×	0.625	289	434	151	227	HSS12×8×	0.625	127	191	96.3	145
	0.500	240	360	123	184		0.500	107	160	80.7	121
	0.375	186	279	75.4	113		0.375	83.4	125	63.3	95.2
	0.312	156	234	56.8	85.4		0.312	71.0	107	53.7	80.8
	0.250 ^{f1}	126	189	40.2	60.4		0.250	58.1	87.3	36.3	54.6
							0.180 ^{f1}	35.3	53.1	22.4	33.6
HSS20×4×	0.375	141	212	31.6	47.5						
	0.312	119	180	23.9	35.9	HSS12×4×	0.375	57.3	86.2	25.9	38.9
	0.250 ^{f1}	96.0	144	16.8	25.2		0.312	49.1	73.8	22.3	33.5
							0.250	40.4	60.8	15.3	22.9
HSS18×6×	0.625	211	317	95.2	143		0.180	29.9	45.0	9.20	13.8
	0.500	175	263	79.6	120						
	0.375	136	205	51.6	77.5						
	0.312	116	174	38.9	58.4						
	0.250	94.3	142	27.5	41.3						

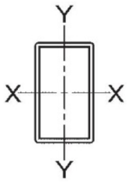
ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 2-10 (continued)
Available Flexural Strength, kip-ft
Rectangular HSS (Press Braked)

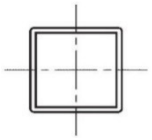


HSS10-HSS6

Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD
HSS10×6×	0.625	78.6	118	54.9	82.6
	0.500	66.6	100	46.7	70.2
	0.375	52.8	79.4	37.1	55.8
	0.312	45.2	68.0	31.9	47.9
	0.250	37.1	55.8	25.6	38.4
	0.180	27.5	41.4	14.8	22.3
	0.120 [f1]	14.7	22.1	8.05	12.1
HSS8×4×	0.375	29.0	43.7	17.8	26.8
	0.312	25.1	37.8	15.4	23.2
	0.250	20.8	31.3	12.9	19.4
	0.180	15.6	23.4	8.40	12.6
	0.120	10.8	16.2	4.55	6.85
HSS7×4×	0.375	23.4	35.1	15.9	23.9
	0.312	20.2	30.4	13.7	20.7
	0.250	16.9	25.4	11.5	17.3
	0.180	12.7	19.1	8.67	13.0
	0.120	8.79	13.2	4.43	6.66
HSS6×3×	0.250	11.2	16.8	6.87	10.3
	0.180	8.49	12.8	5.25	7.90
	0.120	5.93	8.91	2.98	4.48
HSS6×2×	0.250	9.01	13.5	4.04	6.08
	0.180	6.93	10.4	3.14	4.73
	0.120	4.87	7.31	1.80	2.70

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.



HSS12-HSS1.5

Table 2-11
Available Flexural Strength, kip-ft
Square HSS (Roll Formed)

F_y = 30 ksi

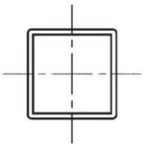
Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD			ASD	LRFD
HSS12×12×	0.500	141	212	HSS4×4×	0.500	11.5	17.3
	0.375	111	166		0.375	10.1	15.1
	0.312	93.0	140		0.312	8.62	13.0
	0.250 [f1]	61.5	92.4		0.250	7.44	11.2
					0.180	5.64	8.48
HSS10×10×	0.500	95.4	143		0.120	3.97	5.96
	0.375	75.4	113		0.083 [f1]	2.26	3.39
	0.312	63.5	95.4				
	0.250 [f1]	48.8	73.4	HSS3.5×3.5×	0.250	5.52	8.30
					0.180	4.24	6.37
HSS9×9×	0.500	75.7	114		0.120	2.99	4.50
	0.375	60.3	90.7		0.083 [f1]	1.83	2.76
	0.312	50.7	76.3				
	0.250	41.9	63.0	HSS3×3×	0.375	5.06	7.61
					0.250	3.91	5.87
HSS8×8×	0.500	58.4	87.8		0.180	3.02	4.55
	0.375	46.9	70.4		0.120	2.17	3.26
	0.312	39.5	59.4		0.080	1.50	2.25
	0.250	32.8	49.3				
	0.180 [f1]	20.3	30.6	HSS2.5×2.5×	0.250	2.56	3.85
					0.180	2.02	3.04
HSS7×7×	0.500	43.4	65.3		0.120	1.47	2.21
	0.375	35.2	52.9		0.080	1.03	1.54
	0.312	29.6	44.6		0.060 [f1]	0.689	1.04
	0.250	24.7	37.1				
				HSS2×2×	0.250	1.50	2.25
HSS6×6×	0.500	30.5	45.9		0.180	1.22	1.83
	0.375	25.1	37.8		0.120	0.906	1.36
	0.312	21.3	32.0		0.080	0.642	0.965
	0.250	17.8	26.8		0.060	0.493	0.740
	0.180	13.3	20.0				
	0.120 [f1]	7.24	10.9	HSS1.75×1.75×	0.180	0.889	1.34
					0.120	0.675	1.01
HSS5×5×	0.500	19.9	29.9		0.083	0.500	0.752
	0.375	16.8	25.2		0.063	0.386	0.581
	0.312	14.3	21.4				
	0.250	12.1	18.2	HSS1.5×1.5×	0.250	0.720	1.08
	0.180	9.07	13.6		0.180	0.614	0.923
	0.120 [f1]	5.44	8.17		0.120	0.479	0.720
					0.080	0.347	0.522
					0.060	0.268	0.403

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

F_y **= 30 ksi**

Table 2-11 (continued)
Available Flexural Strength, kip-ft
Square HSS (Roll Formed)

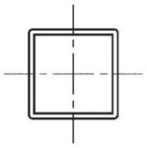


HSS1.25-HSS1

Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	**LRFD**
HSS1.25×1.25×	0.180	0.389	0.585
	0.120	0.316	0.475
	0.080	0.234	0.351
	0.060	0.183	0.275
HSS1×1×	0.180	0.214	0.322
	0.120	0.187	0.281
	0.080	0.143	0.214
	0.060	0.112	0.168

ASD	**LFRD**
Ω_b **= 1.67**	φ_b **= 0.90**

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.



HSS20-HSS5

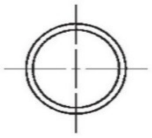
Table 2-12
Available Flexural Strength, kip-ft
Square HSS (Press Braked)

F_y = 30 ksi

Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD			ASD	LRFD
HSS20×20×	0.625	507	763	HSS6×6×	0.500	30.2	45.5
	0.500 ^{f1}	403	605		0.375	24.6	36.9
	0.375 ^{f1}	245	369		0.312	21.3	32.0
					0.250	17.7	26.6
HSS16×16×	0.625	316	475		0.180	13.2	19.8
	0.500	259	389		0.120 ^{f1}	7.26	10.9
	0.375 ^{f1}	175	263				
	0.312 ^{f1}	133	200	HSS5×5×	0.250	11.9	17.9
					0.180	8.98	13.5
HSS14×14×	0.625	238	358		0.120 ^{f1}	5.67	8.52
	0.500	196	295				
	0.375	151	227				
	0.312 ^{f1}	108	162				
HSS12×12×	0.625	169	254				
	0.500	141	212				
	0.375	110	165				
	0.312	92.8	140				
	0.250 ^{f1}	61.8	92.8				
HSS10×10×	0.625	114	171				
	0.500	95.1	143				
	0.375	74.4	112				
	0.312	63.3	95.2				
	0.250 ^{f1}	50.3	75.5				
HSS8×8×	0.625	68.7	103				
	0.500	58.2	87.5				
	0.375	46.1	69.3				
	0.312	39.5	59.4				
	0.250	32.5	48.8				
	0.180 ^{f1}	20.4	30.7				
HSS7×7×	0.500	43.1	64.8				
	0.375	34.4	51.8				
	0.312	29.6	44.6				
	0.250	24.4	36.7				
	0.180	18.3	27.5				

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.



HSS7.5-HSS2.5

Table 2-13
Available Flexural Strength, kip-ft
Round HSS

F_y = 30 ksi

Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD			ASD	LRFD
HSS7.5×	0.375	28.6	43.0	HSS3.125×	0.250	3.10	4.66
	0.250	19.6	29.5		0.180	2.34	3.51
	0.180	14.4	21.7		0.120	1.62	2.43
	0.120	9.79	14.7		0.109	1.49	2.23
					0.083	1.15	1.73
HSS6.25×	0.375	19.5	29.3		0.063	0.877	1.32
	0.250	13.5	20.3				
	0.180	9.93	14.9	HSS3×	0.250	2.84	4.28
	0.120	6.75	10.1		0.180	2.14	3.22
					0.148	1.80	2.70
HSS5×	0.250	8.46	12.7		0.120	1.49	2.24
	0.180	6.26	9.41		0.109	1.36	2.05
	0.120	4.28	6.44		0.083	1.06	1.59
	0.109	3.91	5.87		0.063	0.807	1.21
	0.083	3.01	4.52		0.049	0.639	0.961
HSS4.5×	0.250	6.77	10.2	HSS2.875×	0.180	1.96	2.95
	0.180	5.03	7.56		0.120	1.36	2.05
	0.148	4.19	6.30		0.109	1.25	1.88
	0.120	3.44	5.18		0.083	0.969	1.46
	0.109	3.14	4.73				
	0.083	2.43	3.65	HSS2.75×	0.250	2.35	3.53
					0.180	1.78	2.68
HSS4×	0.120	2.71	4.07		0.148	1.50	2.25
	0.109	2.47	3.71		0.120	1.24	1.87
	0.083	1.90	2.86		0.109	1.14	1.71
					0.083	0.885	1.33
HSS3.75×	0.250	4.60	6.91		0.065	0.702	1.06
	0.180	3.44	5.18				
	0.148	2.87	4.32	HSS2.5×	0.250	1.90	2.86
	0.120	2.37	3.56		0.180	1.45	2.18
	0.109	2.17	3.26		0.148	1.23	1.85
	0.083	1.68	2.52		0.120	1.02	1.53
					0.109	0.934	1.40
HSS3.5×	0.180	2.98	4.48		0.083	0.726	1.09
	0.148	2.49	3.74		0.063	0.555	0.835
	0.120	2.05	3.08		0.049	0.440	0.662
	0.109	1.87	2.81				
	0.083	1.45	2.18				
	0.063	1.11	1.66				
	0.049 [f1]	0.862	1.30				

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 65 ksi.

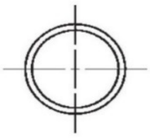
Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 2-13 (continued)

Available Flexural Strength, kip-ft

Round HSS

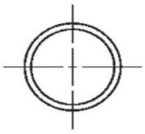


HSS2.375-HSS1

Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD				
HSS2.375×	0.180	1.30	1.96	HSS1.66×	0.148	0.507	0.763
	0.148	1.10	1.65		0.120	0.427	0.641
	0.120	0.915	1.37		0.109	0.394	0.592
	0.109	0.838	1.26		0.083	0.310	0.466
	0.083	0.653	0.981		0.063	0.240	0.360
	0.063	0.500	0.752				
	0.049	0.397	0.596	HSS1.5×	0.120	0.343	0.515
					0.109	0.316	0.475
HSS2.25×	0.180	1.16	1.74		0.083	0.250	0.376
	0.148	0.981	1.47		0.063	0.193	0.290
	0.120	0.816	1.23		0.049	0.154	0.232
	0.109	0.749	1.13		0.035	0.112	0.169
	0.083	0.584	0.878				
	0.063	0.448	0.673	HSS1.25×	0.120	0.231	0.347
					0.109	0.213	0.320
HSS2×	0.180	0.895	1.35		0.083	0.169	0.254
	0.148	0.762	1.15		0.063	0.132	0.198
	0.120	0.636	0.956		0.049	0.106	0.159
	0.109	0.584	0.878		0.035	0.077	0.116
	0.083	0.457	0.686				
	0.063	0.352	0.529	HSS1×	0.120	0.140	0.210
	0.049	0.280	0.421		0.109	0.130	0.196
	0.035	0.202	0.304		0.083	0.105	0.158
					0.065	0.085	0.128
HSS1.9×	0.148	0.681	1.02		0.063	0.082	0.124
	0.120	0.570	0.857		0.049	0.067	0.100
	0.109	0.524	0.788		0.042	0.058	0.087
	0.083	0.410	0.617		0.035	0.049	0.073
	0.063	0.316	0.475		0.032	0.045	0.068
	0.049	0.251	0.378				
	0.035	0.183	0.275				
HSS1.75×	0.120	0.478	0.718				
	0.109	0.440	0.662				
	0.083	0.346	0.520				
	0.063	0.266	0.401				
	0.049	0.213	0.320				
	0.035	0.154	0.232				

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 65 ksi.



PIPE 12-PIPE 1

Table 2-14
Available Flexural Strength, kip-ft
Pipe

F_y = 30 ksi

Shape	M_n/Ω_b	$\varphi_b M_n$	Shape	M_n/Ω_b	$\varphi_b M_n$
	ASD	LRFD		ASD	LRFD
Pipe 12 Std. 40S	86.7	130	Pipe 2 Std. 80S	1.53	2.30
Pipe 12 Std. 10S [f1]	42.4	63.7	Pipe 2 Std. 40S	1.14	1.72
			Pipe 2 Std. 10S	0.843	1.27
Pipe 10 Std. 40S	59.6	89.6	Pipe 2 Std. 5S	0.521	0.783
Pipe 10 Std. 10S [f1]	28.0	42.1			
			Pipe 1½ Std. 80S	0.870	1.31
Pipe 8 Std. 80S	49.6	74.5	Pipe 1½ Std. 40S	0.671	1.01
Pipe 8 Std. 40S	33.2	50.0	Pipe 1½ Std. 10S	0.524	0.788
Pipe 8 Std. 10S	15.9	23.9	Pipe 1½ Std. 5S	0.328	0.493
Pipe 8 Std. 5S [f1]	11.5	17.2			
			Pipe 1¼ Std. 80S	0.620	0.932
Pipe 6 Std. 80S	24.9	37.4	Pipe 1¼ Std. 40S	0.485	0.729
Pipe 6 Std. 40S	16.9	25.4	Pipe 1¼ Std. 10S	0.394	0.592
Pipe 6 Std. 10S	8.47	12.7	Pipe 1¼ Std. 5S	0.247	0.371
Pipe 6 Std. 5S	6.95	10.4			
			Pipe 1 Std. 80S	0.352	0.529
Pipe 5 Std. 80S	15.1	22.7	Pipe 1 Std. 40S	0.281	0.423
Pipe 5 Std. 40S	10.9	16.3	Pipe 1 Std. 10S	0.240	0.360
Pipe 5 Std. 10S	5.91	8.89	Pipe 1 Std. 5S	0.153	0.230
Pipe 5 Std. 5S	4.85	7.29			
Pipe 4 Std. 80S	8.76	13.2			
Pipe 4 Std. 40S	6.45	9.70			
Pipe 4 Std.10S	3.44	5.18			
Pipe 4 Std. 5S	2.43	3.65			
Pipe 3½ Std. 80S	6.47	9.72			
Pipe 3½ Std. 40S	4.82	7.25			
Pipe 3½ Std. 10S	2.71	4.07			
Pipe 3½ Std. 5S	1.90	2.86			
Pipe 3 Std. 80S	4.61	6.93			
Pipe 3 Std. 40S	3.49	5.24			
Pipe 3 Std. 10S	2.05	3.08			
Pipe 3 Std. 5S	1.45	2.18			
Pipe 2½ Std. 80S	2.81	4.23			
Pipe 2½ Std. 40S	2.19	3.29			
Pipe 2½ Std. 10S	1.37	2.06			
Pipe 2½ Std. 5S	0.973	1.46			

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90

[f1] Shape exceeds compact limit for flexure with F_y = 30 ksi.

PART 3: DESIGN OF FLEXURAL MEMBERS (F_y = 65 ksi)

Z_x

Table 3-1
W-Shapes (Welded)
Selection by Z_x

F_y = 65 ksi

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W24×131	**367**	**1190**	**1790**	**476**	**715**	**31.7**	**47.6**	**4.20**	**26.7**	**3990**	**346**	**520**
W24×117 ^{f2}	**325**	**979**	**1470**	**422**	**634**	**29.3**	**44.0**	**6.72**	**25.7**	**3510**	**312**	**469**
W21×122	305	989	1490	396	595	25.8	38.8	4.11	27.1	2940	304	457
W24×104 ^{f2}	**287**	**746**	**1120**	**374**	**562**	**26.8**	**40.3**	**11.0**	**24.9**	**3080**	**281**	**423**
W21×111 ^{f2}	276	889	1340	361	542	24.3	36.5	4.37	26.1	2650	276	415
W24×94	**251**	**814**	**1220**	**321**	**483**	**32.6**	**49.0**	**2.80**	**17.9**	**2670**	**292**	**439**
W21×101 ^{f2}	251	741	1110	328	494	22.9	34.4	7.30	25.3	2400	250	376
W18×106	229	743	1120	296	445	20.1	30.2	3.76	26.0	1900	258	387
W24×84	**222**	**720**	**1080**	**283**	**426**	**30.1**	**45.2**	**2.76**	**17.3**	**2340**	**265**	**398**
W21×93	219	710	1070	277	417	28.8	43.2	2.61	17.7	2050	293	440
W18×97	210	681	1020	273	410	19.2	28.9	3.75	25.0	1740	232	349
W14×120 ^{f2}	210	608	914	274	412	11.4	17.1	11.7	41.1	1360	200	300
W24×76	**198**	**642**	**965**	**253**	**380**	**27.7**	**41.7**	**2.72**	**16.8**	**2070**	**246**	**369**
W16×100	197	639	960	254	382	16.9	25.5	3.55	26.3	1480	232	349
W21×83	194	629	946	247	371	26.7	40.2	2.58	16.9	1810	257	387
W14×109 ^{f2}	190	499	750	250	375	11.0	16.6	15.9	38.6	1230	175	264
W18×86 ^{f2}	185	582	875	241	362	17.9	26.9	4.73	23.8	1520	206	310
W24×68 ^{f2,v2}	**174**	**513**	**771**	**222**	**333**	**20.5**	**30.7**	**2.04**	**16.3**	**1800**	**220**	**330**
W16×89	174	564	848	225	338	16.1	24.2	3.52	24.6	1290	206	310
W14×99 ^{f2}	171	391	588	226	340	10.5	15.8	20.8	36.5	1100	161	242
W21×73	170	551	829	217	327	24.3	36.6	2.56	16.3	1580	225	339
W18×76 ^{f2}	162	451	678	212	318	16.4	24.6	8.22	22.9	1320	181	271
W12×106	162	525	790	209	314	9.09	13.7	4.41	39.3	925	184	276
W21×68	**158**	**512**	**770**	**201**	**303**	**23.2**	**34.9**	**2.55**	**16.0**	**1460**	**212**	**318**
W14×90 ^{f2}	155	303	456	206	309	N/A	N/A	N/A	34.6	987	144	216
W24×62 ^{v2}	**151**	**490**	**736**	**187**	**281**	**28.8**	**43.3**	**1.94**	**12.4**	**1520**	**236**	**355**
W16×77	149	483	726	194	292	14.8	22.3	3.49	23.0	1100	175	264
W12×96	146	474	712	190	285	8.92	13.4	4.38	36.2	824	163	245
W18×71	144	467	702	184	276	20.5	30.8	2.41	16.2	1160	214	321
W21×62	**142**	**461**	**692**	**182**	**274**	**21.4**	**32.2**	**2.51**	**15.5**	**1310**	**196**	**295**
W14×82	137	444	668	178	268	11.8	17.7	3.52	26.1	870	170	256

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

[v2] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(b) with F_y = 65 ksi.

F_y = 65 ksi

Table 3-1 (continued)
W-Shapes (Welded)
Selection by Z_x

Z_x

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W24×55 [f2,v2]	**132**	**428**	**644**	**163**	**246**	**25.2**	**37.9**	**1.52**	**12.0**	**1320**	**198**	**297**
W18×65	132	428	644	169	254	19.5	29.2	2.39	15.7	1060	193	291
W12×87 [f2]	130	395	594	171	257	8.55	12.9	7.43	33.7	731	150	226
W16×67 [f2]	129	382	574	169	254	13.6	20.4	6.17	21.8	947	150	226
W21×57	126	409	614	159	239	24.2	36.4	1.92	12.2	1150	200	300
W14×74	124	402	605	162	244	11.3	17.0	3.51	24.8	784	149	224
W18×60	122	396	595	156	235	18.5	27.9	2.38	15.3	974	176	265
W12×79 [f2]	117	320	481	155	233	8.25	12.4	11.5	31.6	654	136	205
W14×68	113	367	551	147	222	10.8	16.2	3.49	23.8	711	136	204
W10×88	112	363	546	143	214	6.25	9.40	3.72	39.0	530	153	229
W18×55	**111**	**360**	**541**	**142**	**213**	**17.5**	**26.2**	**2.35**	**14.8**	**881**	**165**	**248**
W21×50 [v2]	**108**	**350**	**527**	**135**	**203**	**21.9**	**32.9**	**1.84**	**11.7**	**964**	**185**	**277**
W12×72 [f2]	106	259	390	140	211	7.94	11.9	14.9	30.0	588	124	186
W16×57	104	337	507	133	200	15.8	23.8	2.27	15.2	750	165	248
W14×61 [f2]	100	293	440	132	199	10.1	15.1	6.60	22.6	628	122	183
W18×50	**99.6**	**323**	**486**	**128**	**193**	**16.1**	**24.2**	**2.34**	**14.5**	**790**	**149**	**224**
W10×77	96.7	314	471	124	187	6.09	9.16	3.69	34.8	451	131	197
W12×65 [f2]	95.2	197	296	126	190	7.56	11.4	19.1	28.4	524	110	166
W21×44 [f2,v2]	**93.3**	**292**	**439**	**116**	**175**	**17.9**	**26.9**	**1.42**	**11.3**	**822**	**155**	**234**
W16×50	91.0	295	444	117	176	14.6	22.0	2.25	14.5	651	145	217
W18×46	89.5	290	436	114	171	18.1	27.2	1.83	11.6	702	152	229
W14×53	85.2	276	415	111	167	10.7	16.1	2.73	18.1	530	120	181
W12×58 [f2]	84.7	246	370	112	168	7.93	11.9	7.18	24.1	467	103	154
W10×68	84.3	273	411	109	164	5.92	8.90	3.66	31.4	390	114	172
W16×45	81.3	264	396	105	158	13.5	20.4	2.22	14.0	579	130	195
W18×40 [v2]	**77.2**	**250**	**376**	**98.2**	**148**	**16.2**	**24.3**	**1.80**	**11.2**	**602**	**128**	**192**
W14×48	76.5	248	373	100	150	10.1	15.2	2.72	17.4	473	110	165
W12×53 [f2]	76.3	195	293	101	152	7.53	11.3	10.5	23.0	417	97.5	147
W10×60 [f2]	73.6	225	338	96.2	145	5.71	8.58	6.04	28.6	337	100	150
W16×40	**71.9**	**233**	**351**	**93.1**	**140**	**12.4**	**18.6**	**2.21**	**13.5**	**511**	**114**	**171**
W12×50	70.7	229	345	92.2	139	8.33	12.5	2.79	19.2	385	105	158
W8×67	69.7	226	340	87.6	132	4.17	6.27	3.00	36.2	270	120	180
W14×43 [f2]	67.7	204	306	89.0	134	9.31	14.0	4.39	16.7	416	97.6	147
W10×54 [f2]	65.7	182	274	86.4	130	5.50	8.26	9.23	26.7	299	87.3	131

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

[v2] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(b) with F_y = 65 ksi.

Z_x

Table 3-1 (continued)
W-Shapes (Welded)
Selection by Z_x

F_y = 65 ksi

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W18×35 [f2,v2]	**65.3**	**209**	**315**	**82.5**	**124**	**13.6**	**20.4**	**1.35**	**10.7**	**500**	**115**	**172**
W12×45 [f2]	63.1	204	306	82.6	124	7.85	11.8	2.87	18.3	342	94.7	142
W16×36 [f2]	62.9	174	261	81.2	122	11.2	16.9	4.86	13.1	441	110	165
W14×38	60.6	197	295	78.5	118	10.3	15.4	2.20	13.7	380	102	153
W10×49 [f2]	59.4	146	219	78.5	118	5.28	7.93	12.5	25.2	268	79.2	119
W8×58	59.3	192	289	75.5	113	4.07	6.11	2.96	31.7	226	104	157
W12×40 [f2]	56.1	163	245	74.0	111	7.29	11.0	5.39	17.6	303	82.0	123
W10×45	54.0	175	263	70.5	106	5.70	8.56	2.84	21.2	244	82.6	124
W14×34 [f2]	**53.7**	**164**	**247**	**69.8**	**105**	**9.42**	**14.2**	**3.22**	**13.3**	**334**	**93.2**	**140**
W16×31 [f2,v2]	**53.0**	**172**	**258**	**67.4**	**101**	**11.7**	**17.5**	**1.27**	**10.2**	**367**	**97.1**	**146**
W12×35	50.7	164	247	66.0	99.2	8.37	12.6	2.17	13.9	283	87.6	132
W8×48	48.5	157	236	62.6	94.1	3.92	5.90	2.94	27.1	182	79.4	119
W14×30 [f2]	**46.4**	**116**	**175**	**60.1**	**90.4**	**8.50**	**12.8**	**6.12**	**12.7**	**285**	**87.0**	**131**
W10×39 [f2]	45.9	138	208	60.3	90.6	5.33	8.01	4.80	19.4	205	73.0	110
W16×26 [f2,v2]	**43.2**	**121**	**183**	**54.6**	**82.0**	**7.87**	**11.8**	**1.23**	**9.73**	**294**	**79.3**	**119**
W12×30 [f2]	42.7	131	197	55.8	83.8	7.49	11.3	3.18	13.2	236	74.7	112
W14×26	**39.4**	**128**	**192**	**50.2**	**75.5**	**9.76**	**14.7**	**1.53**	**9.49**	**240**	**82.8**	**124**
W8×40 [f2]	39.3	124	186	51.2	77.0	3.74	5.62	3.92	23.3	145	69.4	104
W10×33 [f2]	37.9	89.6	135	49.9	75.0	4.85	7.29	9.64	17.8	166	65.9	99.0
W12×26 [f2]	**36.8**	**95.8**	**144**	**48.2**	**72.4**	**6.72**	**10.1**	**5.64**	**12.7**	**202**	**65.5**	**98.5**
W10×30	36.2	117	176	46.9	70.4	6.26	9.41	1.94	13.2	168	73.6	111
W8×35 [f2]	34.2	95.3	143	45.0	67.6	3.57	5.37	7.28	21.4	125	58.8	88.4
W14×22 [f2,v2]	**32.3**	**97.9**	**147**	**41.0**	**61.6**	**7.21**	**10.8**	**1.13**	**9.03**	**193**	**67.5**	**101**
W10×26	30.9	100	151	40.3	60.5	5.72	8.60	1.93	12.4	143	62.5	94.0
W8×31 [f2]	29.9	70.3	106	39.6	59.5	3.38	5.08	10.7	19.8	108	53.2	80.0
W12×22	**28.9**	**93.7**	**141**	**36.5**	**54.8**	**8.74**	**13.1**	**1.20**	**7.75**	**154**	**74.7**	**112**
W8×28 [f2]	26.7	85.9	129	34.9	52.4	3.60	5.42	2.48	16.6	96.4	53.6	80.6
W10×22 [f2]	**25.7**	**72.6**	**109**	**33.4**	**50.2**	**5.11**	**7.68**	**3.98**	**11.6**	**117**	**57.2**	**85.9**
W12×19	**24.3**	**78.8**	**118**	**30.5**	**45.8**	**7.77**	**11.7**	**1.16**	**7.38**	**127**	**67.0**	**101**
W8×24 [f2]	22.7	63.1	94.8	29.9	45.0	3.35	5.04	5.44	15.3	81.1	45.4	68.2

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

[v2] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(b) with F_y = 65 ksi.

F_y = 65 ksi

Table 3-1 (continued)
W-Shapes (Welded)
Selection by Z_x

Z_x

Shape	Z_x	M_{px}/Ω_b	$\varphi_b M_{px}$	M_{rx}/Ω_b	$\varphi_b M_{rx}$	BF/Ω_b	$\varphi_b BF$	L_p	L_r	I_x	V_{nx}/Ω_v	$\varphi_v V_{nx}$
		kip-ft	kip-ft	kip-ft	kip-ft	kips	kips				kips	kips
	in.^{3}	ASD	LRFD	ASD	LRFD	ASD	LRFD	ft	ft	in.^{4}	ASD	LRFD
W10×19	**21.2**	**68.8**	**103**	**27.0**	**40.6**	**6.07**	**9.12**	**1.24**	**8.12**	**94.6**	**59.6**	**89.5**
W8×21	20.1	65.2	98.0	26.1	39.3	3.80	5.72	1.79	12.1	74.2	48.3	72.7
W12×16 [f2,v2]	**19.6**	**58.7**	**88.3**	**24.4**	**36.6**	**6.69**	**10.0**	**1.82**	**6.96**	**100**	**61.4**	**92.3**
W6×25	18.8	61.0	91.7	24.2	36.4	2.25	3.39	2.15	18.5	53.0	47.7	71.7
W10×17	18.3	59.4	89.2	23.2	34.9	5.55	8.34	1.20	7.71	80.2	56.6	85.1
W12×14 [f2,v2]	**17.0**	**41.2**	**62.0**	**21.2**	**31.8**	**3.42**	**5.14**	**0.857**	**6.73**	**86.1**	**50.4**	**75.8**
W8×18 [f2]	16.7	47.5	71.4	21.9	32.9	3.43	5.16	3.70	11.2	60.9	43.7	65.7
W10×15 [f2]	15.6	47.7	71.6	19.7	29.6	4.99	7.50	1.74	7.34	67.2	53.7	80.6
W6×20 [f2]	14.8	40.2	60.5	19.3	29.0	2.10	3.16	5.83	15.8	41.0	37.6	56.6
W8×15	13.3	43.1	64.8	16.9	25.4	3.72	5.59	1.24	8.30	47.0	46.4	69.7
W10×12 [f2]	**12.3**	**26.7**	**40.2**	**15.5**	**23.3**	**4.18**	**6.28**	**4.27**	**6.96**	**52.2**	**43.8**	**65.8**
W6×16	11.5	37.3	56.1	14.7	22.2	2.34	3.51	1.37	11.0	31.8	38.1	57.3
W5×19	11.5	37.3	56.1	14.7	22.2	1.44	2.17	1.82	17.4	25.9	32.5	48.8
W8×13 [f2]	11.1	31.8	47.9	14.1	21.2	3.32	4.98	2.45	7.81	38.5	42.9	64.5
W5×18.9	10.9	35.4	53.1	13.9	20.9	1.34	2.02	1.77	17.7	23.8	36.9	55.5
W6×15 [f2]	10.6	16.2	24.4	14.0	21.0	N/A	N/A	N/A	13.5	28.7	32.2	48.4
W5×16	9.47	30.7	46.2	12.3	18.4	1.37	2.06	1.79	15.2	21.1	28.1	42.2
W8×10 [f2]	**8.59**	**18.3**	**27.5**	**11.0**	**16.6**	**2.74**	**4.12**	**4.69**	**7.34**	**29.8**	**31.3**	**47.1**
W6×12 [f2]	8.16	25.9	38.9	10.5	15.8	2.05	3.08	1.59	9.10	21.7	32.4	48.7
W4×13	6.19	20.1	30.2	7.85	11.8	0.937	1.41	1.42	14.5	11.2	27.2	40.9
W6×9 [f2]	**6.09**	**14.2**	**21.4**	**7.93**	**11.9**	**1.73**	**2.60**	**4.47**	**8.12**	**16.0**	**23.4**	**35.2**

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

[v2] Shape does not meet the h/t_w limit for shear in AISC *Specification* Section G2.1(b) with F_y = 65 ksi.

Z_y

Table 3-2
W-Shapes (Welded)
Selection by Z_y

F_y = 65 ksi

Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$	Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$	Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$
		kip-ft	kip-ft			kip-ft	kip-ft			kip-ft	kip-ft
	in.^{3}	ASD	LRFD		in.^{3}	ASD	LRFD		in.^{3}	ASD	LRFD
W14×120 ^{f2}	**102**	**280**	**421**	**W10×60** ^{f2}	**34.9**	**104**	**156**	**W10×39** ^{f2}	**17.1**	**49.7**	**74.8**
				W21×93	34.6	112	169	W12×40 ^{f2}	16.9	46.4	69.7
W14×109 ^{f2}	**92.6**	**217**	**327**	W14×61 ^{f2}	32.7	90.9	137	W18×50	16.5	53.5	80.4
				W24×84	32.6	106	159	W16×50	16.3	52.9	79.5
W14×99 ^{f2}	**83.5**	**153**	**230**	W8×67	32.6	106	159				
W24×131	81.4	264	397					**W8×35** ^{f2}	**16.1**	**41.5**	**62.3**
W21×122	75.5	245	368	**W12×58** ^{f2}	**32.4**	**89.0**	**134**	W24×62	15.7	50.8	76.4
								W21×57	14.8	48.0	72.2
W14×90 ^{f2}	**75.5**	**107**	**161**	**W10×54** ^{f2}	**31.2**	**79.9**	**120**	W16×45	14.4	46.7	70.2
W12×106	74.9	243	365	W21×83	30.3	98.3	148				
W24×117 ^{f2}	71.3	208	312					**W10×33** ^{f2}	**14.0**	**27.3**	**41.1**
W21×111 ^{f2}	68.1	219	328	**W12×53** ^{f2}	**29.0**	**64.6**	**97.1**				
W12×96	67.4	219	329	W24×76	28.6	92.8	139	**W8×31** ^{f2}	**14.0**	**27.1**	**40.7**
W24×104 ^{f2}	62.4	144	217					W24×55 ^{f2}	13.3	43.0	64.7
W21×101 ^{f2}	61.7	174	261	**W10×49** ^{f2}	**28.3**	**59.1**	**88.9**	W16×40	12.7	41.2	61.9
W18×106	60.4	196	294	W8×58	27.8	90.2	136	W21×50	12.1	39.2	59.0
				W21×73	26.5	86.0	129	W14×38	12.1	39.2	59.0
W12×87 ^{f2}	**60.3**	**178**	**267**	W18×71	24.6	79.8	120	W18×46	11.7	37.9	57.0
W18×97	55.2	179	269	W24×68 ^{f2}	24.5	69.1	104	W12×35	11.4	37.0	55.6
W16×100	54.8	178	267	W21×68	24.3	78.8	118	W16×36 ^{f2}	10.8	27.5	41.4
								W14×34 ^{f2}	10.6	31.6	47.4
W12×79 ^{f2}	**54.2**	**135**	**204**	**W8×48**	**22.8**	**74.0**	**111**	W21×44 ^{f2}	10.1	31.2	46.9
W10×88	53.0	172	258	W18×65	22.5	73.0	110				
				W14×53	21.9	71.0	107	**W8×28** ^{f2}	**10.1**	**32.4**	**48.7**
W12×72 ^{f2}	**49.1**	**102**	**153**	W21×62	21.7	70.4	106	W18×40	9.92	32.2	48.4
W18×86 ^{f2}	48.3	150	225	W12×50	21.3	69.1	104	W12×30 ^{f2}	9.55	28.5	42.8
W16×89	48.0	156	234	W18×60	20.6	66.8	100	W14×30 ^{f2}	8.96	19.6	29.4
W10×77	45.8	149	223					W10×30	8.82	28.6	43.0
W14×82	44.7	145	218	**W10×45**	**20.2**	**65.5**	**98.5**				
				W14×48	19.5	63.2	95.1	**W6×25**	**8.55**	**27.7**	**41.7**
W12×65 ^{f2}	**44.0**	**66.1**	**99.4**								
W18×76 ^{f2}	42.2	109	164	**W12×45** ^{f2}	**18.9**	**61.0**	**91.6**	**W8×24** ^{f2}	**8.54**	**21.9**	**32.9**
W16×77	41.1	133	200	W16×57	18.8	61.0	91.7	W12×26 ^{f2}	8.15	18.8	28.3
W14×74	40.4	131	197	W18×55	18.5	60.0	90.2	W18×35 ^{f2}	8.03	25.6	38.5
W10×68	40.0	130	195					W10×26	7.48	24.3	36.5
W24×94	37.4	121	182	**W8×40** ^{f2}	**18.5**	**57.4**	**86.3**	W16×31 ^{f2}	7.00	22.7	34.1
W14×68	36.8	119	179	W14×43 ^{f2}	17.2	49.9	75.0				
W16×67 ^{f2}	35.4	100	151					**W6×20** ^{f2}	**6.71**	**16.7**	**25.1**
								W10×22 ^{f2}	6.09	16.1	24.1
								W8×21	5.67	18.4	27.6
								W14×26	5.52	17.9	26.9

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

F_y = 65 ksi

Table 3-2 (continued)
W-Shapes (Welded)
Selection by Z_y

Z_y

Shape	Z_y	M_{ny}/Ω_b	$\varphi_b M_{ny}$
		kip-ft	kip-ft
	in.^{3}	ASD	LRFD
W5×19	**5.52**	**17.9**	**26.9**
W16×26 [f2]	5.45	14.4	21.6
W5×18.9	**5.31**	**17.2**	**25.9**
W6×15 [f2]	**4.74**	**5.26**	**7.90**
W8×18 [f2]	4.65	12.4	18.6
W5×16	4.56	14.8	22.2
W14×22 [f2]	4.36	12.8	19.3
W12×22	3.64	11.8	17.7
W6×16	3.38	11.0	16.5
W10×19	3.34	10.8	16.3
W12×19	2.97	9.63	14.5
W4×13	**2.91**	**9.44**	**14.2**
W10×17	2.79	9.05	13.6
W8×15	2.65	8.60	12.9
W6×12 [f2]	**2.31**	**7.25**	**10.9**
W10×15 [f2]	2.28	6.79	10.2
W12×16 [f2]	2.25	6.53	9.81
W8×13 [f2]	2.14	5.80	8.72
W12×14 [f2]	1.89	3.98	5.99
W10×12 [f2]	**1.73**	**3.02**	**4.54**
W6×9 [f2]	**1.71**	**3.30**	**4.96**
W8×10 [f2]	1.65	2.72	4.09

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Version 1.0 03/04/2018

W24

Table 3-3
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W24×											
		131		117 [f2]		104 [f2]		94		84		76	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8												
	9												
	10					562	846			530	796	492	738
	11					543	816	584	878	524	787	467	702
	12			624	938	497	748	543	816	480	722	428	644
	13	692	1040	602	905	459	690	501	753	443	666	395	594
	14	680	1020	559	841	426	641	465	699	411	618	367	552
	15	635	954	522	785	398	598	434	653	384	577	343	515
	16	595	895	489	736	373	561	407	612	360	541	321	483
	17	560	842	461	692	351	528	383	576	339	509	302	454
	18	529	795	435	654	332	498	362	544	320	481	285	429
	19	501	753	412	619	314	472	343	515	303	456	270	406
	20	476	716	392	589	298	449	326	489	288	433	257	386
	21	453	682	373	560	284	427	310	466	274	412	245	368
	22	433	651	356	535	271	408	296	445	262	394	234	351
	23	414	622	340	512	260	390	283	426	250	376	223	336
	24	397	596	326	490	249	374	271	408	240	361	214	322
	25	381	573	313	471	239	359	261	392	230	346	206	309
	26	366	551	301	453	230	345	250	377	222	333	198	297
	27	353	530	290	436	221	332	241	363	213	321	190	286
	28	340	511	280	420	213	320	233	350	206	309	183	276
	29	328	494	270	406	206	309	225	338	199	299	177	266
	30	317	477	261	392	199	299	217	326	192	289	171	257
	32	298	447	245	368	187	280	204	306	180	271	161	241
	34	280	421	230	346	176	264	192	288	169	255	151	227
	36	265	398	218	327	166	249	181	272	160	241	143	215
	38	251	377	206	310	157	236	171	258	152	228	135	203
	40	238	358	196	294	149	224	163	245	144	216	128	193
	42	227	341	186	280	142	214	155	233	137	206	122	184
	44	216	325	178	268	136	204	148	222	131	197	117	176
	46	207	311	170	256	130	195	142	213	125	188	112	168
	48	198	298	163	245	124	187	136	204	120	180	107	161
	50	190	286	157	235	119	179	130	196	115	173	103	154
	52	183	275	151	226	115	173	125	188	111	167	98.8	149
	54	176	265	145	218	111	166	121	181	107	160	95.1	143
	56	170	256	140	210	107	160	116	175	103	155	91.7	138
	58	164	247	135	203	103	155	112	169	99.3	149	88.6	133
	60	159	239	131	196	100	150	109	163	96.0	144	85.6	129
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	9520	14300	7830	11800	5970	8970	6510	9790	5760	8660	5140	7720
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	1190	1790	979	1470	746	1120	814	1220	720	1080	642	965
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	476	715	422	634	374	562	321	483	283	426	253	380
BF/Ω_b	$\varphi_b BF$, kips	31.7	47.6	29.3	44.0	26.8	40.3	32.6	49.0	30.1	45.2	27.7	41.7
V_n/Ω_v	$\varphi_v V_{nx}$, kips	346	520	312	469	281	423	292	439	265	398	246	369
Z_x, in.^{3}		367		325		287		251		222		198	
L_p, ft		4.20		6.72		11.0		2.80		2.76		2.72	
L_r, ft		26.7		25.7		24.9		17.9		17.3		16.8	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W24-W21

Shape		W24×						W21×					
		68 ^{f2,v2}		62 ^{v2}		55 ^{f2,v2}		122		111 ^{f2}		101 ^{f2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8			472	710	396	594						
	9	440	660	435	654	360	541						
	10	407	612	392	589	324	487						
	11	370	557	356	535	295	443					500	752
	12	339	510	327	491	270	406			552	830	494	742
	13	313	471	301	453	249	375	608	914	547	822	456	685
	14	291	437	280	421	231	348	565	850	508	763	423	636
	15	272	408	261	393	216	325	528	793	474	712	395	594
	16	255	383	245	368	203	304	495	743	444	668	370	557
	17	240	360	230	346	191	286	466	700	418	629	349	524
	18	226	340	218	327	180	271	440	661	395	594	329	495
	19	214	322	206	310	171	256	417	626	374	562	312	469
	20	204	306	196	294	162	243	396	595	355	534	296	445
	21	194	292	187	280	154	232	377	566	339	509	282	424
	22	185	278	178	268	147	221	360	541	323	486	269	405
	23	177	266	170	256	141	212	344	517	309	465	258	387
	24	170	255	163	245	135	203	330	496	296	445	247	371
	25	163	245	157	236	130	195	317	476	284	427	237	356
	26	157	236	151	227	125	187	304	458	273	411	228	342
	27	151	227	145	218	120	180	293	441	263	396	219	330
	28	145	219	140	210	116	174	283	425	254	382	212	318
	29	140	211	135	203	112	168	273	410	245	368	204	307
	30	136	204	131	196	108	162	264	397	237	356	197	297
	32	127	191	122	184	101	152	247	372	222	334	185	278
	34	120	180	115	173	95.3	143	233	350	209	314	174	262
	36	113	170	109	164	90.0	135	220	330	197	297	165	247
	38	107	161	103	155	85.3	128	208	313	187	281	156	234
	40	102	153	98.0	147	81.0	122	198	297	178	267	148	223
	42	97.0	146	93.3	140	77.1	116	188	283	169	254	141	212
	44	92.6	139	89.0	134	73.6	111	180	270	162	243	135	202
	46	88.6	133	85.2	128	70.4	106	172	259	155	232	129	194
	48	84.9	128	81.6	123	67.5	101	165	248	148	223	123	186
	50	81.5	122	78.4	118	64.8	97.4	158	238	142	214	118	178
	52	78.3	118	75.3	113	62.3	93.7	152	229	137	205	114	171
	54	75.4	113	72.6	109	60.0	90.2	147	220	132	198	110	165
	56	72.7	109	70.0	105	57.9	87.0	141	212	127	191	106	159
	58	70.2	106	67.6	102	55.9	84.0	136	205	123	184	102	154
	60	67.9	102	65.3	98.2	54.0	81.2	132	198	118	178	98.7	148
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	4070	6120	3920	5890	3240	4870	7910	11900	7110	10700	5920	8900
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	513	771	490	736	428	644	989	1490	889	1340	741	1110
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	222	333	187	281	163	246	396	595	361	542	328	494
BF/Ω_b	$\varphi_b BF$, kips	20.5	30.7	28.8	43.3	25.2	37.9	25.8	38.8	24.3	36.5	22.9	34.4
V_n/Ω_v	$\varphi_v V_{nx}$, kips	220	330	236	355	198	297	304	457	276	415	250	376
Z_x, in.^{3}		174		151		132		305		276		251	
L_p, ft		2.04		1.94		1.52		4.11		4.37		7.30	
L_r, ft		16.3		12.4		12.0		27.1		26.1		25.3	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W21

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W21×											
		93		83		73		68		62		57	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7												
	8											400	600
	9	586	880	514	774	450	678	424	636	392	590	363	546
	10	568	854	503	757	441	663	410	616	368	554	327	491
	11	517	776	458	688	401	603	373	560	335	503	297	447
	12	474	712	419	631	368	553	342	514	307	462	272	410
	13	437	657	387	582	339	510	315	474	283	426	251	378
	14	406	610	360	540	315	474	293	440	263	396	234	351
	15	379	569	336	504	294	442	273	411	246	369	218	328
	16	355	534	315	473	276	414	256	385	230	346	204	307
	17	334	502	296	445	259	390	241	362	217	326	192	289
	18	316	475	280	420	245	368	228	342	205	308	182	273
	19	299	450	265	398	232	349	216	324	194	291	172	259
	20	284	427	252	378	221	332	205	308	184	277	163	246
	21	271	407	240	360	210	316	195	293	175	264	156	234
	22	258	388	229	344	201	301	186	280	167	252	149	223
	23	247	371	219	329	192	288	178	268	160	241	142	214
	24	237	356	210	315	184	276	171	257	154	231	136	205
	25	227	342	201	303	176	265	164	246	147	222	131	197
	26	219	329	194	291	170	255	158	237	142	213	126	189
	27	210	316	186	280	163	246	152	228	136	205	121	182
	28	203	305	180	270	158	237	146	220	132	198	117	176
	29	196	295	174	261	152	229	141	212	127	191	113	169
	30	189	285	168	252	147	221	137	205	123	185	109	164
	32	178	267	157	236	138	207	128	193	115	173	102	154
	34	167	251	148	223	130	195	121	181	108	163	96.2	145
	36	158	237	140	210	123	184	114	171	102	154	90.8	137
	38	150	225	132	199	116	174	108	162	97.0	146	86.0	129
	40	142	214	126	189	110	166	102	154	92.1	138	81.7	123
	42	135	203	120	180	105	158	97.6	147	87.7	132	77.8	117
	44	129	194	114	172	100	151	93.2	140	83.7	126	74.3	112
	46	124	186	109	164	95.9	144	89.1	134	80.1	120	71.1	107
	48	118	178	105	158	91.9	138	85.4	128	76.8	115	68.1	102
	50	114	171	101	151	88.2	133	82.0	123	73.7	111	65.4	98.3
	52	109	164	96.8	146	84.8	128	78.8	119	70.9	107	62.9	94.5
	54	105	158	93.2	140	81.7	123	75.9	114	68.2	103	60.5	91.0
	56	101	153	89.9	135	78.8	118	73.2	110	65.8	98.9	58.4	87.8
	58	98.0	147	86.8	130	76.1	114	70.7	106	63.5	95.5	56.4	84.7
	60	94.7	142	83.9	126	73.5	111	68.3	103	61.4	92.3	54.5	81.9
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	5680	8540	5030	7570	4410	6630	4100	6160	3680	5540	3270	4910
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	710	1070	629	946	551	829	512	770	461	692	409	614
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	277	417	247	371	217	327	201	303	182	274	159	239
BF/Ω_b	$\varphi_b BF$, kips	28.8	43.2	26.7	40.2	24.3	36.6	23.2	34.9	21.4	32.2	24.2	36.4
V_n/Ω_v	$\varphi_v V_{nx}$, kips	293	440	257	387	225	339	212	318	196	295	200	300
Z_x, in.^{3}		219		194		170		158		142		126	
L_p, ft		2.61		2.58		2.56		2.55		2.51		1.92	
L_r, ft		17.7		16.9		16.3		16.0		15.5		12.2	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W21-W18

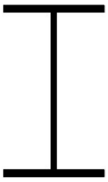
Shape		W21×				W18×							
		50 ^{v2}		44 ^{f2,v2}		106		97		86 ^{f2}		76 ^{f2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7	370	554	310	468								
	8	350	527	280	421								
	9	311	468	249	374							362	542
	10	280	421	224	337							361	543
	11	255	383	204	306	516	774	464	698	412	620	328	493
	12	234	351	187	281	495	744	454	683	388	583	301	452
	13	216	324	172	259	457	687	419	630	358	538	278	417
	14	200	301	160	241	424	638	389	585	333	500	258	388
	15	187	281	149	225	396	595	363	546	310	466	241	362
	16	175	263	140	211	371	558	341	512	291	437	226	339
	17	165	248	132	198	350	525	321	482	274	412	212	319
	18	156	234	125	187	330	496	303	455	259	389	201	301
	19	147	222	118	177	313	470	287	431	245	368	190	286
	20	140	211	112	169	297	447	272	410	233	350	181	271
	21	133	201	107	160	283	425	259	390	222	333	172	258
	22	127	191	102	153	270	406	248	372	212	318	164	247
	23	122	183	97.5	147	258	388	237	356	202	304	157	236
	24	117	176	93.4	140	248	372	227	341	194	292	150	226
	25	112	168	89.7	135	238	357	218	328	186	280	144	217
	26	108	162	86.2	130	229	344	210	315	179	269	139	209
	27	104	156	83.0	125	220	331	202	303	172	259	134	201
	28	100	150	80.1	120	212	319	195	293	166	250	129	194
	29	96.6	145	77.3	116	205	308	188	282	161	241	124	187
	30	93.4	140	74.7	112	198	298	182	273	155	233	120	181
	32	87.6	132	70.1	105	186	279	170	256	145	219	113	170
	34	82.4	124	65.9	99.1	175	263	160	241	137	206	106	160
	36	77.8	117	62.3	93.6	165	248	151	228	129	194	100	151
	38	73.7	111	59.0	88.7	156	235	143	216	123	184	95.0	143
	40	70.1	105	56.1	84.3	149	223	136	205	116	175	90.3	136
	42	66.7	100	53.4	80.2	141	213	130	195	111	167	86.0	129
	44	63.7	95.7	51.0	76.6	135	203	124	186	106	159	82.0	123
	46	60.9	91.6	48.7	73.3	129	194	118	178	101	152	78.5	118
	48	58.4	87.8	46.7	70.2	124	186	114	171	97.0	146	75.2	113
	50	56.0	84.2	44.8	67.4	119	179	109	164	93.1	140	72.2	109
	52	53.9	81.0	43.1	64.8	114	172	105	158	89.5	135	69.4	104
	54	51.9	78.0	41.5	62.4	110	165	101	152	86.2	130	66.9	100
	56	50.0	75.2	40.0	60.2	106	159	97.3	146	83.1	125	64.5	96.9
	58	48.3	72.6	38.7	58.1	102	154	94.0	141	80.3	121	62.2	93.6
	60	46.7	70.2	37.4	56.2	99.0	149	90.8	137	77.6	117	60.2	90.4
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2800	4210	2240	3370	5940	8930	5450	8190	4660	7000	3610	5430
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	350	527	292	439	743	1120	681	1020	582	875	451	678
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	135	203	116	175	296	445	273	410	241	362	212	318
BF/Ω_b	$\varphi_b BF$, kips	21.9	32.9	17.9	26.9	20.1	30.2	19.2	28.9	17.9	26.9	16.4	24.6
V_n/Ω_v	$\varphi_v V_{nx}$, kips	185	277	155	234	258	387	232	349	206	310	181	271
Z_x, in.^{3}		108		93.3		229		210		185		162	
L_p, ft		1.84		1.42		3.76		3.75		4.73		8.22	
L_r, ft		11.7		11.3		26.0		25.0		23.8		22.9	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.



W18

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W18×											
		71		65		60		55		50		46	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7											304	458
	8	428	642	386	582			330	496	298	448	290	436
	9	415	624	381	572	352	530	320	481	287	432	258	388
	10	374	562	343	515	317	476	288	433	258	388	232	349
	11	340	511	311	468	288	433	262	394	235	353	211	317
	12	311	468	285	429	264	397	240	361	215	324	194	291
	13	287	432	263	396	244	366	222	333	199	299	179	269
	14	267	401	245	368	226	340	206	309	185	277	166	249
	15	249	374	228	343	211	317	192	289	172	259	155	233
	16	234	351	214	322	198	297	180	271	162	243	145	218
	17	220	330	201	303	186	280	169	255	152	228	137	205
	18	208	312	190	286	176	264	160	241	144	216	129	194
	19	197	296	180	271	167	250	152	228	136	204	122	184
	20	187	281	171	257	158	238	144	216	129	194	116	175
	21	178	267	163	245	151	227	137	206	123	185	111	166
	22	170	255	156	234	144	216	131	197	117	177	106	159
	23	162	244	149	224	138	207	125	188	112	169	101	152
	24	156	234	143	215	132	198	120	180	108	162	96.8	145
	25	149	225	137	206	127	190	115	173	103	155	92.9	140
	26	144	216	132	198	122	183	111	167	99.4	149	89.3	134
	27	138	208	127	191	117	176	107	160	95.7	144	86.0	129
	28	133	201	122	184	113	170	103	155	92.3	139	82.9	125
	29	129	194	118	178	109	164	99.3	149	89.1	134	80.1	120
	30	125	187	114	172	106	159	96.0	144	86.1	129	77.4	116
	32	117	176	107	161	98.9	149	90.0	135	80.8	121	72.6	109
	34	110	165	101	151	93.1	140	84.7	127	76.0	114	68.3	103
	36	104	156	95.1	143	87.9	132	80.0	120	71.8	108	64.5	97.0
	38	98.3	148	90.1	135	83.3	125	75.8	114	68.0	102	61.1	91.9
	40	93.4	140	85.6	129	79.1	119	72.0	108	64.6	97.1	58.1	87.3
	42	89.0	134	81.6	123	75.4	113	68.6	103	61.5	92.5	55.3	83.1
	44	84.9	128	77.8	117	71.9	108	65.5	98.4	58.7	88.3	52.8	79.3
	46	81.2	122	74.5	112	68.8	103	62.6	94.1	56.2	84.4	50.5	75.9
	48	77.8	117	71.4	107	66.0	99.1	60.0	90.2	53.8	80.9	48.4	72.7
	50	74.7	112	68.5	103	63.3	95.2	57.6	86.6	51.7	77.7	46.4	69.8
	52	71.9	108	65.9	99.0	60.9	91.5	55.4	83.3	49.7	74.7	44.7	67.1
	54	69.2	104	63.4	95.3	58.6	88.1	53.3	80.2	47.9	71.9	43.0	64.6
	56	66.7	100	61.2	91.9	56.5	85.0	51.4	77.3	46.2	69.4	41.5	62.3
	58	64.4	96.8	59.1	88.8	54.6	82.0	49.7	74.6	44.6	67.0	40.0	60.2
	60	62.3	93.6	57.1	85.8	52.8	79.3	48.0	72.2	43.1	64.7	38.7	58.2
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	3740	5620	3430	5150	3170	4760	2880	4330	2580	3880	2320	3490
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	467	702	428	644	396	595	360	541	323	486	290	436
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	184	276	169	254	156	235	142	213	128	193	114	171
BF/Ω_b	$\varphi_b BF$, kips	20.5	30.8	19.5	29.2	18.5	27.9	17.5	26.2	16.1	24.2	18.1	27.2
V_n/Ω_v	$\varphi_v V_{nx}$, kips	214	321	193	291	176	265	165	248	149	224	152	229
Z_x, in.^{3}		144		132		122		111		100		89.5	
L_p, ft		2.41		2.39		2.38		2.35		2.34		1.83	
L_r, ft		16.2		15.7		15.3		14.8		14.5		11.6	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W18-W16

Shape		W18×				W16×							
		40 ^{v2}		35 ^{f2,v2}		100		89		77		67 ^{f2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7	256	384	230	344								
	8	250	376	202	304								
	9	223	335	180	270								
	10	200	301	162	243			412	620			300	452
	11	182	274	147	221	464	698	410	617	350	528	278	417
	12	167	251	135	203	426	640	376	566	322	484	255	383
	13	154	232	124	187	393	591	347	522	297	447	235	353
	14	143	215	116	174	365	549	322	485	276	415	218	328
	15	134	201	108	162	341	512	301	452	258	387	204	306
	16	125	188	101	152	319	480	282	424	242	363	191	287
	17	118	177	95.2	143	301	452	266	399	227	342	180	270
	18	111	167	89.9	135	284	427	251	377	215	323	170	255
	19	105	158	85.2	128	269	404	238	357	203	306	161	242
	20	100	151	80.9	122	256	384	226	339	193	291	153	230
	21	95.4	143	77.1	116	243	366	215	323	184	277	145	219
	22	91.1	137	73.6	111	232	349	205	308	176	264	139	209
	23	87.1	131	70.4	106	222	334	196	295	168	253	133	200
	24	83.5	125	67.4	101	213	320	188	283	161	242	127	191
	25	80.1	120	64.7	97.3	204	307	181	271	155	232	122	184
	26	77.0	116	62.2	93.5	197	296	174	261	149	224	117	177
	27	74.2	112	59.9	90.1	189	285	167	251	143	215	113	170
	28	71.5	108	57.8	86.9	183	274	161	242	138	208	109	164
	29	69.1	104	55.8	83.9	176	265	156	234	133	200	105	158
	30	66.8	100	53.9	81.1	170	256	150	226	129	194	102	153
	32	62.6	94.1	50.6	76.0	160	240	141	212	121	182	95.4	143
	34	58.9	88.6	47.6	71.5	150	226	133	200	114	171	89.8	135
	36	55.6	83.6	45.0	67.6	142	213	125	189	107	161	84.8	128
	38	52.7	79.2	42.6	64.0	135	202	119	179	102	153	80.4	121
	40	50.1	75.3	40.5	60.8	128	192	113	170	96.7	145	76.4	115
	42	47.7	71.7	38.5	57.9	122	183	107	162	92.1	138	72.7	109
	44	45.5	68.4	36.8	55.3	116	175	103	154	87.9	132	69.4	104
	46	43.5	65.5	35.2	52.9	111	167	98.2	148	84.0	126	66.4	100
	48	41.7	62.7	33.7	50.7	106	160	94.1	141	80.5	121	63.6	95.6
	50	40.1	60.2	32.4	48.6	102	154	90.3	136	77.3	116	61.1	91.8
	52	38.5	57.9	31.1	46.8	98.3	148	86.8	131	74.4	112	58.7	88.3
	54	37.1	55.8	30.0	45.0	94.7	142	83.6	126	71.6	108	56.6	85.0
	56	35.8	53.8	28.9	43.4	91.3	137	80.6	121	69.0	104	54.5	82.0
	58	34.5	51.9	27.9	41.9	88.1	132	77.8	117	66.7	100	52.7	79.1
	60	33.4	50.2	27.0	40.5	85.2	128	75.2	113	64.4	96.9	50.9	76.5
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2000	3010	1620	2430	5110	7680	4510	6790	3870	5810	3050	4590
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	250	376	209	315	639	960	564	848	483	726	382	574
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	98.2	148	82.5	124	254	382	225	338	194	292	169	254
BF/Ω_b	$\varphi_b BF$, kips	16.2	24.3	13.6	20.4	16.9	25.5	16.1	24.2	14.8	22.3	13.6	20.4
V_n/Ω_v	$\varphi_v V_{nx}$, kips	128	192	115	172	232	349	206	310	175	264	150	226
Z_x, in.^{3}		77.2		65.3		197		174		149		129	
L_p, ft		1.80		1.35		3.55		3.52		3.49		6.17	
L_r, ft		11.2		10.7		26.3		24.6		23.0		21.8	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W16

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W16×											
		57		50		45		40		36 ^{f2}		31 ^{f2,v2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6									220	330		
	7									198	298	194	292
	8	330	496	290	434	260	390	228	342	174	261	170	255
	9	300	451	262	394	234	352	207	312	154	232	151	227
	10	270	406	236	355	211	317	187	280	139	209	136	204
	11	245	369	215	323	192	288	170	255	126	190	123	186
	12	225	338	197	296	176	264	155	234	116	174	113	170
	13	208	312	182	273	162	244	144	216	107	161	104	157
	14	193	290	169	254	151	226	133	200	99.2	149	97.0	146
	15	180	270	157	237	141	211	124	187	92.6	139	90.5	136
	16	169	254	148	222	132	198	117	175	86.8	130	84.9	128
	17	159	239	139	209	124	187	110	165	81.7	123	79.9	120
	18	150	225	131	197	117	176	104	156	77.1	116	75.4	113
	19	142	213	124	187	111	167	98.2	148	73.1	110	71.5	107
	20	135	203	118	177	105	159	93.3	140	69.4	104	67.9	102
	21	129	193	112	169	100	151	88.8	134	66.1	99.4	64.7	97.2
	22	123	184	107	161	95.9	144	84.8	127	63.1	94.9	61.7	92.8
	23	117	176	103	154	91.7	138	81.1	122	60.4	90.7	59.0	88.7
	24	112	169	98.4	148	87.9	132	77.7	117	57.9	87.0	56.6	85.0
	25	108	162	94.5	142	84.4	127	74.6	112	55.5	83.5	54.3	81.6
	26	104	156	90.8	137	81.1	122	71.8	108	53.4	80.3	52.2	78.5
	27	100	150	87.5	131	78.1	117	69.1	104	51.4	77.3	50.3	75.6
	28	96.4	145	84.3	127	75.3	113	66.6	100	49.6	74.5	48.5	72.9
	29	93.1	140	81.4	122	72.7	109	64.3	96.7	47.9	72.0	46.8	70.4
	30	90.0	135	78.7	118	70.3	106	62.2	93.5	46.3	69.6	45.3	68.0
	32	84.3	127	73.8	111	65.9	99.1	58.3	87.6	43.4	65.2	42.4	63.8
	34	79.4	119	69.4	104	62.0	93.3	54.9	82.5	40.8	61.4	39.9	60.0
	36	75.0	113	65.6	98.6	58.6	88.1	51.8	77.9	38.6	58.0	37.7	56.7
	38	71.0	107	62.1	93.4	55.5	83.4	49.1	73.8	36.5	54.9	35.7	53.7
	40	67.5	101	59.0	88.7	52.7	79.3	46.6	70.1	34.7	52.2	34.0	51.0
	42	64.3	96.6	56.2	84.5	50.2	75.5	44.4	66.8	33.1	49.7	32.3	48.6
	44	61.3	92.2	53.7	80.7	47.9	72.1	42.4	63.7	31.6	47.4	30.9	46.4
	46	58.7	88.2	51.3	77.2	45.9	68.9	40.6	61.0	30.2	45.4	29.5	44.4
	48	56.2	84.5	49.2	73.9	43.9	66.1	38.9	58.4	28.9	43.5	28.3	42.5
	50	54.0	81.1	47.2	71.0	42.2	63.4	37.3	56.1	27.8	41.7	27.2	40.8
	52	51.9	78.0	45.4	68.3	40.6	61.0	35.9	53.9	26.7	40.1	26.1	39.3
	54	50.0	75.1	43.7	65.7	39.1	58.7	34.5	51.9	25.7	38.6	25.1	37.8
	56	48.2	72.4	42.2	63.4	37.7	56.6	33.3	50.1	24.8	37.3	24.3	36.4
	58	46.5	69.9	40.7	61.2	36.4	54.7	32.2	48.3	23.9	36.0	23.4	35.2
	60	45.0	67.6	39.4	59.2	35.2	52.8	31.1	46.7	23.1	34.8	22.6	34.0
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2700	4060	2360	3550	2110	3170	1870	2800	1390	2090	1360	2040
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	337	507	295	444	264	396	233	351	174	261	172	258
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	133	200	117	176	105	158	93.1	140	81.2	122	67.4	101
BF/Ω_b	$\varphi_b BF$, kips	15.8	23.8	14.6	22.0	13.5	20.4	12.4	18.6	11.2	16.9	11.7	17.5
V_n/Ω_v	$\varphi_v V_{nx}$, kips	165	248	145	217	130	195	114	171	110	165	97.1	146
Z_x, in.^{3}		104		91.0		81.3		71.9		62.9		53.0	
L_p, ft		2.27		2.25		2.22		2.21		4.86		1.27	
L_r, ft		15.2		14.5		14.0		13.5		13.1		10.2	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W16-W14

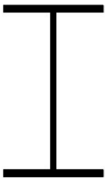
Shape		W16×		W14×									
		26 ^{f2,v2}		120 ^{f2}		109 ^{f2}		99 ^{f2}		90 ^{f2}		82	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**			**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	4												
	5	159	238										
	6	151	227										
	7	130	195										
	8	113	170							288	432		
	9	101	152					322	484	270	405		
	10	90.7	136					313	470	243	365	340	512
	11	82.5	124			350	528	284	427	221	332	323	486
	12	75.6	114	400	600	333	500	261	392	202	304	296	445
	13	69.8	105	374	562	307	462	241	362	187	281	273	411
	14	64.8	97.4	348	522	285	429	223	336	173	261	254	382
	15	60.5	90.9	324	487	266	400	208	313	162	243	237	356
	16	56.7	85.2	304	457	250	375	195	294	152	228	222	334
	17	53.4	80.2	286	430	235	353	184	276	143	215	209	314
	18	50.4	75.8	270	406	222	333	174	261	135	203	197	297
	19	47.8	71.8	256	385	210	316	165	247	128	192	187	281
	20	45.4	68.2	243	366	200	300	156	235	121	182	178	267
	21	43.2	64.9	232	348	190	286	149	224	116	174	169	254
	22	41.2	62.0	221	332	182	273	142	214	110	166	162	243
	23	39.5	59.3	212	318	174	261	136	204	106	159	155	232
	24	37.8	56.8	203	305	166	250	130	196	101	152	148	223
	25	36.3	54.6	195	292	160	240	125	188	97.1	146	142	214
	26	34.9	52.5	187	281	154	231	120	181	93.3	140	137	206
	27	33.6	50.5	180	271	148	222	116	174	89.9	135	132	198
	28	32.4	48.7	174	261	143	214	112	168	86.7	130	127	191
	29	31.3	47.0	168	252	138	207	108	162	83.7	126	123	184
	30	30.2	45.5	162	244	133	200	104	157	80.9	122	118	178
	32	28.4	42.6	152	229	125	188	97.7	147	75.8	114	111	167
	34	26.7	40.1	143	215	117	177	92.0	138	71.4	107	105	157
	36	25.2	37.9	135	203	111	167	86.9	131	67.4	101	98.7	148
	38	23.9	35.9	128	192	105	158	82.3	124	63.9	96.0	93.5	141
	40	22.7	34.1	122	183	100	150	78.2	118	60.7	91.2	88.9	134
	42	21.6	32.5	116	174	95.1	143	74.5	112	57.8	86.8	84.6	127
	44	20.6	31.0	111	166	90.8	136	71.1	107	55.1	82.9	80.8	121
	46	19.7	29.6	106	159	86.8	130	68.0	102	52.8	79.3	77.3	116
	48	18.9	28.4	101	152	83.2	125	65.1	97.9	50.6	76.0	74.1	111
	50	18.1	27.3	97.3	146	79.9	120	62.5	94.0	48.5	72.9	71.1	107
	52	17.5	26.2	93.6	141	76.8	115	60.1	90.4	46.7	70.1	68.4	103
	54	16.8	25.3	90.1	135	74.0	111	57.9	87.0	44.9	67.5	65.8	98.9
	56	16.2	24.4	86.9	131	71.3	107	55.8	83.9	43.3	65.1	63.5	95.4
	58	15.6	23.5	83.9	126	68.9	103	53.9	81.0	41.8	62.9	61.3	92.1
	60	15.1	22.7	81.1	122	66.6	100	52.1	78.3	40.4	60.8	59.2	89.1
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	907	1360	4870	7310	3990	6000	3130	4700	2430	3650	3550	5340
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	121	183	608	914	499	750	391	588	303	456	444	668
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	54.6	82.0	274	412	250	375	226	340	206	309	178	268
BF/Ω_b	$\varphi_b BF$, kips	7.87	11.8	11.4	17.1	11.0	16.6	10.5	15.8	N/A	N/A	11.8	17.7
V_n/Ω_v	$\varphi_v V_{nx}$, kips	79.3	119	200	300	175	264	161	242	144	216	170	256
Z_x, in.^{3}		43.2		210		190		171		155		137	
L_p, ft		1.23		11.7		15.9		20.8		N/A		3.52	
L_r, ft		9.73		41.1		38.6		36.5		34.6		26.1	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.



W14

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W14×											
		74		68		61 [f2]		53		48		43 [f2]	
Design		**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Span, ft	**4**												
	5												
	6												
	7												
	8											195	294
	9					244	366	240	362	220	330	181	272
	10	298	448	272	408	234	352	221	332	199	298	163	245
	11	293	440	267	401	213	320	201	302	180	271	148	223
	12	268	403	244	367	195	294	184	277	165	249	136	204
	13	248	372	226	339	180	271	170	256	153	230	125	188
	14	230	345	209	315	167	252	158	237	142	213	116	175
	15	215	322	195	294	156	235	147	222	132	199	109	163
	16	201	302	183	275	146	220	138	208	124	186	102	153
	17	189	284	172	259	138	207	130	195	117	176	95.9	144
	18	179	269	163	245	130	196	123	185	110	166	90.6	136
	19	169	255	154	232	123	185	116	175	104	157	85.8	129
	20	161	242	147	220	117	176	111	166	99.3	149	81.5	123
	21	153	230	140	210	112	168	105	158	94.5	142	77.6	117
	22	146	220	133	200	107	160	100	151	90.2	136	74.1	111
	23	140	210	127	192	102	153	96.1	144	86.3	130	70.9	107
	24	134	202	122	184	97.6	147	92.1	138	82.7	124	67.9	102
	25	129	193	117	176	93.7	141	88.4	133	79.4	119	65.2	98.0
	26	124	186	113	170	90.1	135	85.0	128	76.3	115	62.7	94.2
	27	119	179	109	163	86.8	130	81.9	123	73.5	111	60.4	90.7
	28	115	173	105	157	83.7	126	79.0	119	70.9	107	58.2	87.5
	29	111	167	101	152	80.8	121	76.2	115	68.4	103	56.2	84.5
	30	107	161	97.7	147	78.1	117	73.7	111	66.2	99.5	54.3	81.7
	32	101	151	91.6	138	73.2	110	69.1	104	62.0	93.2	50.9	76.6
	34	94.6	142	86.2	130	68.9	104	65.0	97.7	58.4	87.8	47.9	72.1
	36	89.4	134	81.4	122	65.1	97.8	61.4	92.3	55.1	82.9	45.3	68.1
	38	84.7	127	77.2	116	61.7	92.7	58.2	87.4	52.2	78.5	42.9	64.5
	40	80.4	121	73.3	110	58.6	88.1	55.3	83.1	49.6	74.6	40.8	61.3
	42	76.6	115	69.8	105	55.8	83.9	52.6	79.1	47.3	71.0	38.8	58.3
	44	73.1	110	66.6	100	53.3	80.1	50.2	75.5	45.1	67.8	37.0	55.7
	46	69.9	105	63.7	95.8	50.9	76.6	48.1	72.2	43.2	64.9	35.4	53.3
	48	67.0	101	61.1	91.8	48.8	73.4	46.1	69.2	41.4	62.2	34.0	51.0
	50	64.4	96.7	58.6	88.1	46.9	70.4	44.2	66.5	39.7	59.7	32.6	49.0
	52	61.9	93.0	56.4	84.8	45.1	67.7	42.5	63.9	38.2	57.4	31.3	47.1
	54	59.6	89.6	54.3	81.6	43.4	65.2	40.9	61.5	36.8	55.3	30.2	45.4
	56	57.5	86.4	52.4	78.7	41.8	62.9	39.5	59.3	35.4	53.3	29.1	43.8
	58	55.5	83.4	50.6	76.0	40.4	60.7	38.1	57.3	34.2	51.4	28.1	42.2
	60	53.6	80.6	48.9	73.5	39.1	58.7	36.8	55.4	33.1	49.7	27.2	40.8
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	3220	4840	2930	4410	2340	3520	2210	3320	1990	2980	1630	2450
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	402	605	367	551	293	440	276	415	248	373	204	306
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	162	244	147	222	132	199	111	167	100	150	89.0	134
BF/Ω_b	$\varphi_b BF$, kips	11.3	17.0	10.8	16.2	10.1	15.1	10.7	16.1	10.1	15.2	9.31	14.0
V_n/Ω_v	$\varphi_v V_{nx}$, kips	149	224	136	204	122	183	120	181	110	165	97.6	147
Z_x, in.^{3}		124		113		100		85.2		76.5		67.7	
L_p, ft		3.51		3.49		6.60		2.73		2.72		4.39	
L_r, ft		24.8		23.8		22.6		18.1		17.4		16.7	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W14-W12

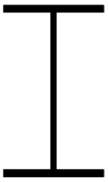
Shape		W14×										W12×	
		38		34 [f2]		30 [f2]		26		22 [f2,v2]		106	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5					174	262			135	202		
	6					155	233	166	248	126	189		
	7	204	306	186	280	133	200	146	220	108	162		
	8	197	295	164	247	116	175	128	192	94.5	142		
	9	175	263	146	219	103	156	114	171	84.0	126		
	10	157	236	131	197	93.1	140	102	154	75.6	114		
	11	143	215	119	180	84.7	127	92.9	140	68.7	103	368	552
	12	131	197	109	165	77.6	117	85.2	128	63.0	94.7	350	527
	13	121	182	101	152	71.6	108	78.6	118	58.2	87.4	323	486
	14	112	169	93.9	141	66.5	100	73.0	110	54.0	81.2	300	451
	15	105	158	87.6	132	62.1	93.3	68.2	102	50.4	75.8	280	421
	16	98.3	148	82.1	123	58.2	87.5	63.9	96.0	47.3	71.0	263	395
	17	92.5	139	77.3	116	54.8	82.3	60.1	90.4	44.5	66.8	247	372
	18	87.4	131	73.0	110	51.7	77.8	56.8	85.4	42.0	63.1	234	351
	19	82.8	124	69.2	104	49.0	73.7	53.8	80.9	39.8	59.8	221	333
	20	78.6	118	65.7	98.7	46.6	70.0	51.1	76.8	37.8	56.8	210	316
	21	74.9	113	62.6	94.0	44.3	66.7	48.7	73.2	36.0	54.1	200	301
	22	71.5	107	59.7	89.8	42.3	63.6	46.5	69.8	34.4	51.7	191	287
	23	68.4	103	57.1	85.9	40.5	60.9	44.5	66.8	32.9	49.4	183	275
	24	65.5	98.5	54.7	82.3	38.8	58.3	42.6	64.0	31.5	47.4	175	263
	25	62.9	94.5	52.6	79.0	37.3	56.0	40.9	61.5	30.2	45.5	168	253
	26	60.5	90.9	50.5	76.0	35.8	53.8	39.3	59.1	29.1	43.7	162	243
	27	58.2	87.5	48.7	73.1	34.5	51.8	37.9	56.9	28.0	42.1	156	234
	28	56.2	84.4	46.9	70.5	33.3	50.0	36.5	54.9	27.0	40.6	150	226
	29	54.2	81.5	45.3	68.1	32.1	48.3	35.3	53.0	26.1	39.2	145	218
	30	52.4	78.8	43.8	65.8	31.0	46.7	34.1	51.2	25.2	37.9	140	211
	32	49.1	73.9	41.1	61.7	29.1	43.7	31.9	48.0	23.6	35.5	131	197
	34	46.2	69.5	38.6	58.1	27.4	41.2	30.1	45.2	22.2	33.4	124	186
	36	43.7	65.7	36.5	54.9	25.9	38.9	28.4	42.7	21.0	31.6	117	176
	38	41.4	62.2	34.6	52.0	24.5	36.8	26.9	40.4	19.9	29.9	111	166
	40	39.3	59.1	32.8	49.4	23.3	35.0	25.6	38.4	18.9	28.4	105	158
	42	37.4	56.3	31.3	47.0	22.2	33.3	24.3	36.6	18.0	27.1	100	150
	44	35.7	53.7	29.9	44.9	21.2	31.8	23.2	34.9	17.2	25.8	95.5	144
	46	34.2	51.4	28.6	42.9	20.2	30.4	22.2	33.4	16.4	24.7	91.4	137
	48	32.8	49.2	27.4	41.1	19.4	29.2	21.3	32.0	15.8	23.7	87.6	132
	50	31.4	47.3	26.3	39.5	18.6	28.0	20.4	30.7	15.1	22.7	84.1	126
	52	30.2	45.5	25.3	38.0	17.9	26.9	19.7	29.6	14.5	21.9	80.8	122
	54	29.1	43.8	24.3	36.6	17.2	25.9	18.9	28.5	14.0	21.0	77.8	117
	56	28.1	42.2	23.5	35.3	16.6	25.0	18.3	27.4	13.5	20.3	75.1	113
	58	27.1	40.7	22.7	34.1	16.1	24.1	17.6	26.5	13.0	19.6	72.5	109
	60	26.2	39.4	21.9	32.9	15.5	23.3	17.0	25.6	12.6	18.9	70.1	105
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1570	2360	1310	1970	931	1400	1020	1540	756	1140	4200	6320
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	197	295	164	247	116	175	128	192	98	147	525	790
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	78.5	118	69.8	105	60.1	90.4	50.2	75.5	41.0	61.6	209	314
BF/Ω_b	$\varphi_b BF$, kips	10.3	15.4	9.42	14.2	8.50	12.8	9.76	14.7	7.21	10.8	9.09	13.7
V_n/Ω_v	$\varphi_v V_{nx}$, kips	102	153	93.2	140	87.0	131	82.8	124	67.5	101	184	276
Z_x, in.^{3}		60.6		53.7		46.4		39.4		32.3		162	
L_p, ft		2.20		3.22		6.12		1.53		1.13		4.41	
L_r, ft		13.7		13.3		12.7		9.49		9.03		39.3	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.



W12

Table 3-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×											
		96		87 [f2]		79 [f2]		72 [f2]		65 [f2]		58 [f2]	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7									220	332		
	8							248	372	197	296		
	9					272	410	231	346	175	263	206	308
	10			300	452	256	385	207	312	157	237	197	296
	11	326	490	288	432	233	350	189	283	143	215	179	269
	12	316	475	264	396	214	321	173	260	131	197	164	247
	13	291	438	243	366	197	296	160	240	121	182	151	228
	14	271	407	226	340	183	275	148	223	112	169	141	211
	15	253	380	211	317	171	257	138	208	105	158	131	197
	16	237	356	198	297	160	241	130	195	98.4	148	123	185
	17	223	335	186	280	151	227	122	183	92.6	139	116	174
	18	210	316	176	264	142	214	115	173	87.5	131	109	164
	19	199	300	166	250	135	203	109	164	82.9	125	104	156
	20	189	285	158	238	128	193	104	156	78.7	118	98.4	148
	21	180	271	151	226	122	183	98.8	148	75.0	113	93.7	141
	22	172	259	144	216	116	175	94.3	142	71.6	108	89.5	134
	23	165	248	138	207	111	167	90.2	136	68.4	103	85.6	129
	24	158	237	132	198	107	160	86.4	130	65.6	98.6	82.0	123
	25	152	228	127	190	102	154	83.0	125	63.0	94.6	78.7	118
	26	146	219	122	183	98.6	148	79.8	120	60.5	91.0	75.7	114
	27	140	211	117	176	94.9	143	76.8	115	58.3	87.6	72.9	110
	28	135	203	113	170	91.5	138	74.1	111	56.2	84.5	70.3	106
	29	131	196	109	164	88.4	133	71.5	108	54.3	81.6	67.9	102
	30	126	190	105	158	85.4	128	69.2	104	52.5	78.9	65.6	98.6
	32	118	178	98.8	149	80.1	120	64.8	97.4	49.2	73.9	61.5	92.4
	34	111	167	93.0	140	75.4	113	61.0	91.7	46.3	69.6	57.9	87.0
	36	105	158	87.9	132	71.2	107	57.6	86.6	43.7	65.7	54.7	82.2
	38	99.7	150	83.2	125	67.4	101	54.6	82.1	41.4	62.3	51.8	77.8
	40	94.7	142	79.1	119	64.1	96.3	51.9	78.0	39.4	59.2	49.2	74.0
	42	90.2	136	75.3	113	61.0	91.7	49.4	74.2	37.5	56.3	46.9	70.4
	44	86.1	129	71.9	108	58.2	87.5	47.2	70.9	35.8	53.8	44.7	67.2
	46	82.4	124	68.8	103	55.7	83.7	45.1	67.8	34.2	51.4	42.8	64.3
	48	78.9	119	65.9	99.0	53.4	80.2	43.2	65.0	32.8	49.3	41.0	61.6
	50	75.8	114	63.3	95.1	51.2	77.0	41.5	62.4	31.5	47.3	39.4	59.2
	52	72.9	110	60.8	91.4	49.3	74.1	39.9	60.0	30.3	45.5	37.8	56.9
	54	70.2	105	58.6	88.0	47.5	71.3	38.4	57.7	29.2	43.8	36.4	54.8
	56	67.7	102	56.5	84.9	45.8	68.8	37.0	55.7	28.1	42.3	35.1	52.8
	58	65.3	98.2	54.5	82.0	44.2	66.4	35.8	53.8	27.1	40.8	33.9	51.0
	60	63.1	94.9	52.7	79.2	42.7	64.2	34.6	52.0	26.2	39.4	32.8	49.3
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	3790	5690	3160	4750	2560	3850	2070	3120	1570	2370	1970	2960
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	474	712	395	594	320	481	259	390	197	296	246	370
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	190	285	171	257	155	233	140	211	126	190	112	168
BF/Ω_b	$\varphi_b BF$, kips	8.92	13.4	8.55	12.9	8.25	12.4	7.94	11.9	7.56	11.4	7.93	11.9
V_n/Ω_v	$\varphi_v V_{nx}$, kips	163	245	150	226	136	205	124	186	110	166	103	154
Z_x, in.^{3}		146		130		117		106		95.2		84.7	
L_p, ft		4.38		7.43		11.5		14.9		19.1		7.18	
L_r, ft		36.2		33.7		31.6		30.0		28.4		24.1	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W12

Shape		W12×											
		53 [f2]		50		45 [f2]		40 [f2]		35		30 [f2]	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7							164	246	175	264	149	224
	8	195	294	210	316	189	284	163	245	164	247	131	197
	9	173	260	204	306	181	272	145	218	146	220	116	175
	10	156	234	183	276	163	245	130	196	132	198	105	157
	11	142	213	167	251	148	223	118	178	120	180	95.1	143
	12	130	195	153	230	136	204	109	163	110	165	87.2	131
	13	120	180	141	212	125	189	100	151	101	152	80.5	121
	14	111	167	131	197	117	175	93.1	140	94.0	141	74.8	112
	15	104	156	122	184	109	163	86.9	131	87.7	132	69.8	105
	16	97.3	146	115	172	102	153	81.4	122	82.2	124	65.4	98.3
	17	91.6	138	108	162	96.0	144	76.6	115	77.4	116	61.6	92.5
	18	86.5	130	102	153	90.6	136	72.4	109	73.1	110	58.1	87.4
	19	81.9	123	96.6	145	85.9	129	68.6	103	69.2	104	55.1	82.8
	20	77.9	117	91.7	138	81.6	123	65.1	97.9	65.8	98.9	52.3	78.6
	21	74.1	111	87.4	131	77.7	117	62.0	93.2	62.6	94.2	49.8	74.9
	22	70.8	106	83.4	125	74.1	111	59.2	89.0	59.8	89.9	47.6	71.5
	23	67.7	102	79.8	120	70.9	107	56.6	85.1	57.2	86.0	45.5	68.4
	24	64.9	97.5	76.4	115	68.0	102	54.3	81.6	54.8	82.4	43.6	65.5
	25	62.3	93.6	73.4	110	65.2	98.1	52.1	78.3	52.6	79.1	41.9	62.9
	26	59.9	90.0	70.6	106	62.7	94.3	50.1	75.3	50.6	76.1	40.3	60.5
	27	57.7	86.7	67.9	102	60.4	90.8	48.3	72.5	48.7	73.2	38.8	58.3
	28	55.6	83.6	65.5	98.5	58.3	87.6	46.5	69.9	47.0	70.6	37.4	56.2
	29	53.7	80.7	63.3	95.1	56.2	84.5	44.9	67.5	45.4	68.2	36.1	54.2
	30	51.9	78.0	61.2	91.9	54.4	81.7	43.4	65.3	43.9	65.9	34.9	52.4
	32	48.7	73.1	57.3	86.2	51.0	76.6	40.7	61.2	41.1	61.8	32.7	49.2
	34	45.8	68.8	54.0	81.1	48.0	72.1	38.3	57.6	38.7	58.2	30.8	46.3
	36	43.3	65.0	51.0	76.6	45.3	68.1	36.2	54.4	36.5	54.9	29.1	43.7
	38	41.0	61.6	48.3	72.6	42.9	64.5	34.3	51.5	34.6	52.0	27.5	41.4
	40	38.9	58.5	45.9	68.9	40.8	61.3	32.6	49.0	32.9	49.4	26.2	39.3
	42	37.1	55.7	43.7	65.7	38.8	58.4	31.0	46.6	31.3	47.1	24.9	37.5
	44	35.4	53.2	41.7	62.7	37.1	55.7	29.6	44.5	29.9	44.9	23.8	35.7
	46	33.8	50.9	39.9	59.9	35.5	53.3	28.3	42.6	28.6	43.0	22.8	34.2
	48	32.4	48.8	38.2	57.4	34.0	51.1	27.1	40.8	27.4	41.2	21.8	32.8
	50	31.1	46.8	36.7	55.1	32.6	49.0	26.1	39.2	26.3	39.5	20.9	31.5
	52	29.9	45.0	35.3	53.0	31.4	47.1	25.1	37.7	25.3	38.0	20.1	30.2
	54	28.8	43.3	34.0	51.1	30.2	45.4	24.1	36.3	24.4	36.6	19.4	29.1
	56	27.8	41.8	32.8	49.2	29.1	43.8	23.3	35.0	23.5	35.3	18.7	28.1
	58	26.8	40.3	31.6	47.5	28.1	42.3	22.5	33.8	22.7	34.1	18.0	27.1
	60	26.0	39.0	30.6	46.0	27.2	40.9	21.7	32.6	21.9	33.0	17.4	26.2
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1560	2340	1830	2760	1630	2450	1300	1960	1320	1980	1050	1570
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	195	293	229	345	204	306	163	245	164	247	131	197
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	101	152	92.2	139	82.6	124	74.0	111	66.0	99.2	55.8	83.8
BF/Ω_b	$\varphi_b BF$, kips	7.53	11.3	8.33	12.5	7.85	11.8	7.29	11.0	8.37	12.6	7.49	11.3
V_n/Ω_v	$\varphi_v V_{nx}$, kips	97.5	147	105	158	94.7	142	82.0	123	87.6	132	74.7	112
Z_x, in.^{3}		76.3		70.7		63.1		56.1		50.7		42.7	
L_p, ft		10.5		2.79		2.87		5.39		2.17		3.18	
L_r, ft		23.0		19.2		18.3		17.6		13.9		13.2	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W12-W10

Table 3-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×										W10×	
		26 [f2]		22		19		16 [f2,v2]		14 [f2,v2]		88	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4					134	202	117	177	80.3	121		
	5	131	197	149	224	126	190	94.0	141	64.2	96.5		
	6	128	192	125	188	105	158	78.3	118	53.5	80.4		
	7	109	165	107	161	90.1	135	67.1	101	45.9	68.9		
	8	95.8	144	93.7	141	78.8	118	58.7	88.3	40.1	60.3		
	9	85.1	128	83.3	125	70.1	105	52.2	78.5	35.7	53.6	306	458
	10	76.6	115	75.0	113	63.1	94.8	47.0	70.6	32.1	48.2	291	437
	11	69.7	105	68.2	102	57.3	86.2	42.7	64.2	29.2	43.9	264	397
	12	63.9	96.0	62.5	93.9	52.5	79.0	39.2	58.8	26.8	40.2	242	364
	13	58.9	88.6	57.7	86.7	48.5	72.9	36.1	54.3	24.7	37.1	224	336
	14	54.7	82.3	53.6	80.5	45.0	67.7	33.6	50.4	22.9	34.5	208	312
	15	51.1	76.8	50.0	75.1	42.0	63.2	31.3	47.1	21.4	32.2	194	291
	16	47.9	72.0	46.9	70.4	39.4	59.2	29.4	44.1	20.1	30.2	182	273
	17	45.1	67.7	44.1	66.3	37.1	55.7	27.6	41.5	18.9	28.4	171	257
	18	42.6	64.0	41.7	62.6	35.0	52.7	26.1	39.2	17.8	26.8	161	243
	19	40.3	60.6	39.5	59.3	33.2	49.9	24.7	37.2	16.9	25.4	153	230
	20	38.3	57.6	37.5	56.4	31.5	47.4	23.5	35.3	16.1	24.1	145	218
	21	36.5	54.8	35.7	53.7	30.0	45.1	22.4	33.6	15.3	23.0	138	208
	22	34.8	52.3	34.1	51.2	28.7	43.1	21.4	32.1	14.6	21.9	132	199
	23	33.3	50.1	32.6	49.0	27.4	41.2	20.4	30.7	14.0	21.0	126	190
	24	31.9	48.0	31.2	47.0	26.3	39.5	19.6	29.4	13.4	20.1	121	182
	25	30.7	46.1	30.0	45.1	25.2	37.9	18.8	28.2	12.8	19.3	116	175
	26	29.5	44.3	28.8	43.4	24.3	36.5	18.1	27.2	12.3	18.6	112	168
	27	28.4	42.7	27.8	41.7	23.4	35.1	17.4	26.2	11.9	17.9	108	162
	28	27.4	41.1	26.8	40.3	22.5	33.8	16.8	25.2	11.5	17.2	104	156
	29	26.4	39.7	25.9	38.9	21.7	32.7	16.2	24.4	11.1	16.6	100	151
	30	25.5	38.4	25.0	37.6	21.0	31.6	15.7	23.5	10.7	16.1	96.9	146
	32	23.9	36.0	23.4	35.2	19.7	29.6	14.7	22.1	10.0	15.1	90.8	137
	34	22.5	33.9	22.1	33.2	18.5	27.9	13.8	20.8	9.44	14.2	85.5	128
	36	21.3	32.0	20.8	31.3	17.5	26.3	13.1	19.6	8.92	13.4	80.7	121
	38	20.2	30.3	19.7	29.7	16.6	24.9	12.4	18.6	8.45	12.7	76.5	115
	40	19.2	28.8	18.7	28.2	15.8	23.7	11.7	17.7	8.03	12.1	72.7	109
	42	18.2	27.4	17.9	26.8	15.0	22.6	11.2	16.8	7.64	11.5	69.2	104
	44	17.4	26.2	17.0	25.6	14.3	21.5	10.7	16.0	7.30	11.0	66.0	99.3
	46	16.7	25.0	16.3	24.5	13.7	20.6	10.2	15.4	6.98	10.5	63.2	95.0
	48	16.0	24.0	15.6	23.5	13.1	19.7	9.79	14.7	6.69	10.1	60.5	91.0
	50	15.3	23.0	15.0	22.5	12.6	19.0	9.40	14.1	6.42	9.65	58.1	87.4
	52	14.7	22.1	14.4	21.7	12.1	18.2	9.04	13.6	6.17	9.28	55.9	84.0
	54	14.2	21.3	13.9	20.9	11.7	17.6	8.70	13.1	5.94	8.94	53.8	80.9
	56	13.7	20.6	13.4	20.1	11.3	16.9	8.39	12.6	5.73	8.62	51.9	78.0
	58	13.2	19.9	12.9	19.4	10.9	16.3	8.10	12.2	5.53	8.32	50.1	75.3
	60	12.8	19.2	12.5	18.8	10.5	15.8	7.83	11.8	5.35	8.04	48.4	72.8
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	766	1150	750	1130	631	948	470	706	321	482	2910	4370
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	95.8	144	93.7	141	78.8	118	58.7	88.3	41.2	62.0	363	546
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	48.2	72.4	36.5	54.8	30.5	45.8	24.4	36.6	21.2	31.8	143	214
BF/Ω_b	$\varphi_b BF$, kips	6.72	10.1	8.74	13.1	7.77	11.7	6.69	10.0	3.42	5.14	6.25	9.40
V_n/Ω_v	$\varphi_v V_{nx}$, kips	65.5	98.5	74.7	112	67.0	101	61.4	92.3	50.4	75.8	153	229
Z_x, in.^{3}		36.8		28.9		24.3		19.6		17.0		112	
L_p, ft		5.64		1.20		1.16		1.82		0.857		3.72	
L_r, ft		12.7		7.75		7.38		6.96		6.73		39.0	

ASD	LFRD
$\Omega_b = 1.67$ $\Omega_v = 1.67$	$\varphi_b = 0.90$ $\varphi_v = 0.90$

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W10

Shape		W10×											
		77		68		60 ^{f2}		54 ^{f2}		49 ^{f2}		45	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5												
	6												
	7									158	238		
	8							175	262	146	219	165	248
	9	262	394	228	344	200	300	162	243	130	195	156	234
	10	251	377	219	329	180	271	146	219	117	176	140	211
	11	228	343	199	299	164	246	133	199	106	160	127	191
	12	209	314	182	274	150	225	121	183	97.3	146	117	176
	13	193	290	168	253	138	208	112	169	89.8	135	108	162
	14	179	269	156	235	129	193	104	157	83.4	125	100	150
	15	167	251	146	219	120	180	97.2	146	77.9	117	93.4	140
	16	157	236	137	205	112	169	91.1	137	73.0	110	87.6	132
	17	148	222	129	193	106	159	85.8	129	68.7	103	82.4	124
	18	139	210	122	183	100	150	81.0	122	64.9	97.5	77.8	117
	19	132	198	115	173	94.7	142	76.7	115	61.5	92.4	73.7	111
	20	125	189	109	164	90.0	135	72.9	110	58.4	87.8	70.1	105
	21	119	180	104	157	85.7	129	69.4	104	55.6	83.6	66.7	100
	22	114	171	99.4	149	81.8	123	66.3	99.6	53.1	79.8	63.7	95.7
	23	109	164	95.1	143	78.3	118	63.4	95.3	50.8	76.3	60.9	91.6
	24	105	157	91.1	137	75.0	113	60.7	91.3	48.7	73.1	58.4	87.8
	25	100	151	87.5	132	72.0	108	58.3	87.7	46.7	70.2	56.0	84.2
	26	96.5	145	84.1	126	69.2	104	56.1	84.3	44.9	67.5	53.9	81.0
	27	92.9	140	81.0	122	66.7	100	54.0	81.2	43.3	65.0	51.9	78.0
	28	89.6	135	78.1	117	64.3	96.6	52.1	78.3	41.7	62.7	50.0	75.2
	29	86.5	130	75.4	113	62.1	93.3	50.3	75.6	40.3	60.5	48.3	72.6
	30	83.6	126	72.9	110	60.0	90.2	48.6	73.0	38.9	58.5	46.7	70.2
	32	78.4	118	68.4	103	56.2	84.5	45.6	68.5	36.5	54.8	43.8	65.8
	34	73.8	111	64.3	96.7	52.9	79.6	42.9	64.4	34.3	51.6	41.2	61.9
	36	69.7	105	60.8	91.3	50.0	75.1	40.5	60.9	32.4	48.8	38.9	58.5
	38	66.0	99.2	57.6	86.5	47.4	71.2	38.4	57.7	30.7	46.2	36.9	55.4
	40	62.7	94.3	54.7	82.2	45.0	67.6	36.4	54.8	29.2	43.9	35.0	52.7
	42	59.7	89.8	52.1	78.3	42.9	64.4	34.7	52.2	27.8	41.8	33.4	50.1
	44	57.0	85.7	49.7	74.7	40.9	61.5	33.1	49.8	26.5	39.9	31.8	47.9
	46	54.5	82.0	47.6	71.5	39.1	58.8	31.7	47.6	25.4	38.2	30.5	45.8
	48	52.3	78.6	45.6	68.5	37.5	56.4	30.4	45.7	24.3	36.6	29.2	43.9
	50	50.2	75.4	43.7	65.8	36.0	54.1	29.2	43.8	23.4	35.1	28.0	42.1
	52	48.3	72.5	42.1	63.2	34.6	52.0	28.0	42.1	22.5	33.8	26.9	40.5
	54	46.5	69.8	40.5	60.9	33.3	50.1	27.0	40.6	21.6	32.5	25.9	39.0
	56	44.8	67.3	39.1	58.7	32.1	48.3	26.0	39.1	20.9	31.3	25.0	37.6
	58	43.3	65.0	37.7	56.7	31.0	46.6	25.1	37.8	20.1	30.3	24.2	36.3
	60	41.8	62.9	36.5	54.8	30.0	45.1	24.3	36.5	19.5	29.3	23.4	35.1
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	2510	3770	2190	3290	1800	2710	1460	2190	1170	1760	1400	2110
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	314	471	273	411	225	338	182	274	146	219	175	263
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	124	187	109	164	96.2	145	86.4	130	78.5	118	70.5	106
BF/Ω_b	$\varphi_b BF$, kips	6.09	9.16	5.92	8.90	5.71	8.58	5.50	8.26	5.28	7.93	5.70	8.56
V_n/Ω_v	$\varphi_v V_{nx}$, kips	131	197	114	172	100	150	87.3	131	79.2	119	82.6	124
Z_x, in.^{3}		96.7		84.3		73.6		65.7		59.4		54.0	
L_p, ft		3.69		3.66		6.04		9.23		12.5		2.84	
L_r, ft		34.8		31.4		28.6		26.7		25.2		21.2	

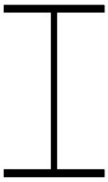
ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



W10

Table 3-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

F_y = 65 ksi

Shape		W10×											
		39 [f2]		33 [f2]		30		26		22 [f2]		19	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD			ASD	LRFD	ASD	LRFD
Span, ft	4											119	179
	5			132	198					114	172	110	165
	6			119	179	147	222	125	188	96.8	145	91.7	138
	7	146	220	102	154	134	202	115	172	83.0	125	78.6	118
	8	138	208	89.6	135	117	176	100	151	72.6	109	68.8	103
	9	123	185	79.6	120	104	157	89.1	134	64.5	97.0	61.1	91.9
	10	111	166	71.7	108	93.9	141	80.2	121	58.1	87.3	55.0	82.7
	11	101	151	65.1	97.9	85.4	128	72.9	110	52.8	79.3	50.0	75.2
	12	92.2	139	59.7	89.7	78.3	118	66.8	100	48.4	72.7	45.8	68.9
	13	85.1	128	55.1	82.8	72.3	109	61.7	92.7	44.7	67.1	42.3	63.6
	14	79.0	119	51.2	76.9	67.1	101	57.3	86.1	41.5	62.3	39.3	59.1
	15	73.8	111	47.8	71.8	62.6	94.1	53.5	80.3	38.7	58.2	36.7	55.1
	16	69.2	104	44.8	67.3	58.7	88.2	50.1	75.3	36.3	54.5	34.4	51.7
	17	65.1	97.8	42.1	63.3	55.3	83.0	47.2	70.9	34.2	51.3	32.4	48.6
	18	61.5	92.4	39.8	59.8	52.2	78.4	44.5	67.0	32.3	48.5	30.6	45.9
	19	58.2	87.5	37.7	56.7	49.4	74.3	42.2	63.4	30.6	45.9	29.0	43.5
	20	55.3	83.1	35.8	53.8	47.0	70.6	40.1	60.3	29.0	43.6	27.5	41.3
	21	52.7	79.2	34.1	51.3	44.7	67.2	38.2	57.4	27.7	41.6	26.2	39.4
	22	50.3	75.6	32.6	49.0	42.7	64.2	36.4	54.8	26.4	39.7	25.0	37.6
	23	48.1	72.3	31.2	46.8	40.8	61.4	34.9	52.4	25.2	37.9	23.9	35.9
	24	46.1	69.3	29.9	44.9	39.1	58.8	33.4	50.2	24.2	36.4	22.9	34.5
	25	44.3	66.5	28.7	43.1	37.6	56.5	32.1	48.2	23.2	34.9	22.0	33.1
	26	42.6	64.0	27.6	41.4	36.1	54.3	30.8	46.4	22.3	33.6	21.2	31.8
	27	41.0	61.6	26.5	39.9	34.8	52.3	29.7	44.6	21.5	32.3	20.4	30.6
	28	39.5	59.4	25.6	38.5	33.5	50.4	28.6	43.0	20.7	31.2	19.6	29.5
	29	38.2	57.3	24.7	37.1	32.4	48.7	27.6	41.6	20.0	30.1	19.0	28.5
	30	36.9	55.4	23.9	35.9	31.3	47.1	26.7	40.2	19.4	29.1	18.3	27.6
	32	34.6	52.0	22.4	33.7	29.4	44.1	25.1	37.7	18.1	27.3	17.2	25.8
	34	32.5	48.9	21.1	31.7	27.6	41.5	23.6	35.4	17.1	25.7	16.2	24.3
	36	30.7	46.2	19.9	29.9	26.1	39.2	22.3	33.5	16.1	24.2	15.3	23.0
	38	29.1	43.8	18.9	28.3	24.7	37.2	21.1	31.7	15.3	23.0	14.5	21.8
	40	27.7	41.6	17.9	26.9	23.5	35.3	20.0	30.1	14.5	21.8	13.8	20.7
	42	26.3	39.6	17.1	25.6	22.4	33.6	19.1	28.7	13.8	20.8	13.1	19.7
	44	25.1	37.8	16.3	24.5	21.3	32.1	18.2	27.4	13.2	19.8	12.5	18.8
	46	24.1	36.2	15.6	23.4	20.4	30.7	17.4	26.2	12.6	19.0	12.0	18.0
	48	23.1	34.6	14.9	22.4	19.6	29.4	16.7	25.1	12.1	18.2	11.5	17.2
	50	22.1	33.3	14.3	21.5	18.8	28.2	16.0	24.1	11.6	17.5	11.0	16.5
	52	21.3	32.0	13.8	20.7	18.1	27.2	15.4	23.2	11.2	16.8	10.6	15.9
	54	20.5	30.8	13.3	19.9	17.4	26.1	14.8	22.3	10.8	16.2	10.2	15.3
	56	19.8	29.7	12.8	19.2	16.8	25.2	14.3	21.5	10.4	15.6	9.82	14.8
	58	19.1	28.7	12.4	18.6	16.2	24.3	13.8	20.8	10.0	15.0	9.48	14.3
	60	18.4	27.7	11.9	17.9	15.7	23.5	13.4	20.1	9.68	14.5	9.17	13.8
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1110	1660	717	1080	939	1410	802	1210	581	873	550	827
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	138	208	89.6	135	117	176	100	151	72.6	109	68.8	103
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	60.3	90.6	49.9	75.0	46.9	70.4	40.3	60.5	33.4	50.2	27.0	40.6
BF/Ω_b	$\varphi_b BF$, kips	5.33	8.01	4.85	7.29	6.26	9.41	5.72	8.60	5.11	7.68	6.07	9.12
V_n/Ω_v	$\varphi_v V_{nx}$, kips	73.0	110	65.9	99.0	73.6	111	62.5	94.0	57.2	85.9	59.6	89.5
Z_x, in.^{3}		45.9		37.9		36.2		30.9		25.7		21.2	
L_p, ft		4.80		9.64		1.94		1.93		3.98		1.24	
L_r, ft		19.4		17.8		13.2		12.4		11.6		8.12	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W10-W8

Shape		W10×						W8×					
		17		15 ^{f2}		12 ^{f2}		67		58		48	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4	113	170	95.3	143	53.5	80.4						
	5	95.0	143	76.2	115	42.8	64.3						
	6	79.1	119	63.5	95.5	35.6	53.6						
	7	67.8	102	54.5	81.9	30.6	45.9	240	360	208	314	159	238
	8	59.4	89.2	47.7	71.6	26.7	40.2	226	340	192	289	157	236
	9	52.8	79.3	42.4	63.7	23.8	35.7	201	302	171	257	140	210
	10	47.5	71.4	38.1	57.3	21.4	32.1	181	272	154	231	126	189
	11	43.2	64.9	34.7	52.1	19.4	29.2	164	247	140	210	114	172
	12	39.6	59.5	31.8	47.7	17.8	26.8	151	227	128	193	105	158
	13	36.5	54.9	29.3	44.1	16.5	24.7	139	209	118	178	96.8	146
	14	33.9	51.0	27.2	40.9	15.3	23.0	129	194	110	165	89.9	135
	15	31.7	47.6	25.4	38.2	14.3	21.4	121	181	103	154	83.9	126
	16	29.7	44.6	23.8	35.8	13.4	20.1	113	170	96.2	145	78.7	118
	17	27.9	42.0	22.4	33.7	12.6	18.9	106	160	90.5	136	74.0	111
	18	26.4	39.7	21.2	31.8	11.9	17.9	100	151	85.5	128	69.9	105
	19	25.0	37.6	20.1	30.2	11.3	16.9	95.2	143	81.0	122	66.2	99.6
	20	23.7	35.7	19.1	28.6	10.7	16.1	90.4	136	76.9	116	62.9	94.6
	21	22.6	34.0	18.2	27.3	10.2	15.3	86.1	129	73.3	110	59.9	90.1
	22	21.6	32.4	17.3	26.0	9.72	14.6	82.2	124	69.9	105	57.2	86.0
	23	20.6	31.0	16.6	24.9	9.30	14.0	78.6	118	66.9	101	54.7	82.2
	24	19.8	29.7	15.9	23.9	8.91	13.4	75.4	113	64.1	96.4	52.4	78.8
	25	19.0	28.5	15.2	22.9	8.56	12.9	72.3	109	61.5	92.5	50.3	75.7
	26	18.3	27.5	14.7	22.0	8.23	12.4	69.6	105	59.2	89.0	48.4	72.8
	27	17.6	26.4	14.1	21.2	7.92	11.9	67.0	101	57.0	85.7	46.6	70.1
	28	17.0	25.5	13.6	20.5	7.64	11.5	64.6	97.1	55.0	82.6	44.9	67.6
	29	16.4	24.6	13.1	19.8	7.38	11.1	62.4	93.7	53.1	79.7	43.4	65.2
	30	15.8	23.8	12.7	19.1	7.13	10.7	60.3	90.6	51.3	77.1	41.9	63.1
	32	14.8	22.3	11.9	17.9	6.68	10.0	56.5	84.9	48.1	72.3	39.3	59.1
	34	14.0	21.0	11.2	16.9	6.29	9.46	53.2	80.0	45.3	68.0	37.0	55.6
	36	13.2	19.8	10.6	15.9	5.94	8.93	50.2	75.5	42.7	64.2	35.0	52.5
	38	12.5	18.8	10.0	15.1	5.63	8.46	47.6	71.5	40.5	60.9	33.1	49.8
	40	11.9	17.8	9.53	14.3	5.35	8.04	45.2	68.0	38.5	57.8	31.5	47.3
	42	11.3	17.0	9.08	13.6	5.09	7.65	43.1	64.7	36.6	55.1	30.0	45.0
	44	10.8	16.2	8.66	13.0	4.86	7.31	41.1	61.8	35.0	52.6	28.6	43.0
	46	10.3	15.5	8.29	12.5	4.65	6.99	39.3	59.1	33.5	50.3	27.4	41.1
	48	9.89	14.9	7.94	11.9	4.46	6.70	37.7	56.6	32.1	48.2	26.2	39.4
	50	9.50	14.3	7.62	11.5	4.28	6.43	36.2	54.4	30.8	46.3	25.2	37.8
	52	9.13	13.7	7.33	11.0	4.11	6.18	34.8	52.3	29.6	44.5	24.2	36.4
	54	8.79	13.2	7.06	10.6	3.96	5.95	33.5	50.3	28.5	42.8	23.3	35.0
	56	8.48	12.7	6.81	10.2	3.82	5.74	32.3	48.5	27.5	41.3	22.5	33.8
	58	8.19	12.3	6.57	9.88	3.69	5.54	31.2	46.9	26.5	39.9	21.7	32.6
	60	7.91	11.9	6.35	9.55	3.56	5.36	30.1	45.3	25.6	38.5	21.0	31.5
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	475	714	381	573	214	321	1810	2720	1540	2310	1260	1890
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	59.4	89.2	47.7	71.6	26.7	40.2	226	340	192	289	157	236
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	23.2	34.9	19.7	29.6	15.5	23.3	87.6	132	75.5	113	62.6	94.1
BF/Ω_b	$\varphi_b BF$, kips	5.55	8.34	4.99	7.50	4.18	6.28	4.17	6.27	4.07	6.11	3.92	5.90
V_n/Ω_v	$\varphi_v V_{nx}$, kips	56.6	85.1	53.7	80.6	43.8	65.8	120	180	104	157	79.4	119
Z_x, in.^{3}		18.3		15.6		12.3		69.7		59.3		48.5	
L_p, ft		1.20		1.74		4.27		3.00		2.96		2.94	
L_r, ft		7.71		7.34		6.96		36.2		31.7		27.1	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W8

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W8×											
		40 ^{f2}		35 ^{f2}		31 ^{f2}		28 ^{f2}		24 ^{f2}		21	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4												
	5					106	160			90.8	136	96.6	145
	6			118	177	93.7	141	107	161	84.1	126	86.9	131
	7	139	208	109	164	80.4	121	98.2	148	72.1	108	74.5	112
	8	124	186	95.3	143	70.3	106	85.9	129	63.1	94.8	65.2	98.0
	9	110	165	84.7	127	62.5	93.9	76.4	115	56.0	84.2	58.0	87.1
	10	98.9	149	76.2	115	56.2	84.5	68.7	103	50.4	75.8	52.2	78.4
	11	89.9	135	69.3	104	51.1	76.9	62.5	93.9	45.9	68.9	47.4	71.3
	12	82.4	124	63.5	95.4	46.9	70.4	57.3	86.1	42.0	63.2	43.5	65.3
	13	76.1	114	58.6	88.1	43.3	65.0	52.9	79.5	38.8	58.3	40.1	60.3
	14	70.7	106	54.4	81.8	40.2	60.4	49.1	73.8	36.0	54.2	37.3	56.0
	15	66.0	99.1	50.8	76.4	37.5	56.4	45.8	68.9	33.6	50.5	34.8	52.3
	16	61.8	92.9	47.6	71.6	35.2	52.8	43.0	64.6	31.5	47.4	32.6	49.0
	17	58.2	87.5	44.8	67.4	33.1	49.7	40.4	60.8	29.7	44.6	30.7	46.1
	18	55.0	82.6	42.3	63.6	31.2	47.0	38.2	57.4	28.0	42.1	29.0	43.6
	19	52.1	78.3	40.1	60.3	29.6	44.5	36.2	54.4	26.5	39.9	27.5	41.3
	20	49.5	74.4	38.1	57.3	28.1	42.3	34.4	51.7	25.2	37.9	26.1	39.2
	21	47.1	70.8	36.3	54.5	26.8	40.3	32.7	49.2	24.0	36.1	24.8	37.3
	22	45.0	67.6	34.6	52.1	25.6	38.4	31.2	47.0	22.9	34.5	23.7	35.6
	23	43.0	64.7	33.1	49.8	24.5	36.8	29.9	44.9	21.9	33.0	22.7	34.1
	24	41.2	62.0	31.8	47.7	23.4	35.2	28.6	43.0	21.0	31.6	21.7	32.7
	25	39.6	59.5	30.5	45.8	22.5	33.8	27.5	41.3	20.2	30.3	20.9	31.4
	26	38.1	57.2	29.3	44.1	21.6	32.5	26.4	39.7	19.4	29.2	20.1	30.2
	27	36.6	55.1	28.2	42.4	20.8	31.3	25.5	38.3	18.7	28.1	19.3	29.0
	28	35.3	53.1	27.2	40.9	20.1	30.2	24.6	36.9	18.0	27.1	18.6	28.0
	29	34.1	51.3	26.3	39.5	19.4	29.2	23.7	35.6	17.4	26.1	18.0	27.0
	30	33.0	49.6	25.4	38.2	18.7	28.2	22.9	34.4	16.8	25.3	17.4	26.1
	32	30.9	46.5	23.8	35.8	17.6	26.4	21.5	32.3	15.8	23.7	16.3	24.5
	34	29.1	43.7	22.4	33.7	16.5	24.9	20.2	30.4	14.8	22.3	15.3	23.1
	36	27.5	41.3	21.2	31.8	15.6	23.5	19.1	28.7	14.0	21.1	14.5	21.8
	38	26.0	39.1	20.1	30.1	14.8	22.2	18.1	27.2	13.3	20.0	13.7	20.6
	40	24.7	37.2	19.1	28.6	14.1	21.1	17.2	25.8	12.6	19.0	13.0	19.6
	42	23.6	35.4	18.1	27.3	13.4	20.1	16.4	24.6	12.0	18.1	12.4	18.7
	44	22.5	33.8	17.3	26.0	12.8	19.2	15.6	23.5	11.5	17.2	11.9	17.8
	46	21.5	32.3	16.6	24.9	12.2	18.4	14.9	22.5	11.0	16.5	11.3	17.0
	48	20.6	31.0	15.9	23.9	11.7	17.6	14.3	21.5	10.5	15.8	10.9	16.3
	50	19.8	29.7	15.2	22.9	11.2	16.9	13.7	20.7	10.1	15.2	10.4	15.7
	52	19.0	28.6	14.7	22.0	10.8	16.3	13.2	19.9	9.70	14.6	10.0	15.1
	54	18.3	27.5	14.1	21.2	10.4	15.7	12.7	19.1	9.34	14.0	9.66	14.5
	56	17.7	26.6	13.6	20.5	10.0	15.1	12.3	18.4	9.01	13.5	9.31	14.0
	58	17.1	25.6	13.1	19.7	9.70	14.6	11.9	17.8	8.70	13.1	8.99	13.5
	60	16.5	24.8	12.7	19.1	9.37	14.1	11.5	17.2	8.41	12.6	8.69	13.1
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	989	1490	762	1150	562	845	687	1030	504	758	522	784
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	124	186	95.3	143	70.3	106	85.9	129	63.1	94.8	65.2	98.0
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	51.2	77.0	45.0	67.6	39.6	59.5	34.9	52.4	29.9	45.0	26.1	39.3
BF/Ω_b	$\varphi_b BF$, kips	3.74	5.62	3.57	5.37	3.38	5.08	3.60	5.42	3.35	5.04	3.80	5.72
V_n/Ω_v	$\varphi_v V_{nx}$, kips	69.4	104	58.8	88.4	53.2	80.0	53.6	80.6	45.4	68.2	48.3	72.7
Z_x, in.^{3}		39.3		34.2		29.9		26.7		22.7		20.1	
L_p, ft		3.92		7.28		10.7		2.48		5.44		1.79	
L_r, ft		23.3		21.4		19.8		16.6		15.3		12.1	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

^{f2} Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

W8-W6

Shape		W8×								W6×			
		18[f2]		15		13[f2]		10[f2]		25		20[f2]	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4	87.4	131	86.3	130	63.7	95.7	36.6	55.0			75.2	113
	5	76.0	114	69.0	104	50.9	76.6	29.3	44.0	95.4	143	64.4	96.7
	6	63.3	95.1	57.5	86.5	42.5	63.8	24.4	36.7	81.3	122	53.6	80.6
	7	54.3	81.5	49.3	74.1	36.4	54.7	20.9	31.4	69.7	105	46.0	69.1
	8	47.5	71.4	43.1	64.8	31.8	47.9	18.3	27.5	61.0	91.7	40.2	60.5
	9	42.2	63.4	38.3	57.6	28.3	42.5	16.3	24.4	54.2	81.5	35.8	53.7
	10	38.0	57.1	34.5	51.9	25.5	38.3	14.6	22.0	48.8	73.3	32.2	48.4
	11	34.5	51.9	31.4	47.2	23.2	34.8	13.3	20.0	44.3	66.7	29.3	44.0
	12	31.6	47.6	28.8	43.2	21.2	31.9	12.2	18.3	40.7	61.1	26.8	40.3
	13	29.2	43.9	26.5	39.9	19.6	29.5	11.3	16.9	37.5	56.4	24.8	37.2
	14	27.1	40.8	24.7	37.1	18.2	27.3	10.5	15.7	34.8	52.4	23.0	34.5
	15	25.3	38.1	23.0	34.6	17.0	25.5	9.76	14.7	32.5	48.9	21.5	32.2
	16	23.7	35.7	21.6	32.4	15.9	23.9	9.15	13.7	30.5	45.8	20.1	30.2
	17	22.3	33.6	20.3	30.5	15.0	22.5	8.61	12.9	28.7	43.1	18.9	28.4
	18	21.1	31.7	19.2	28.8	14.2	21.3	8.13	12.2	27.1	40.7	17.9	26.9
	19	20.0	30.0	18.2	27.3	13.4	20.2	7.70	11.6	25.7	38.6	16.9	25.5
	20	19.0	28.5	17.3	25.9	12.7	19.1	7.32	11.0	24.4	36.7	16.1	24.2
	21	18.1	27.2	16.4	24.7	12.1	18.2	6.97	10.5	23.2	34.9	15.3	23.0
	22	17.3	25.9	15.7	23.6	11.6	17.4	6.65	10.0	22.2	33.3	14.6	22.0
	23	16.5	24.8	15.0	22.6	11.1	16.6	6.36	9.56	21.2	31.9	14.0	21.0
	24	15.8	23.8	14.4	21.6	10.6	16.0	6.10	9.17	20.3	30.6	13.4	20.2
	25	15.2	22.8	13.8	20.7	10.2	15.3	5.85	8.80	19.5	29.3	12.9	19.3
	26	14.6	22.0	13.3	20.0	9.80	14.7	5.63	8.46	18.8	28.2	12.4	18.6
	27	14.1	21.1	12.8	19.2	9.44	14.2	5.42	8.15	18.1	27.2	11.9	17.9
	28	13.6	20.4	12.3	18.5	9.10	13.7	5.23	7.86	17.4	26.2	11.5	17.3
	29	13.1	19.7	11.9	17.9	8.78	13.2	5.05	7.59	16.8	25.3	11.1	16.7
	30	12.7	19.0	11.5	17.3	8.49	12.8	4.88	7.33	16.3	24.4	10.7	16.1
	32	11.9	17.8	10.8	16.2	7.96	12.0	4.57	6.87	15.2	22.9	10.1	15.1
	34	11.2	16.8	10.2	15.3	7.49	11.3	4.30	6.47	14.3	21.6	9.46	14.2
	36	10.5	15.9	9.59	14.4	7.08	10.6	4.07	6.11	13.6	20.4	8.94	13.4
	38	10.0	15.0	9.08	13.7	6.70	10.1	3.85	5.79	12.8	19.3	8.47	12.7
	40	9.49	14.3	8.63	13.0	6.37	9.57	3.66	5.50	12.2	18.3	8.04	12.1
	42	9.04	13.6	8.22	12.4	6.07	9.12	3.48	5.24	11.6	17.5	7.66	11.5
	44	8.63	13.0	7.84	11.8	5.79	8.70	3.33	5.00	11.1	16.7	7.31	11.0
	46	8.26	12.4	7.50	11.3	5.54	8.32	3.18	4.78	10.6	15.9	6.99	10.5
	48	7.91	11.9	7.19	10.8	5.31	7.98	3.05	4.58	10.2	15.3	6.70	10.1
	50	7.60	11.4	6.90	10.4	5.09	7.66	2.93	4.40	9.76	14.7	6.44	9.67
	52	7.30	11.0	6.64	10.0	4.90	7.36	2.81	4.23	9.38	14.1	6.19	9.30
	54	7.03	10.6	6.39	9.61	4.72	7.09	2.71	4.07	9.03	13.6	5.96	8.96
	56	6.78	10.2	6.16	9.26	4.55	6.84	2.61	3.93	8.71	13.1	5.75	8.64
	58	6.55	9.84	5.95	8.94	4.39	6.60	2.52	3.79	8.41	12.6	5.55	8.34
	60	6.33	9.51	5.75	8.65	4.25	6.38	2.44	3.67	8.13	12.2	5.36	8.06
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	380	571	345	519	255	383	146	220	488	733	322	484
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	47.5	71.4	43.1	64.8	31.8	47.9	18.3	27.5	61.0	91.7	40.2	60.5
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	21.9	32.9	16.9	25.4	14.1	21.2	11.0	16.6	24.2	36.4	19.3	29.0
BF/Ω_b	$\varphi_b BF$, kips	3.43	5.16	3.72	5.59	3.32	4.98	2.74	4.12	2.25	3.39	2.10	3.16
V_n/Ω_v	$\varphi_v V_{nx}$, kips	43.7	65.7	46.4	69.7	42.9	64.5	31.3	47.1	47.7	71.7	37.6	56.6
Z_x, in.^{3}		16.7		13.3		11.1		8.59		18.8		14.8	
L_p, ft		3.70		1.24		2.45		4.69		2.15		5.83	
L_r, ft		11.2		8.30		7.81		7.34		18.5		15.8	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

W6-W5

Table 3-3 (continued)
Maximum Total Uniform Load, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W6×								W5×			
		16		15 ^{f2}		12 ^{f2}		9 ^{f2}		19		18.9	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	4	74.6	112	32.4	48.7	51.8	77.8	28.5	42.8	65.0	97.6	70.7	106
	5	59.7	89.7	25.9	39.0	41.4	62.2	22.8	34.3	59.7	89.7	56.6	85.0
	6	49.7	74.8	21.6	32.5	34.5	51.9	19.0	28.6	49.7	74.8	47.1	70.9
	7	42.6	64.1	18.5	27.8	29.6	44.4	16.3	24.5	42.6	64.1	40.4	60.7
	8	37.3	56.1	16.2	24.4	25.9	38.9	14.2	21.4	37.3	56.1	35.4	53.1
	9	33.2	49.8	14.4	21.7	23.0	34.6	12.7	19.0	33.2	49.8	31.4	47.2
	10	29.8	44.9	13.0	19.5	20.7	31.1	11.4	17.1	29.8	44.9	28.3	42.5
	11	27.1	40.8	11.8	17.7	18.8	28.3	10.4	15.6	27.1	40.8	25.7	38.6
	12	24.9	37.4	10.8	16.2	17.3	25.9	9.50	14.3	24.9	37.4	23.6	35.4
	13	23.0	34.5	9.98	15.0	15.9	23.9	8.77	13.2	23.0	34.5	21.8	32.7
	14	21.3	32.0	9.26	13.9	14.8	22.2	8.14	12.2	21.3	32.0	20.2	30.4
	15	19.9	29.9	8.65	13.0	13.8	20.7	7.60	11.4	19.9	29.9	18.9	28.3
	16	18.7	28.0	8.11	12.2	12.9	19.4	7.12	10.7	18.7	28.0	17.7	26.6
	17	17.6	26.4	7.63	11.5	12.2	18.3	6.71	10.1	17.6	26.4	16.6	25.0
	18	16.6	24.9	7.20	10.8	11.5	17.3	6.33	9.52	16.6	24.9	15.7	23.6
	19	15.7	23.6	6.83	10.3	10.9	16.4	6.00	9.02	15.7	23.6	14.9	22.4
	20	14.9	22.4	6.48	9.75	10.4	15.6	5.70	8.57	14.9	22.4	14.1	21.3
	21	14.2	21.4	6.18	9.28	9.86	14.8	5.43	8.16	14.2	21.4	13.5	20.2
	22	13.6	20.4	5.89	8.86	9.41	14.1	5.18	7.79	13.6	20.4	12.9	19.3
	23	13.0	19.5	5.64	8.47	9.00	13.5	4.96	7.45	13.0	19.5	12.3	18.5
	24	12.4	18.7	5.40	8.12	8.63	13.0	4.75	7.14	12.4	18.7	11.8	17.7
	25	11.9	17.9	5.19	7.80	8.28	12.4	4.56	6.85	11.9	17.9	11.3	17.0
	26	11.5	17.3	4.99	7.50	7.96	12.0	4.38	6.59	11.5	17.3	10.9	16.4
	27	11.1	16.6	4.80	7.22	7.67	11.5	4.22	6.35	11.1	16.6	10.5	15.7
	28	10.7	16.0	4.63	6.96	7.39	11.1	4.07	6.12	10.7	16.0	10.1	15.2
	29	10.3	15.5	4.47	6.72	7.14	10.7	3.93	5.91	10.3	15.5	9.75	14.7
	30	9.95	15.0	4.32	6.50	6.90	10.4	3.80	5.71	9.95	15.0	9.43	14.2
	32	9.33	14.0	4.05	6.09	6.47	9.72	3.56	5.35	9.33	14.0	8.84	13.3
	34	8.78	13.2	3.81	5.73	6.09	9.15	3.35	5.04	8.78	13.2	8.32	12.5
	36	8.29	12.5	3.60	5.41	5.75	8.64	3.17	4.76	8.29	12.5	7.86	11.8
	38	7.85	11.8	3.41	5.13	5.45	8.19	3.00	4.51	7.85	11.8	7.44	11.2
	40	7.46	11.2	3.24	4.87	5.18	7.78	2.85	4.28	7.46	11.2	7.07	10.6
	42	7.10	10.7	3.09	4.64	4.93	7.41	2.71	4.08	7.10	10.7	6.73	10.1
	44	6.78	10.2	2.95	4.43	4.70	7.07	2.59	3.89	6.78	10.2	6.43	9.66
	46	6.49	9.75	2.82	4.24	4.50	6.76	2.48	3.72	6.49	9.75	6.15	9.24
	48	6.22	9.34	2.70	4.06	4.31	6.48	2.37	3.57	6.22	9.34	5.89	8.86
	50	5.97	8.97	2.59	3.90	4.14	6.22	2.28	3.43	5.97	8.97	5.66	8.50
	52	5.74	8.63	2.49	3.75	3.98	5.98	2.19	3.29	5.74	8.63	5.44	8.18
	54	5.53	8.31	2.40	3.61	3.83	5.76	2.11	3.17	5.53	8.31	5.24	7.87
	56	5.33	8.01	2.32	3.48	3.70	5.56	2.04	3.06	5.33	8.01	5.05	7.59
	58	5.14	7.73	2.24	3.36	3.57	5.36	1.97	2.95	5.14	7.73	4.88	7.33
	60	4.97	7.48	2.16	3.25	3.45	5.19	1.90	2.86	4.97	7.48	4.71	7.09
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	298	449	130.0	195	207	311	114	171	298	449	283	425
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	37.3	56.1	16.2	24.4	25.9	38.9	14.2	21.4	37.3	56.1	35.4	53.1
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	14.7	22.2	14.0	21.0	10.5	15.8	7.93	11.9	14.7	22.2	13.9	20.9
BF/Ω_b	$\varphi_b BF$, kips	2.34	3.51	N/A	N/A	2.05	3.08	1.73	2.60	1.44	2.17	1.34	2.02
V_n/Ω_v	$\varphi_v V_{nx}$, kips	38.1	57.3	32.2	48.4	32.4	48.7	23.4	35.2	32.5	48.8	36.9	55.5
Z_x, in.^{3}		11.5		10.6		8.16		6.09		11.5		10.9	
L_p, ft		1.37		N/A		1.59		4.47		1.82		1.77	
L_r, ft		11.0		13.5		9.10		8.12		17.4		17.7	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018

F_y = 65 ksi

Table 3-3 (continued)

Maximum Total Uniform Load, kips

W-Shapes (Welded)

W5-W4

Shape		W5×		W4×	
		16		13	
Design		ASD	LRFD	ASD	LRFD
Span, ft	4	56.2	84.4	40.2	60.4
	5	49.1	73.9	32.1	48.3
	6	41.0	61.6	26.8	40.2
	7	35.1	52.8	22.9	34.5
	8	30.7	46.2	20.1	30.2
	9	27.3	41.0	17.8	26.8
	10	24.6	36.9	16.1	24.1
	11	22.3	33.6	14.6	21.9
	12	20.5	30.8	13.4	20.1
	13	18.9	28.4	12.4	18.6
	14	17.6	26.4	11.5	17.2
	15	16.4	24.6	10.7	16.1
	16	15.4	23.1	10.0	15.1
	17	14.5	21.7	9.45	14.2
	18	13.7	20.5	8.92	13.4
	19	12.9	19.4	8.45	12.7
	20	12.3	18.5	8.03	12.1
	21	11.7	17.6	7.65	11.5
	22	11.2	16.8	7.30	11.0
	23	10.7	16.1	6.98	10.5
	24	10.2	15.4	6.69	10.1
	25	9.83	14.8	6.42	9.66
	26	9.45	14.2	6.18	9.29
	27	9.10	13.7	5.95	8.94
	28	8.78	13.2	5.74	8.62
	29	8.47	12.7	5.54	8.32
	30	8.19	12.3	5.35	8.05
	32	7.68	11.5	5.02	7.54
	34	7.23	10.9	4.72	7.10
	36	6.83	10.3	4.46	6.71
	38	6.47	9.72	4.23	6.35
	40	6.14	9.23	4.02	6.04
	42	5.85	8.79	3.82	5.75
	44	5.58	8.39	3.65	5.49
	46	5.34	8.03	3.49	5.25
	48	5.12	7.69	3.35	5.03
	50	4.91	7.39	3.21	4.83
	52	4.73	7.10	3.09	4.64
	54	4.55	6.84	2.97	4.47
	56	4.39	6.60	2.87	4.31
	58	4.24	6.37	2.77	4.16
	60	4.10	6.16	2.68	4.02
Beam Properties					
W_c/Ω_b	$\varphi_b W_c$, kip-ft	246	369	161	241
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	30.7	46.2	20.1	30.2
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	12.3	18.4	7.85	11.8
BF/Ω_b	$\varphi_b BF$, kips	1.37	2.06	0.937	1.41
V_n/Ω_v	$\varphi_v V_{nx}$, kips	28.1	42.2	27.2	40.9
Z_x, in.^{3}		9.47		6.19	
L_p, ft		1.79		1.42	
L_r, ft		15.2		14.5	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-3 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

S15-S12

Table 3-4
Maximum Total Uniform Load, kips
S-Shapes (Welded)

F_y = 65 ksi

Shape		S15×				S12×							
		50		42.9		50		40.8		35		31.8	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	6	331	497	288	432	262	394	228	343	192	289	180	270
	7	284	426	254	382	225	338	195	294	165	247	154	232
	8	248	373	223	334	197	295	171	257	144	216	135	203
	9	221	332	198	297	175	263	152	228	128	192	120	180
	10	199	298	178	268	157	236	137	206	115	173	108	162
	11	180	271	162	243	143	215	124	187	105	157	98.1	147
	12	165	249	148	223	131	197	114	171	96.0	144	90.0	135
	13	153	230	137	206	121	182	105	158	88.6	133	83.0	125
	14	142	213	127	191	112	169	97.7	147	82.3	124	77.1	116
	15	132	199	119	178	105	158	91.2	137	76.8	115	72.0	108
	16	124	186	111	167	98.3	148	85.5	128	72.0	108	67.5	101
	17	117	176	105	157	92.5	139	80.4	121	67.8	102	63.5	95.4
	18	110	166	98.9	149	87.4	131	76.0	114	64.0	96.2	60.0	90.1
	19	104	157	93.7	141	82.8	124	72.0	108	60.6	91.1	56.8	85.4
	20	99.3	149	89.0	134	78.6	118	68.4	103	57.6	86.6	54.0	81.1
	21	94.5	142	84.8	127	74.9	113	65.1	97.9	54.9	82.5	51.4	77.3
	22	90.2	136	80.9	122	71.5	107	62.2	93.4	52.4	78.7	49.1	73.7
	23	86.3	130	77.4	116	68.4	103	59.5	89.4	50.1	75.3	46.9	70.5
	24	82.7	124	74.2	111	65.5	98.5	57.0	85.6	48.0	72.2	45.0	67.6
	25	79.4	119	71.2	107	62.9	94.5	54.7	82.2	46.1	69.3	43.2	64.9
	26	76.3	115	68.5	103	60.5	90.9	52.6	79.1	44.3	66.6	41.5	62.4
	27	73.5	111	65.9	99.1	58.2	87.5	50.6	76.1	42.7	64.1	40.0	60.1
	28	70.9	107	63.6	95.6	56.2	84.4	48.8	73.4	41.1	61.8	38.6	57.9
	29	68.4	103	61.4	92.3	54.2	81.5	47.2	70.9	39.7	59.7	37.2	55.9
	30	66.2	99.5	59.3	89.2	52.4	78.8	45.6	68.5	38.4	57.7	36.0	54.1
	32	62.0	93.2	55.6	83.6	49.1	73.9	42.7	64.2	36.0	54.1	33.7	50.7
	34	58.4	87.8	52.4	78.7	46.2	69.5	40.2	60.5	33.9	50.9	31.7	47.7
	36	55.1	82.9	49.4	74.3	43.7	65.7	38.0	57.1	32.0	48.1	30.0	45.1
	38	52.2	78.5	46.8	70.4	41.4	62.2	36.0	54.1	30.3	45.6	28.4	42.7
	40	49.6	74.6	44.5	66.9	39.3	59.1	34.2	51.4	28.8	43.3	27.0	40.6
	42	47.3	71.0	42.4	63.7	37.4	56.3	32.6	48.9	27.4	41.2	25.7	38.6
	44	45.1	67.8	40.5	60.8	35.7	53.7	31.1	46.7	26.2	39.4	24.5	36.9
	46	43.2	64.9	38.7	58.2	34.2	51.4	29.7	44.7	25.0	37.6	23.5	35.3
	48	41.4	62.2	37.1	55.7	32.8	49.2	28.5	42.8	24.0	36.1	22.5	33.8
	50	39.7	59.7	35.6	53.5	31.4	47.3	27.3	41.1	23.0	34.6	21.6	32.4
	52	38.2	57.4	34.2	51.5	30.2	45.5	26.3	39.5	22.2	33.3	20.8	31.2
	54	36.8	55.3	33.0	49.5	29.1	43.8	25.3	38.1	21.3	32.1	20.0	30.0
	56	35.4	53.3	31.8	47.8	28.1	42.2	24.4	36.7	20.6	30.9	19.3	29.0
	58	34.2	51.4	30.7	46.1	27.1	40.7	23.6	35.4	19.9	29.9	18.6	28.0
	60	33.1	49.7	29.7	44.6	26.2	39.4	22.8	34.3	19.2	28.9	18.0	27.0
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1990	2980	1780	2680	1570	2360	1370	2060	1150	1730	1080	1620
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	248	373	223	334	197	295	171	257	144	216	135	203
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	93.9	141	86.3	130	73.4	110	66.0	99.2	55.5	83.4	52.8	79.4
BF/Ω_b	$\varphi_b BF$, kips	15.0	22.6	14.1	21.2	9.45	14.2	9.49	14.3	9.23	13.9	8.91	13.4
V_n/Ω_v	$\varphi_v V_{nx}$, kips	193	290	144	216	193	289	132	199	120	180	98.1	147
Z_x, in.^{3}		76.5		68.6		60.6		52.7		44.4		41.6	
L_p, ft		1.59		1.66		1.58		1.62		1.52		1.56	
L_r, ft		11.9		11.3		14.6		12.7		11.1		10.8	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

S10-S7

Shape		S10×				S8×				S7×			
		35		25.4		23		18.4		20		15.3	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	6	152	228	122	183	82.6	124	70.5	106	61.8	93.0	51.5	77.4
	7	130	196	104	157	70.8	106	60.4	90.8	53.0	79.7	44.1	66.3
	8	114	171	91.1	137	62.0	93.1	52.9	79.5	46.4	69.7	38.6	58.0
	9	101	152	81.0	122	55.1	82.8	47.0	70.6	41.2	62.0	34.3	51.6
	10	91.1	137	72.9	110	49.6	74.5	42.3	63.6	37.1	55.8	30.9	46.4
	11	82.8	124	66.3	99.6	45.1	67.7	38.5	57.8	33.7	50.7	28.1	42.2
	12	75.9	114	60.8	91.3	41.3	62.1	35.2	53.0	30.9	46.5	25.7	38.7
	13	70.1	105	56.1	84.3	38.1	57.3	32.5	48.9	28.5	42.9	23.8	35.7
	14	65.1	97.8	52.1	78.3	35.4	53.2	30.2	45.4	26.5	39.8	22.1	33.2
	15	60.7	91.3	48.6	73.1	33.0	49.7	28.2	42.4	24.7	37.2	20.6	30.9
	16	56.9	85.6	45.6	68.5	31.0	46.6	26.4	39.7	23.2	34.9	19.3	29.0
	17	53.6	80.5	42.9	64.5	29.2	43.8	24.9	37.4	21.8	32.8	18.2	27.3
	18	50.6	76.1	40.5	60.9	27.5	41.4	23.5	35.3	20.6	31.0	17.2	25.8
	19	47.9	72.0	38.4	57.7	26.1	39.2	22.3	33.5	19.5	29.4	16.3	24.4
	20	45.5	68.4	36.5	54.8	24.8	37.2	21.1	31.8	18.6	27.9	15.4	23.2
	21	43.4	65.2	34.7	52.2	23.6	35.5	20.1	30.3	17.7	26.6	14.7	22.1
	22	41.4	62.2	33.1	49.8	22.5	33.9	19.2	28.9	16.9	25.4	14.0	21.1
	23	39.6	59.5	31.7	47.6	21.5	32.4	18.4	27.6	16.1	24.2	13.4	20.2
	24	37.9	57.0	30.4	45.7	20.7	31.0	17.6	26.5	15.5	23.2	12.9	19.3
	25	36.4	54.8	29.2	43.8	19.8	29.8	16.9	25.4	14.8	22.3	12.4	18.6
	26	35.0	52.7	28.0	42.2	19.1	28.7	16.3	24.5	14.3	21.5	11.9	17.9
	27	33.7	50.7	27.0	40.6	18.4	27.6	15.7	23.5	13.7	20.7	11.4	17.2
	28	32.5	48.9	26.0	39.1	17.7	26.6	15.1	22.7	13.3	19.9	11.0	16.6
	29	31.4	47.2	25.1	37.8	17.1	25.7	14.6	21.9	12.8	19.2	10.6	16.0
	30	30.4	45.6	24.3	36.5	16.5	24.8	14.1	21.2	12.4	18.6	10.3	15.5
	32	28.5	42.8	22.8	34.2	15.5	23.3	13.2	19.9	11.6	17.4	9.65	14.5
	34	26.8	40.3	21.4	32.2	14.6	21.9	12.4	18.7	10.9	16.4	9.08	13.7
	36	25.3	38.0	20.3	30.4	13.8	20.7	11.7	17.7	10.3	15.5	8.58	12.9
	38	24.0	36.0	19.2	28.8	13.0	19.6	11.1	16.7	9.76	14.7	8.13	12.2
	40	22.8	34.2	18.2	27.4	12.4	18.6	10.6	15.9	9.28	13.9	7.72	11.6
	42	21.7	32.6	17.4	26.1	11.8	17.7	10.1	15.1	8.83	13.3	7.35	11.1
	44	20.7	31.1	16.6	24.9	11.3	16.9	9.61	14.4	8.43	12.7	7.02	10.5
	46	19.8	29.8	15.9	23.8	10.8	16.2	9.19	13.8	8.07	12.1	6.71	10.1
	48	19.0	28.5	15.2	22.8	10.3	15.5	8.81	13.2	7.73	11.6	6.43	9.67
	50	18.2	27.4	14.6	21.9	9.91	14.9	8.46	12.7	7.42	11.2	6.18	9.28
	52	17.5	26.3	14.0	21.1	9.53	14.3	8.13	12.2	7.14	10.7	5.94	8.93
	54	16.9	25.4	13.5	20.3	9.18	13.8	7.83	11.8	6.87	10.3	5.72	8.59
	56	16.3	24.4	13.0	19.6	8.85	13.3	7.55	11.4	6.63	10.0	5.51	8.29
	58	15.7	23.6	12.6	18.9	8.54	12.8	7.29	11.0	6.40	9.62	5.32	8.00
	60	15.2	22.8	12.2	18.3	8.26	12.4	7.05	10.6	6.18	9.30	5.15	7.74
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	911	1370	729	1100	496	745	423	636	371	558	309	464
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	114	171	91.1	137	62.0	93.1	52.9	79.5	46.4	69.7	38.6	58.0
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	42.6	64.1	35.9	54.0	23.5	35.3	20.9	31.4	17.5	26.3	15.2	22.8
BF/Ω_b	$\varphi_b BF$, kips	6.28	9.44	6.13	9.21	4.05	6.08	3.92	5.89	2.98	4.48	3.01	4.53
V_n/Ω_v	$\varphi_v V_{nx}$, kips	139	208	72.6	109	82.4	124	50.6	76.1	73.6	111	41.2	61.9
Z_x, in.^{3}		35.1		28.1		19.1		16.3		14.3		11.9	
L_p, ft		1.39		1.49		1.24		1.30		1.14		1.20	
L_r, ft		12.7		10.5		10.7		9.46		10.8		8.97	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

S6-S4

Table 3-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

F_y = 65 ksi

Shape		S6×				S5×				S4×			
		17.25		12.5		14.75		10		9.5		7.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	6	45.4	68.3	36.2	54.3	31.7	47.6	24.1	36.3	17.3	25.9	14.9	22.4
	7	38.9	58.5	31.0	46.6	27.2	40.8	20.7	31.1	14.8	22.2	12.8	19.2
	8	34.1	51.2	27.1	40.8	23.8	35.7	18.1	27.2	12.9	19.5	11.2	16.8
	9	30.3	45.5	24.1	36.2	21.1	31.8	16.1	24.2	11.5	17.3	9.95	15.0
	10	27.2	41.0	21.7	32.6	19.0	28.6	14.5	21.8	10.4	15.6	8.95	13.5
	11	24.8	37.2	19.7	29.6	17.3	26.0	13.2	19.8	9.41	14.1	8.14	12.2
	12	22.7	34.1	18.1	27.2	15.8	23.8	12.1	18.1	8.63	13.0	7.46	11.2
	13	21.0	31.5	16.7	25.1	14.6	22.0	11.1	16.7	7.96	12.0	6.89	10.4
	14	19.5	29.3	15.5	23.3	13.6	20.4	10.3	15.5	7.40	11.1	6.39	9.61
	15	18.2	27.3	14.5	21.7	12.7	19.1	9.65	14.5	6.90	10.4	5.97	8.97
	16	17.0	25.6	13.6	20.4	11.9	17.9	9.05	13.6	6.47	9.73	5.60	8.41
	17	16.0	24.1	12.8	19.2	11.2	16.8	8.52	12.8	6.09	9.15	5.27	7.91
	18	15.1	22.8	12.1	18.1	10.6	15.9	8.04	12.1	5.75	8.65	4.97	7.48
	19	14.3	21.6	11.4	17.2	10.0	15.0	7.62	11.5	5.45	8.19	4.71	7.08
	20	13.6	20.5	10.8	16.3	9.51	14.3	7.24	10.9	5.18	7.78	4.48	6.73
	21	13.0	19.5	10.3	15.5	9.06	13.6	6.89	10.4	4.93	7.41	4.26	6.41
	22	12.4	18.6	9.86	14.8	8.65	13.0	6.58	9.89	4.71	7.07	4.07	6.12
	23	11.8	17.8	9.43	14.2	8.27	12.4	6.30	9.46	4.50	6.77	3.89	5.85
	24	11.4	17.1	9.04	13.6	7.92	11.9	6.03	9.07	4.31	6.48	3.73	5.61
	25	10.9	16.4	8.68	13.0	7.61	11.4	5.79	8.70	4.14	6.22	3.58	5.38
	26	10.5	15.8	8.34	12.5	7.32	11.0	5.57	8.37	3.98	5.99	3.44	5.18
	27	10.1	15.2	8.03	12.1	7.04	10.6	5.36	8.06	3.83	5.76	3.32	4.98
	28	9.73	14.6	7.75	11.6	6.79	10.2	5.17	7.77	3.70	5.56	3.20	4.81
	29	9.40	14.1	7.48	11.2	6.56	9.86	4.99	7.50	3.57	5.37	3.09	4.64
	30	9.08	13.7	7.23	10.9	6.34	9.53	4.83	7.25	3.45	5.19	2.98	4.49
	32	8.51	12.8	6.78	10.2	5.94	8.93	4.52	6.80	3.24	4.86	2.80	4.20
	34	8.01	12.0	6.38	9.59	5.59	8.41	4.26	6.40	3.05	4.58	2.63	3.96
	36	7.57	11.4	6.03	9.06	5.28	7.94	4.02	6.05	2.88	4.32	2.49	3.74
	38	7.17	10.8	5.71	8.58	5.01	7.52	3.81	5.73	2.72	4.10	2.36	3.54
	40	6.81	10.2	5.42	8.15	4.75	7.15	3.62	5.44	2.59	3.89	2.24	3.36
	42	6.49	9.75	5.16	7.76	4.53	6.81	3.45	5.18	2.47	3.71	2.13	3.20
	44	6.19	9.31	4.93	7.41	4.32	6.50	3.29	4.95	2.35	3.54	2.03	3.06
	46	5.92	8.90	4.72	7.09	4.13	6.21	3.15	4.73	2.25	3.38	1.95	2.93
	48	5.68	8.53	4.52	6.79	3.96	5.96	3.02	4.53	2.16	3.24	1.87	2.80
	50	5.45	8.19	4.34	6.52	3.80	5.72	2.90	4.35	2.07	3.11	1.79	2.69
	52	5.24	7.88	4.17	6.27	3.66	5.50	2.78	4.19	1.99	2.99	1.72	2.59
	54	5.05	7.58	4.02	6.04	3.52	5.29	2.68	4.03	1.92	2.88	1.66	2.49
	56	4.87	7.31	3.87	5.82	3.40	5.10	2.59	3.89	1.85	2.78	1.60	2.40
	58	4.70	7.06	3.74	5.62	3.28	4.93	2.50	3.75	1.79	2.68	1.54	2.32
	60	4.54	6.83	3.62	5.43	3.17	4.76	2.41	3.63	1.73	2.59	1.49	2.24
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	272	410	217	326	190	286	145	218	104	156	89.5	135
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	34.1	51.2	27.1	40.8	23.8	35.7	18.1	27.2	12.9	19.5	11.2	16.8
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	12.7	19.1	10.7	16.0	8.82	13.3	7.12	10.7	4.92	7.39	4.39	6.60
BF/Ω_b	$\varphi_b BF$, kips	2.08	3.12	2.21	3.32	1.28	1.93	1.52	2.28	0.895	1.35	0.948	1.42
V_n/Ω_v	$\varphi_v V_{nx}$, kips	65.2	97.9	32.5	48.9	57.7	86.7	25.0	37.6	30.5	45.8	18.0	27.1
Z_x, in.^{3}		10.5		8.36		7.33		5.58		3.99		3.45	
L_p, ft		1.05		1.10		0.952		1.00		0.883		0.907	
L_r, ft		11.3		8.54		12.6		8.23		9.84		8.08	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-4 (continued)
Maximum Total Uniform Load, kips
S-Shapes (Welded)

S3

Shape		S3×			
		7.5		5.7	
Design		ASD	LRFD	ASD	LRFD
Span, ft	6	10.0	15.1	8.30	12.5
	7	8.60	12.9	7.12	10.7
	8	7.52	11.3	6.23	9.36
	9	6.69	10.1	5.54	8.32
	10	6.02	9.05	4.98	7.49
	11	5.47	8.23	4.53	6.81
	12	5.02	7.54	4.15	6.24
	13	4.63	6.96	3.83	5.76
	14	4.30	6.46	3.56	5.35
	15	4.01	6.03	3.32	4.99
	16	3.76	5.66	3.11	4.68
	17	3.54	5.32	2.93	4.40
	18	3.34	5.03	2.77	4.16
	19	3.17	4.76	2.62	3.94
	20	3.01	4.52	2.49	3.74
	21	2.87	4.31	2.37	3.57
	22	2.74	4.11	2.26	3.40
	23	2.62	3.93	2.17	3.26
	24	2.51	3.77	2.08	3.12
	25	2.41	3.62	1.99	3.00
	26	2.32	3.48	1.92	2.88
	27	2.23	3.35	1.85	2.77
	28	2.15	3.23	1.78	2.67
	29	2.08	3.12	1.72	2.58
	30	2.01	3.02	1.66	2.50
	32	1.88	2.83	1.56	2.34
	34	1.77	2.66	1.47	2.20
	36	1.67	2.51	1.38	2.08
	38	1.58	2.38	1.31	1.97
	40	1.50	2.26	1.25	1.87
	42	1.43	2.15	1.19	1.78
	44	1.37	2.06	1.13	1.70
	46	1.31	1.97	1.08	1.63
	48	1.25	1.89	1.04	1.56
	50	1.20	1.81	1.00	1.50
	52	1.16	1.74	0.958	1.44
	54	1.11	1.68	0.923	1.39
	56	1.07	1.62	0.890	1.34
	58	1.04	1.56	0.859	1.29
	60	1.00	1.51	0.830	1.25
Beam Properties					
W_c/Ω_b	$\varphi_b W_c$, kip-ft	60.2	90.5	49.8	74.9
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	7.52	11.3	6.23	9.36
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	2.82	4.23	2.44	3.66
BF/Ω_b	$\varphi_b BF$, kips	0.429	0.645	0.503	0.756
V_n/Ω_v	$\varphi_v V_{nx}$, kips	24.5	36.7	11.9	17.9
Z_x, in.^{3}		2.32		1.92	
L_p, ft		0.797		0.817	
L_r, ft		11.8		8.35	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-4 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

C15-C12

Table 3-5
Maximum Total Uniform Load, kips
C-Shapes (Welded)

F_y = 65 ksi

Shape		C15×						C12×					
		50		40		33.9		30		25		20.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	502	754					286	430	216	326		
	4	443	666	364	548	280	422	219	329	190	286	158	238
	5	354	533	297	446	262	394	175	263	152	229	132	199
	6	295	444	247	372	218	328	146	219	127	190	110	166
	7	253	381	212	319	187	281	125	188	109	163	94.5	142
	8	222	333	186	279	164	246	109	164	95.0	143	82.7	124
	9	197	296	165	248	146	219	97.2	146	84.5	127	73.5	111
	10	177	266	148	223	131	197	87.4	131	76.0	114	66.2	99.5
	11	161	242	135	203	119	179	79.5	119	69.1	104	60.2	90.4
	12	148	222	124	186	109	164	72.9	110	63.4	95.2	55.1	82.9
	13	136	205	114	172	101	152	67.3	101	58.5	87.9	50.9	76.5
	14	127	190	106	159	93.6	141	62.5	93.9	54.3	81.6	47.3	71.0
	15	118	178	98.9	149	87.4	131	58.3	87.6	50.7	76.2	44.1	66.3
	16	111	166	92.8	139	81.9	123	54.7	82.1	47.5	71.4	41.4	62.2
	17	104	157	87.3	131	77.1	116	51.4	77.3	44.7	67.2	38.9	58.5
	18	98.5	148	82.5	124	72.8	109	48.6	73.0	42.2	63.5	36.8	55.3
	19	93.3	140	78.1	117	69.0	104	46.0	69.2	40.0	60.1	34.8	52.3
	20	88.6	133	74.2	112	65.5	98.5	43.7	65.7	38.0	57.1	33.1	49.7
	21	84.4	127	70.7	106	62.4	93.8	41.6	62.6	36.2	54.4	31.5	47.4
	22	80.6	121	67.5	101	59.6	89.5	39.7	59.7	34.6	51.9	30.1	45.2
	23	77.1	116	64.5	97.0	57.0	85.6	38.0	57.1	33.1	49.7	28.8	43.2
	24	73.8	111	61.8	93.0	54.6	82.1	36.4	54.8	31.7	47.6	27.6	41.4
	25	70.9	107	59.4	89.2	52.4	78.8	35.0	52.6	30.4	45.7	26.5	39.8
	26	68.2	102	57.1	85.8	50.4	75.8	33.6	50.6	29.2	44.0	25.4	38.3
	27	65.6	98.7	55.0	82.6	48.5	72.9	32.4	48.7	28.2	42.3	24.5	36.8
	28	63.3	95.1	53.0	79.7	46.8	70.3	31.2	46.9	27.2	40.8	23.6	35.5
	29	61.1	91.9	51.2	76.9	45.2	67.9	30.2	45.3	26.2	39.4	22.8	34.3
	30	59.1	88.8	49.5	74.4	43.7	65.7	29.1	43.8	25.3	38.1	22.1	33.2
	31	57.2	85.9	47.9	72.0	42.3	63.5	28.2	42.4	24.5	36.9	21.3	32.1
	32	55.4	83.2	46.4	69.7	40.9	61.5	27.3	41.1	23.8	35.7	20.7	31.1
	33	53.7	80.7	45.0	67.6	39.7	59.7	26.5	39.8	23.0	34.6	20.1	30.1
	34	52.1	78.3	43.7	65.6	38.5	57.9	25.7	38.7	22.4	33.6	19.5	29.3
	35	50.6	76.1	42.4	63.7	37.4	56.3	25.0	37.6	21.7	32.6	18.9	28.4
	36	49.2	74.0	41.2	62.0	36.4	54.7	24.3	36.5	21.1	31.7	18.4	27.6
	37	47.9	72.0	40.1	60.3	35.4	53.2	23.6	35.5	20.5	30.9	17.9	26.9
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	1770	2660	1480	2230	1310	1970	874	1310	760	1140	662	995
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	222	333	186	279	164	246	109	164	95.0	143	82.7	124
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	78.4	118	67.6	102	60.9	91.5	39.4	59.2	35.0	52.7	31.4	47.2
BF/Ω_b	$\varphi_b BF$, kips	13.4	20.2	13.2	19.9	12.5	18.9	8.20	12.3	7.96	12.0	7.44	11.2
V_n/Ω_v	$\varphi_v V_{nx}$, kips	251	377	182	274	140	211	143	215	108	163	79.0	119
Z_x, in.^{3}		68.3		57.2		50.5		33.7		29.3		25.5	
L_p, ft		1.34		1.38		1.40		1.20		1.23		1.26	
L_r, ft		12.0		10.3		9.61		9.72		8.77		8.16	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-5 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Welded)

C10-C9

Shape		C10×								C9×			
		30		25		20		15.3		20		15	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	231	347	199	299	167	251	112	168	146	220	118	177
	4	173	260	149	224	125	188	102	154	110	165	88.2	133
	5	139	208	119	179	100	151	82.0	123	87.7	132	70.6	106
	6	115	174	99.5	150	83.5	125	68.3	103	73.1	110	58.8	88.4
	7	99.0	149	85.3	128	71.5	108	58.6	88.0	62.6	94.2	50.4	75.8
	8	86.6	130	74.6	112	62.6	94.1	51.2	77.0	54.8	82.4	44.1	66.3
	9	77.0	116	66.3	99.7	55.6	83.6	45.6	68.5	48.7	73.2	39.2	58.9
	10	69.3	104	59.7	89.7	50.1	75.3	41.0	61.6	43.9	65.9	35.3	53.0
	11	63.0	94.7	54.3	81.5	45.5	68.4	37.3	56.0	39.9	59.9	32.1	48.2
	12	57.7	86.8	49.7	74.8	41.7	62.7	34.2	51.4	36.5	54.9	29.4	44.2
	13	53.3	80.1	45.9	69.0	38.5	57.9	31.5	47.4	33.7	50.7	27.1	40.8
	14	49.5	74.4	42.6	64.1	35.8	53.8	29.3	44.0	31.3	47.1	25.2	37.9
	15	46.2	69.4	39.8	59.8	33.4	50.2	27.3	41.1	29.2	43.9	23.5	35.4
	16	43.3	65.1	37.3	56.1	31.3	47.0	25.6	38.5	27.4	41.2	22.1	33.2
	17	40.8	61.3	35.1	52.8	29.5	44.3	24.1	36.2	25.8	38.8	20.8	31.2
	18	38.5	57.9	33.2	49.8	27.8	41.8	22.8	34.2	24.4	36.6	19.6	29.5
	19	36.5	54.8	31.4	47.2	26.4	39.6	21.6	32.4	23.1	34.7	18.6	27.9
	20	34.6	52.1	29.8	44.9	25.0	37.6	20.5	30.8	21.9	33.0	17.6	26.5
	21	33.0	49.6	28.4	42.7	23.8	35.8	19.5	29.3	20.9	31.4	16.8	25.3
	22	31.5	47.3	27.1	40.8	22.8	34.2	18.6	28.0	19.9	30.0	16.0	24.1
	23	30.1	45.3	25.9	39.0	21.8	32.7	17.8	26.8	19.1	28.7	15.3	23.1
	24	28.9	43.4	24.9	37.4	20.9	31.4	17.1	25.7	18.3	27.5	14.7	22.1
	25	27.7	41.7	23.9	35.9	20.0	30.1	16.4	24.6	17.5	26.4	14.1	21.2
	26	26.6	40.1	23.0	34.5	19.3	29.0	15.8	23.7	16.9	25.4	13.6	20.4
	27	25.7	38.6	22.1	33.2	18.5	27.9	15.2	22.8	16.2	24.4	13.1	19.6
	28	24.7	37.2	21.3	32.0	17.9	26.9	14.6	22.0	15.7	23.5	12.6	18.9
	29	23.9	35.9	20.6	30.9	17.3	26.0	14.1	21.2	15.1	22.7	12.2	18.3
	30	23.1	34.7	19.9	29.9	16.7	25.1	13.7	20.5	14.6	22.0	11.8	17.7
	31	22.3	33.6	19.3	28.9	16.2	24.3	13.2	19.9	14.1	21.3	11.4	17.1
	32	21.7	32.5	18.7	28.0	15.6	23.5	12.8	19.3	13.7	20.6	11.0	16.6
	33	21.0	31.6	18.1	27.2	15.2	22.8	12.4	18.7	13.3	20.0	10.7	16.1
	34	20.4	30.6	17.6	26.4	14.7	22.1	12.1	18.1	12.9	19.4	10.4	15.6
	35	19.8	29.8	17.1	25.6	14.3	21.5	11.7	17.6	12.5	18.8	10.1	15.2
	36	19.2	28.9	16.6	24.9	13.9	20.9	11.4	17.1	12.2	18.3	9.80	14.7
	37	18.7	28.1	16.1	24.2	13.5	20.3	11.1	16.7	11.9	17.8	9.54	14.3
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	693	1040	597	897	501	753	410	616	439	659	353	530
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	86.6	130	74.6	112	62.6	94.1	51.2	77.0	54.8	82.4	44.1	66.3
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	30.1	45.2	26.6	39.9	22.9	34.4	19.6	29.4	19.7	29.6	16.5	24.8
BF/Ω_b	$\varphi_b BF$, kips	5.19	7.80	5.51	8.29	5.55	8.34	5.11	7.68	4.50	6.76	4.39	6.59
V_n/Ω_v	$\varphi_v V_{nx}$, kips	157	236	123	185	88.5	133	56.0	84.2	94.2	142	59.9	90.0
Z_x, in.^{3}		26.7		23.0		19.3		15.8		16.9		13.6	
L_p, ft		1.04		1.06		1.09		1.12		1.01		1.04	
L_r, ft		11.9		9.78		8.25		7.33		8.82		7.34	

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

C9-C7

Table 3-5 (continued)

Maximum Total Uniform Load, kips

C-Shapes (Welded)

F_y = 65 ksi

Shape		C9×		C8×						C7×			
		13.4		18.75		13.75		11.5		14.75		12.25	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	98.0	147	120	181	94.3	142	82.2	124	83.9	126	72.7	109
	4	81.1	122	90.2	136	70.7	106	62.1	93.3	62.9	94.6	54.5	81.9
	5	64.9	97.5	72.1	108	56.6	85.0	49.7	74.6	50.3	75.7	43.6	65.5
	6	54.1	81.3	60.1	90.4	47.1	70.9	41.4	62.2	41.9	63.1	36.3	54.6
	7	46.3	69.6	51.5	77.4	40.4	60.7	35.5	53.3	36.0	54.0	31.1	46.8
	8	40.5	60.9	45.1	67.8	35.4	53.1	31.0	46.7	31.5	47.3	27.2	41.0
	9	36.0	54.2	40.1	60.2	31.4	47.2	27.6	41.5	28.0	42.0	24.2	36.4
	10	32.4	48.8	36.1	54.2	28.3	42.5	24.8	37.3	25.2	37.8	21.8	32.8
	11	29.5	44.3	32.8	49.3	25.7	38.6	22.6	33.9	22.9	34.4	19.8	29.8
	12	27.0	40.6	30.1	45.2	23.6	35.4	20.7	31.1	21.0	31.5	18.2	27.3
	13	25.0	37.5	27.7	41.7	21.8	32.7	19.1	28.7	19.4	29.1	16.8	25.2
	14	23.2	34.8	25.8	38.7	20.2	30.4	17.7	26.7	18.0	27.0	15.6	23.4
	15	21.6	32.5	24.0	36.1	18.9	28.3	16.6	24.9	16.8	25.2	14.5	21.8
	16	20.3	30.5	22.5	33.9	17.7	26.6	15.5	23.3	15.7	23.6	13.6	20.5
	17	19.1	28.7	21.2	31.9	16.6	25.0	14.6	22.0	14.8	22.3	12.8	19.3
	18	18.0	27.1	20.0	30.1	15.7	23.6	13.8	20.7	14.0	21.0	12.1	18.2
	19	17.1	25.7	19.0	28.5	14.9	22.4	13.1	19.6	13.2	19.9	11.5	17.2
	20	16.2	24.4	18.0	27.1	14.1	21.3	12.4	18.7	12.6	18.9	10.9	16.4
	21	15.4	23.2	17.2	25.8	13.5	20.2	11.8	17.8	12.0	18.0	10.4	15.6
	22	14.7	22.2	16.4	24.6	12.9	19.3	11.3	17.0	11.4	17.2	9.91	14.9
	23	14.1	21.2	15.7	23.6	12.3	18.5	10.8	16.2	10.9	16.4	9.48	14.2
	24	13.5	20.3	15.0	22.6	11.8	17.7	10.3	15.6	10.5	15.8	9.08	13.7
	25	13.0	19.5	14.4	21.7	11.3	17.0	9.93	14.9	10.1	15.1	8.72	13.1
	26	12.5	18.8	13.9	20.9	10.9	16.4	9.55	14.4	9.68	14.6	8.38	12.6
	27	12.0	18.1	13.4	20.1	10.5	15.7	9.20	13.8	9.32	14.0	8.07	12.1
	28	11.6	17.4	12.9	19.4	10.1	15.2	8.87	13.3	8.99	13.5	7.78	11.7
	29	11.2	16.8	12.4	18.7	9.75	14.7	8.56	12.9	8.68	13.0	7.52	11.3
	30	10.8	16.3	12.0	18.1	9.43	14.2	8.28	12.4	8.39	12.6	7.27	10.9
	31	10.5	15.7	11.6	17.5	9.12	13.7	8.01	12.0	8.12	12.2	7.03	10.6
	32	10.1	15.2	11.3	16.9	8.84	13.3	7.76	11.7	7.87	11.8	6.81	10.2
	33	9.83	14.8	10.9	16.4	8.57	12.9	7.52	11.3	7.63	11.5	6.60	9.93
	34	9.54	14.3	10.6	15.9	8.32	12.5	7.30	11.0	7.40	11.1	6.41	9.64
	35	9.27	13.9	10.3	15.5	8.08	12.1	7.09	10.7	7.19	10.8	6.23	9.36
	36	9.01	13.5	10.0	15.1	7.86	11.8	6.90	10.4	6.99	10.5	6.05	9.10
	37	8.77	13.2	9.75	14.7	7.64	11.5	6.71	10.1	6.80	10.2	5.89	8.85
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	324	488	361	542	283	425	248	373	252	378	218	328
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	40.5	60.9	45.1	67.8	35.4	53.1	31.0	46.7	31.5	47.3	27.2	41.0
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	15.5	23.3	16.1	24.1	13.1	19.7	11.8	17.8	11.3	17.0	10.1	15.1
BF/Ω_b	$\varphi_b BF$, kips	4.23	6.35	3.43	5.15	3.54	5.33	3.37	5.07	2.61	3.92	2.71	4.07
V_n/Ω_v	$\varphi_v V_{nx}$, kips	49.0	73.6	91.0	137	56.6	85.1	41.1	61.8	68.5	103	51.3	77.1
Z_x, in.^{3}		12.5		13.9		10.9		9.57		9.70		8.40	
L_p, ft		1.05		0.939		0.963		0.983		0.882		0.891	
L_r, ft		6.99		9.41		7.23		6.68		8.60		7.23	

ASD	LFRD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

F_y = 65 ksi

Table 3-5 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Welded)

C7-C5

Shape		C7×		C6×						C5×			
		9.8		13		10.5		8.2		9		6.7	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	61.8	92.8	63.0	94.6	53.3	80.1	44.5	66.8	37.8	56.8	30.4	45.8
	4	46.3	69.6	47.2	71.0	40.0	60.1	33.3	50.1	28.3	42.6	22.8	34.3
	5	37.1	55.7	37.8	56.8	32.0	48.0	26.7	40.1	22.7	34.1	18.3	27.5
	6	30.9	46.4	31.5	47.3	26.6	40.0	22.2	33.4	18.9	28.4	15.2	22.9
	7	26.5	39.8	27.0	40.6	22.8	34.3	19.1	28.6	16.2	24.3	13.0	19.6
	8	23.2	34.8	23.6	35.5	20.0	30.0	16.7	25.1	14.2	21.3	11.4	17.2
	9	20.6	30.9	21.0	31.5	17.8	26.7	14.8	22.3	12.6	18.9	10.1	15.3
	10	18.5	27.8	18.9	28.4	16.0	24.0	13.3	20.0	11.3	17.0	9.13	13.7
	11	16.8	25.3	17.2	25.8	14.5	21.8	12.1	18.2	10.3	15.5	8.30	12.5
	12	15.4	23.2	15.7	23.7	13.3	20.0	11.1	16.7	9.45	14.2	7.61	11.4
	13	14.3	21.4	14.5	21.8	12.3	18.5	10.3	15.4	8.72	13.1	7.03	10.6
	14	13.2	19.9	13.5	20.3	11.4	17.2	9.53	14.3	8.10	12.2	6.52	9.81
	15	12.4	18.6	12.6	18.9	10.7	16.0	8.89	13.4	7.56	11.4	6.09	9.15
	16	11.6	17.4	11.8	17.7	9.99	15.0	8.34	12.5	7.09	10.7	5.71	8.58
	17	10.9	16.4	11.1	16.7	9.40	14.1	7.85	11.8	6.67	10.0	5.37	8.08
	18	10.3	15.5	10.5	15.8	8.88	13.3	7.41	11.1	6.30	9.47	5.07	7.63
	19	9.75	14.7	9.94	14.9	8.41	12.6	7.02	10.6	5.97	8.97	4.81	7.23
	20	9.26	13.9	9.45	14.2	7.99	12.0	6.67	10.0	5.67	8.52	4.57	6.86
	21	8.82	13.3	9.00	13.5	7.61	11.4	6.35	9.55	5.40	8.12	4.35	6.54
	22	8.42	12.7	8.59	12.9	7.27	10.9	6.06	9.11	5.15	7.75	4.15	6.24
	23	8.06	12.1	8.21	12.3	6.95	10.4	5.80	8.72	4.93	7.41	3.97	5.97
	24	7.72	11.6	7.87	11.8	6.66	10.0	5.56	8.35	4.72	7.10	3.81	5.72
	25	7.41	11.1	7.56	11.4	6.39	9.61	5.33	8.02	4.54	6.82	3.65	5.49
	26	7.13	10.7	7.27	10.9	6.15	9.24	5.13	7.71	4.36	6.56	3.51	5.28
	27	6.86	10.3	7.00	10.5	5.92	8.90	4.94	7.42	4.20	6.31	3.38	5.08
	28	6.62	9.95	6.75	10.1	5.71	8.58	4.76	7.16	4.05	6.09	3.26	4.90
	29	6.39	9.60	6.51	9.79	5.51	8.28	4.60	6.91	3.91	5.88	3.15	4.73
	30	6.18	9.28	6.30	9.46	5.33	8.01	4.45	6.68	3.78	5.68	3.04	4.58
	31	5.98	8.98	6.09	9.16	5.16	7.75	4.30	6.47	3.66	5.50	2.95	4.43
	32	5.79	8.70	5.90	8.87	5.00	7.51	4.17	6.26	3.54	5.33	2.85	4.29
	33	5.61	8.44	5.72	8.60	4.84	7.28	4.04	6.07	3.44	5.16	2.77	4.16
	34	5.45	8.19	5.56	8.35	4.70	7.07	3.92	5.90	3.34	5.01	2.69	4.04
	35	5.29	7.96	5.40	8.11	4.57	6.86	3.81	5.73	3.24	4.87	2.61	3.92
	36	5.15	7.74	5.25	7.89	4.44	6.67	3.70	5.57	3.15	4.73	2.54	3.81
	37	5.01	7.53	5.11	7.67	4.32	6.49	3.60	5.42	3.06	4.61	2.47	3.71
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	185	278	189	284	160	240	133	200	113	170	91.3	137
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	23.2	34.8	23.6	35.5	20.0	30.0	16.7	25.1	14.2	21.3	11.4	17.2
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	8.85	13.3	8.42	12.7	7.34	11.0	6.38	9.59	5.18	7.79	4.35	6.54
BF/Ω_b	$\varphi_b BF$, kips	2.62	3.94	1.81	2.72	1.96	2.94	1.94	2.92	1.29	1.95	1.34	2.02
V_n/Ω_v	$\varphi_v V_{nx}$, kips	34.3	51.6	61.2	92.0	44.0	66.1	28.0	42.1	37.9	57.0	22.2	33.3
Z_x, in.^{3}		7.14		7.28		6.16		5.14		4.37		3.52	
L_p, ft		0.910		0.817		0.825		0.838		0.765		0.766	
L_r, ft		6.38		9.20		7.28		6.14		7.71		6.04	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

C4-C3

Table 3-5 (continued)
Maximum Total Uniform Load, kips
C-Shapes (Welded)

F_y = 65 ksi

Shape		C4×				C3×					
		7.25		5.4		6		5		4.1	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	24.4	36.7	19.6	29.5	15.0	22.5	13.1	19.6	11.3	17.0
	4	18.3	27.5	14.7	22.1	11.2	16.9	9.80	14.7	8.50	12.8
	5	14.6	22.0	11.8	17.7	8.98	13.5	7.84	11.8	6.80	10.2
	6	12.2	18.3	9.82	14.8	7.48	11.2	6.53	9.82	5.67	8.52
	7	10.5	15.7	8.41	12.6	6.41	9.64	5.60	8.41	4.86	7.30
	8	9.15	13.7	7.36	11.1	5.61	8.43	4.90	7.36	4.25	6.39
	9	8.13	12.2	6.54	9.84	4.99	7.50	4.35	6.54	3.78	5.68
	10	7.32	11.0	5.89	8.85	4.49	6.75	3.92	5.89	3.40	5.11
	11	6.65	10.0	5.35	8.05	4.08	6.13	3.56	5.35	3.09	4.64
	12	6.10	9.17	4.91	7.38	3.74	5.62	3.27	4.91	2.83	4.26
	13	5.63	8.46	4.53	6.81	3.45	5.19	3.01	4.53	2.61	3.93
	14	5.23	7.86	4.21	6.32	3.21	4.82	2.80	4.21	2.43	3.65
	15	4.88	7.33	3.93	5.90	2.99	4.50	2.61	3.93	2.27	3.41
	16	4.57	6.87	3.68	5.53	2.81	4.22	2.45	3.68	2.12	3.19
	17	4.30	6.47	3.46	5.21	2.64	3.97	2.30	3.46	2.00	3.01
	18	4.07	6.11	3.27	4.92	2.49	3.75	2.18	3.27	1.89	2.84
	19	3.85	5.79	3.10	4.66	2.36	3.55	2.06	3.10	1.79	2.69
	20	3.66	5.50	2.95	4.43	2.24	3.37	1.96	2.94	1.70	2.55
	21	3.48	5.24	2.80	4.22	2.14	3.21	1.87	2.80	1.62	2.43
	22	3.33	5.00	2.68	4.02	2.04	3.07	1.78	2.68	1.55	2.32
	23	3.18	4.78	2.56	3.85	1.95	2.93	1.70	2.56	1.48	2.22
	24	3.05	4.58	2.45	3.69	1.87	2.81	1.63	2.45	1.42	2.13
	25	2.93	4.40	2.36	3.54	1.80	2.70	1.57	2.36	1.36	2.04
	26	2.81	4.23	2.27	3.41	1.73	2.60	1.51	2.27	1.31	1.97
	27	2.71	4.07	2.18	3.28	1.66	2.50	1.45	2.18	1.26	1.89
	28	2.61	3.93	2.10	3.16	1.60	2.41	1.40	2.10	1.21	1.82
	29	2.52	3.79	2.03	3.05	1.55	2.33	1.35	2.03	1.17	1.76
	30	2.44	3.67	1.96	2.95	1.50	2.25	1.31	1.96	1.13	1.70
	31	2.36	3.55	1.90	2.86	1.45	2.18	1.26	1.90	1.10	1.65
	32	2.29	3.44	1.84	2.77	1.40	2.11	1.22	1.84	1.06	1.60
	33	2.22	3.33	1.78	2.68	1.36	2.04	1.19	1.78	1.03	1.55
	34	2.15	3.23	1.73	2.60	1.32	1.98	1.15	1.73	1.00	1.50
	35	2.09	3.14	1.68	2.53	1.28	1.93	1.12	1.68	0.971	1.46
	36	2.03	3.06	1.64	2.46	1.25	1.87	1.09	1.64	0.944	1.42
	37	1.98	2.97	1.59	2.39	1.21	1.82	1.06	1.59	0.919	1.38
Beam Properties											
W_c/Ω_b	$\varphi_b W_c$, kip-ft	73.2	110	58.9	88.5	44.9	67.5	39.2	58.9	34.0	51.1
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	9.15	13.7	7.36	11.1	5.61	8.43	4.90	7.36	4.25	6.39
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	3.33	5.00	2.79	4.19	2.01	3.03	1.80	2.70	1.61	2.41
BF/Ω_b	$\varphi_b BF$, kips	0.781	1.17	0.846	1.270	0.383	0.575	0.426	0.640	0.450	0.677
V_n/Ω_v	$\varphi_v V_{nx}$, kips	30.0	45.1	17.2	25.8	24.9	37.5	18.1	27.2	11.9	17.9
Z_x, in.^{3}		2.82		2.27		1.73		1.51		1.31	
L_p, ft		0.697		0.694		0.644		0.635		0.622	
L_r, ft		8.15		6.10		10.0		7.92		6.49	

ASD	LRFD
Ω_b = 1.67 Ω_v = 1.67	φ_b = 0.90 φ_v = 0.90

Note 1: Beams must be laterally supported if Table 3-5 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

MC8-MC4

Table 3-6
Maximum Total Uniform Load, kips
MC-Shapes (Welded)

F_y = 65 ksi

Shape		MC8×				MC6×				MC4×			
		19.8 ^{f2}		13.5 ^{f2}		14.6 ^{f2}		10 ^{f2}		6.5 ^{f2}		6.1 ^{f2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	73.1	110	22.7	34.1	65.9	99.0	22.0	33.1	19.5	29.4	20.8	31.2
	4	54.8	82.4	17.0	25.5	49.4	74.3	16.5	24.8	14.7	22.0	15.6	23.4
	5	43.8	65.9	13.6	20.4	39.5	59.4	13.2	19.9	11.7	17.6	12.5	18.7
	6	36.5	54.9	11.3	17.0	32.9	49.5	11.0	16.5	9.77	14.7	10.4	15.6
	7	31.3	47.1	9.71	14.6	28.2	42.4	9.43	14.2	8.38	12.6	8.90	13.4
	8	27.4	41.2	8.50	12.8	24.7	37.1	8.26	12.4	7.33	11.0	7.78	11.7
	9	24.4	36.6	7.55	11.4	22.0	33.0	7.34	11.0	6.51	9.79	6.92	10.4
	10	21.9	32.9	6.80	10.2	19.8	29.7	6.60	9.93	5.86	8.81	6.23	9.36
	11	19.9	30.0	6.18	9.29	18.0	27.0	6.00	9.02	5.33	8.01	5.66	8.51
	12	18.3	27.5	5.67	8.52	16.5	24.8	5.50	8.27	4.89	7.34	5.19	7.80
	13	16.9	25.3	5.23	7.86	15.2	22.9	5.08	7.64	4.51	6.78	4.79	7.20
	14	15.7	23.5	4.86	7.30	14.1	21.2	4.72	7.09	4.19	6.29	4.45	6.69
	15	14.6	22.0	4.53	6.81	13.2	19.8	4.40	6.62	3.91	5.87	4.15	6.24
	16	13.7	20.6	4.25	6.39	12.4	18.6	4.13	6.20	3.66	5.51	3.89	5.85
	17	12.9	19.4	4.00	6.01	11.6	17.5	3.88	5.84	3.45	5.18	3.66	5.51
	18	12.2	18.3	3.78	5.68	11.0	16.5	3.67	5.51	3.26	4.90	3.46	5.20
	19	11.5	17.3	3.58	5.38	10.4	15.6	3.48	5.22	3.09	4.64	3.28	4.93
	20	11.0	16.5	3.40	5.11	9.88	14.9	3.30	4.96	2.93	4.41	3.11	4.68
	21	10.4	15.7	3.24	4.87	9.41	14.1	3.14	4.73	2.79	4.20	2.97	4.46
	22	9.96	15.0	3.09	4.65	8.99	13.5	3.00	4.51	2.66	4.01	2.83	4.25
	23	9.53	14.3	2.96	4.44	8.60	12.9	2.87	4.32	2.55	3.83	2.71	4.07
	24	9.13	13.7	2.83	4.26	8.24	12.4	2.75	4.14	2.44	3.67	2.59	3.90
	25	8.77	13.2	2.72	4.09	7.91	11.9	2.64	3.97	2.35	3.52	2.49	3.74
	26	8.43	12.7	2.62	3.93	7.60	11.4	2.54	3.82	2.25	3.39	2.40	3.60
	27	8.12	12.2	2.52	3.78	7.32	11.0	2.45	3.68	2.17	3.26	2.31	3.47
	28	7.83	11.8	2.43	3.65	7.06	10.6	2.36	3.55	2.09	3.15	2.22	3.34
	29	7.56	11.4	2.34	3.52	6.82	10.2	2.28	3.42	2.02	3.04	2.15	3.23
	30	7.31	11.0	2.27	3.41	6.59	9.90	2.20	3.31	1.95	2.94	2.08	3.12
	32	6.85	10.3	2.12	3.19	6.18	9.29	2.06	3.10	1.83	2.75	1.95	2.92
	34	6.45	9.69	2.00	3.01	5.81	8.74	1.94	2.92	1.72	2.59	1.83	2.75
	36	6.09	9.15	1.89	2.84	5.49	8.25	1.83	2.76	1.63	2.45	1.73	2.60
	38	5.77	8.67	1.79	2.69	5.20	7.82	1.74	2.61	1.54	2.32	1.64	2.46
	40	5.48	8.24	1.70	2.55	4.94	7.43	1.65	2.48	1.47	2.20	1.56	2.34
	42	5.22	7.84	1.62	2.43	4.71	7.07	1.57	2.36	1.40	2.10	1.48	2.23
	44	4.98	7.49	1.55	2.32	4.49	6.75	1.50	2.26	1.33	2.00	1.42	2.13
Beam Properties													
W_c/Ω_b	$\varphi_b W_c$, kip-ft	219	329	68.0	102	198	297	66.0	99.3	58.6	88.1	62.3	93.6
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	27.4	41.2	8.50	12.8	24.7	37.1	8.26	12.4	7.33	11.0	7.78	11.7
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	20.3	30.5	14.2	21.3	10.8	16.3	7.74	11.6	3.23	4.85	2.90	4.37
BF/Ω_b	$\varphi_b BF$, kips	N/A	N/A	N/A	N/A	1.70	2.55	N/A	N/A	0.773	1.16	0.807	1.21
V_n/Ω_v	$\varphi_v V_{nx}$, kips	70.1	105	46.7	70.2	52.5	79.0	35.0	52.7	23.4	35.1	23.4	35.1
Z_x, in.^{3}		16.4		11.3		8.91		6.20		2.64		2.41	
L_p, ft		N/A		N/A		3.75		N/A		2.45		0.773	
L_r, ft		13.0		10.9		11.9		9.07		7.76		6.82	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

^{f2} Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-6 (continued)
Maximum Total Uniform Load, kips
MC-Shapes (Welded)

MC3-MC2

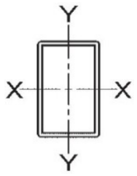
Shape		MC3×				MC2×					
		4.8		3.5 ^{f2}		3		2.4		1.6 ^{f2}	
Design		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Span, ft	3	12.3	18.5	8.61	12.9	5.00	7.51	4.02	6.05	2.44	3.67
	4	9.21	13.8	6.46	9.70	3.75	5.64	3.02	4.53	1.83	2.75
	5	7.37	11.1	5.16	7.76	3.00	4.51	2.41	3.63	1.47	2.20
	6	6.14	9.23	4.30	6.47	2.50	3.76	2.01	3.02	1.22	1.84
	7	5.26	7.91	3.69	5.54	2.14	3.22	1.72	2.59	1.05	1.57
	8	4.61	6.92	3.23	4.85	1.87	2.82	1.51	2.27	0.916	1.38
	9	4.09	6.15	2.87	4.31	1.67	2.50	1.34	2.02	0.814	1.22
	10	3.68	5.54	2.58	3.88	1.50	2.25	1.21	1.81	0.733	1.10
	11	3.35	5.03	2.35	3.53	1.36	2.05	1.10	1.65	0.666	1.00
	12	3.07	4.62	2.15	3.23	1.25	1.88	1.01	1.51	0.611	0.918
	13	2.83	4.26	1.99	2.99	1.15	1.73	0.928	1.40	0.564	0.847
	14	2.63	3.96	1.84	2.77	1.07	1.61	0.862	1.30	0.523	0.787
	15	2.46	3.69	1.72	2.59	1.00	1.50	0.804	1.21	0.488	0.734
	16	2.30	3.46	1.61	2.43	0.937	1.41	0.754	1.13	0.458	0.688
	17	2.17	3.26	1.52	2.28	0.882	1.33	0.710	1.07	0.431	0.648
	18	2.05	3.08	1.43	2.16	0.833	1.25	0.670	1.01	0.407	0.612
	19	1.94	2.91	1.36	2.04	0.789	1.19	0.635	0.954	0.386	0.580
	20	1.84	2.77	1.29	1.94	0.750	1.13	0.603	0.907	0.366	0.551
	21	1.75	2.64	1.23	1.85	0.714	1.07	0.575	0.864	0.349	0.524
	22	1.67	2.52	1.17	1.76	0.682	1.02	0.548	0.824	0.333	0.501
	23	1.60	2.41	1.12	1.69	0.652	0.980	0.525	0.788	0.319	0.479
	24	1.54	2.31	1.08	1.62	0.625	0.939	0.503	0.756	0.305	0.459
	25	1.47	2.22	1.03	1.55	0.600	0.902	0.483	0.725	0.293	0.440
	26	1.42	2.13	0.993	1.49	0.577	0.867	0.464	0.698	0.282	0.424
	27	1.36	2.05	0.956	1.44	0.555	0.835	0.447	0.672	0.271	0.408
	28	1.32	1.98	0.922	1.39	0.536	0.805	0.431	0.648	0.262	0.393
	29	1.27	1.91	0.890	1.34	0.517	0.777	0.416	0.625	0.253	0.380
	30	1.23	1.85	0.861	1.29	0.500	0.751	0.402	0.605	0.244	0.367
	32	1.15	1.73	0.807	1.21	0.469	0.704	0.377	0.567	0.229	0.344
	34	1.08	1.63	0.759	1.14	0.441	0.663	0.355	0.533	0.215	0.324
	36	1.02	1.54	0.717	1.08	0.417	0.626	0.335	0.504	0.204	0.306
	38	0.970	1.46	0.679	1.02	0.395	0.593	0.318	0.477	0.193	0.290
	40	0.921	1.38	0.646	0.970	0.375	0.564	0.302	0.453	0.183	0.275
	42	0.877	1.32	0.615	0.924	0.357	0.537	0.287	0.432	0.174	0.262
	44	0.837	1.26	0.587	0.882	0.341	0.512	0.274	0.412	0.167	0.250
Beam Properties											
W_c/Ω_b	$\varphi_b W_c$, kip-ft	36.8	55.4	25.8	38.8	15.0	22.5	12.1	18.1	7.33	11.0
M_p/Ω_b	$\varphi_b M_{px}$, kip-ft	4.61	6.92	3.23	4.85	1.87	2.82	1.51	2.27	0.916	1.38
M_r/Ω_b	$\varphi_b M_{rx}$, kip-ft	1.71	2.57	1.27	1.92	0.666	1.00	0.550	0.827	0.403	0.605
BF/Ω_b	$\varphi_b BF$, kips	0.429	0.644	0.454	0.683	0.178	0.267	0.197	0.296	0.208	0.313
V_n/Ω_v	$\varphi_v V_{nx}$, kips	17.5	26.3	13.2	19.8	11.7	17.6	8.78	13.2	5.84	8.78
Z_x, in.^{3}		1.42		1.05		0.578		0.465		0.330	
L_p, ft		0.631		0.977		0.408		0.418		1.17	
L_r, ft		7.39		5.28		7.20		5.28		3.63	

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90
Ω_v = 1.67	φ_v = 0.90

^{f2} Shape exceeds compact limit for flexure with F_y = 65 ksi.

Note 1: Beams must be laterally supported if Table 3-6 is used.

Note 2: Available strength tabulated above heavy line is limited by available shear strength.



HSS16-HSS1.5

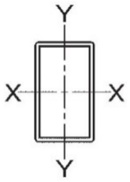
Table 3-7
Available Flexural Strength, kip-ft
Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD
HSS16×8×	0.250 [f2]	156	234	67.8	102
HSS12×8×	0.250 [f2]	103	155	64.5	96.9
HSS12×4×	0.250	88.5	133	26.0	39.1
	0.180 [f2]	52.5	78.9	15.7	23.7
HSS10×6×	0.250	81.4	122	42.5	63.9
	0.180 [f2]	47.8	71.9	26.2	39.4
HSS8×4×	0.250	45.7	68.7	23.9	35.9
	0.180	34.1	51.2	14.6	22.0
	0.120 [f2]	18.4	27.6	7.96	12.0
HSS6×4×	0.250	29.4	44.2	22.2	33.3
	0.180	22.0	33.1	13.8	20.7
	0.120 [f2]	12.1	18.2	7.59	11.4
HSS4×3×	0.120	7.07	10.6	4.74	7.12
	0.080 [f2]	3.69	5.55	2.63	3.96
HSS4×2×	0.120	5.55	8.34	2.79	4.20
	0.080	3.86	5.80	1.53	2.30
HSS3×2×	0.120	3.57	5.36	2.70	4.05
	0.080	2.49	3.75	1.44	2.17
HSS3×1×	0.080	1.74	2.61	0.589	0.885
	0.060	1.33	2.00	0.382	0.574
HSS2×1.5×	0.080	1.14	1.72	0.937	1.41
	0.060	0.879	1.32	0.593	0.891
HSS2×1×	0.080	0.892	1.34	0.548	0.824
	0.060	0.691	1.04	0.351	0.528
HSS1.5×1×	0.080	0.568	0.853	0.428	0.644
	0.060	0.441	0.663	0.334	0.502

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with *Fy* = 65 ksi.



HSS20-HSS10

Table 3-8

Available Flexural Strength, kip-ft

Rectangular HSS (Press Braked)

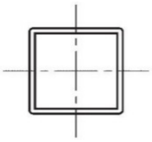
F_y = 65 ksi

Shape		X-Axis		Y-Axis	
		M_n/Ω_b	$\varphi_b M_n$	M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD	ASD	LRFD
HSS20×16×	0.500 [f2]	643	967	502	754
	0.375 [f2]	432	649	333	500
	0.312 [f2]	336	505	255	384
HSS20×12×	0.500	645	970	343	515
	0.375 [f2]	404	607	224	337
	0.312 [f2]	317	477	171	257
	0.250 [f2]	-SW-	-SW-	124	186
HSS20×8×	0.500	519	780	202	304
	0.375	402	605	131	197
	0.312 [f2]	294	441	99.0	149
	0.250 [f2]	-SW-	-SW-	70.5	106
HSS18×6×	0.500	379	570	137	205
	0.375	295	444	88.8	133
	0.312 [f2]	243	366	66.9	101
	0.250 [f2]	-SW-	-SW-	47.5	71.4
HSS16×12×	0.500	461	692	325	488
	0.375 [f2]	297	446	214	322
	0.312 [f2]	231	347	164	247
	0.250 [f2]	171	257	120	180
HSS14×10×	0.500	337	507	268	402
	0.375 [f2]	262	393	164	246
	0.312 [f2]	183	276	125	188
	0.250 [f2]	135	203	90.8	136
HSS12×8×	0.500	231	347	175	263
	0.375	181	272	117	176
	0.312	154	231	89.8	135
	0.250 [f2]	104	156	64.9	97.5
HSS10×6×	0.500	144	217	101	152
	0.375	114	172	80.4	121
	0.312	98.0	147	59.1	88.9
	0.250	80.4	121	42.8	64.4

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with *Fy* = 65 ksi.

-SW- Slender web (outside scope of DG27).



HSS12-HSS1

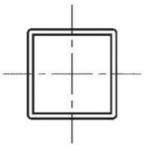
Table 3-9
Available Flexural Strength, kip-ft
Square HSS (Roll Formed)

F_y = 65 ksi

Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD
HSS12×12×	0.250[f2]	113	169
HSS10×10×	0.250[f2]	84.4	127
HSS8×8×	0.250[f2]	59.0	88.7
	0.180[f2]	37.2	55.9
HSS6×6×	0.250	38.6	58.0
	0.180[f2]	23.5	35.4
	0.120[f2]	13.3	20.0
HSS5×5×	0.250	26.2	39.3
	0.180	19.7	29.5
	0.120[f2]	9.91	14.9
HSS4×4×	0.250	16.1	24.2
	0.180	12.2	18.4
	0.120[f2]	6.95	10.4
HSS3.5×3.5×	0.180	9.18	13.8
	0.120[f2]	5.80	8.71
HSS3×3×	0.120	4.70	7.07
	0.080[f2]	2.48	3.73
HSS2.5×2.5×	0.120	3.18	4.78
	0.080[f2]	1.86	2.79
HSS2×2×	0.080	1.39	2.09
	0.060[f2]	0.873	1.31
HSS1.5×1.5×	0.080	0.752	1.13
	0.060	0.581	0.873
HSS1.25×1.25×	0.080	0.506	0.761
	0.060	0.396	0.595
HSS1×1×	0.060	0.243	0.365

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.



HSS20-HSS6

Table 3-10
Available Flexural Strength, kip-ft
Square HSS (Roll Formed)

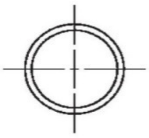
F_y = 65 ksi

Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	**LRFD**
HSS20×20×	0.500 [f2]	679	1020
	0.375 [f2]	452	680
HSS16×16×	0.500 [f2]	476	715
	0.375 [f2]	317	477
	0.312 [f2]	245	368
HSS14×14×	0.500	425	639
	0.375 [f2]	256	385
	0.312 [f2]	198	298
HSS12×12×	0.500	306	459
	0.375 [f2]	200	301
	0.312 [f2]	155	232
	0.250 [f2]	113	170
HSS10×10×	0.500	206	310
	0.375	161	242
	0.312 [f2]	116	174
	0.250 [f2]	84.6	127
HSS8×8×	0.500	126	190
	0.375	99.9	150
	0.312	85.6	129
	0.250 [f2]	59.4	89.2
HSS7×7×	0.500	93.4	140
	0.375	74.6	112
	0.312	64.2	96.5
	0.250	52.9	79.5
HSS6×6×	0.500	65.5	98.5
	0.375	53.2	80.0
	0.312	46.1	69.2
	0.250	38.3	57.5

ASD	**LRFD**
Ω_b = 1.67	**φ_b = 0.90**

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS7.5-HSS2.5

Table 3-11
Available Flexural Strength, kip-ft
Round HSS

F_y = 65 ksi

Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD			ASD	LRFD
HSS7.5×	0.375	62.0	93.1	HSS3.125×	0.250	6.71	10.1
	0.250	42.5	63.9		0.180	5.06	7.61
	0.180 [f2]	29.4	44.1		0.120	3.50	5.27
	0.120 [f2]	18.8	28.3		0.109	3.22	4.84
					0.083 [f2]	2.38	3.58
HSS6.25×	0.375	42.2	63.4		0.063 [f2]	1.74	2.61
	0.250	29.2	43.9				
	0.180 [f2]	20.8	31.3	HSS3×	0.250	6.16	9.26
	0.120 [f2]	13.4	20.1		0.180	4.64	6.97
					0.148	3.89	5.85
HSS5×	0.250	18.3	27.5		0.120	3.23	4.86
	0.180	13.6	20.4		0.109	2.95	4.44
	0.120 [f2]	8.70	13.1		0.083 [f2]	2.21	3.31
	0.109 [f2]	7.81	11.7		0.063 [f2]	1.61	2.42
	0.083 [f2]	5.81	8.73		0.049 [f2]	1.23	1.85
HSS4.5×	0.250	14.7	22.0	HSS2.875×	0.180	4.25	6.39
	0.180	10.9	16.4		0.120	2.95	4.44
	0.148	9.08	13.7		0.109	2.71	4.07
	0.120 [f2]	7.13	10.7		0.083 [f2]	2.04	3.06
	0.109 [f2]	6.41	9.63				
	0.083 [f2]	4.76	7.15	HSS2.75×	0.250	5.09	7.65
					0.180	3.86	5.80
HSS4×	0.120 [f2]	5.73	8.62		0.148	3.24	4.88
	0.109 [f2]	5.13	7.71		0.120	2.70	4.05
	0.083 [f2]	3.80	5.71		0.109	2.47	3.71
					0.083 [f2]	1.87	2.81
HSS3.75×	0.250	9.96	15.0		0.065 [f2]	1.42	2.14
	0.180	7.46	11.2				
	0.148	6.23	9.36	HSS2.5×	0.250	4.12	6.19
	0.120 [f2]	5.10	7.67		0.180	3.15	4.73
	0.109 [f2]	4.54	6.82		0.148	2.66	4.00
	0.083 [f2]	3.36	5.06		0.120	2.21	3.32
					0.109	2.02	3.04
HSS3.5×	0.180	6.45	9.70		0.083	1.57	2.36
	0.148	5.38	8.09		0.063 [f2]	1.14	1.71
	0.120 [f2]	4.44	6.68		0.049 [f2]	0.871	1.31
	0.109 [f2]	4.00	6.01				
	0.083 [f2]	2.95	4.43				
	0.063 [f2]	2.16	3.24				
	0.049 [f2]	1.66	2.49				

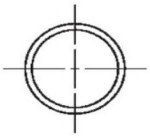
ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 3-11 (continued)
Available Flexural Strength, kip-ft
Round HSS



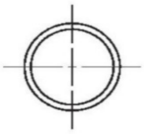
HSS2.375-HSS1

Shape		M_n/Ω_b	$\varphi_b M_n$	Shape		M_n/Ω_b	$\varphi_b M_n$
		ASD	LRFD			ASD	LRFD
HSS2.375×	0.180	2.82	4.24	HSS1.66×	0.148	1.10	1.65
	0.148	2.38	3.58		0.120	0.924	1.39
	0.120	1.98	2.98		0.109	0.853	1.28
	0.109	1.82	2.73		0.083	0.671	1.01
	0.083	1.41	2.13		0.063	0.519	0.780
	0.063 [f2]	1.04	1.56				
	0.049 [f2]	0.790	1.19	HSS1.5×	0.120	0.743	1.12
					0.109	0.684	1.03
HSS2.25×	0.180	2.51	3.77		0.083	0.542	0.814
	0.148	2.12	3.19		0.063	0.418	0.629
	0.120	1.77	2.66		0.049	0.334	0.502
	0.109	1.62	2.44		0.035 [f2]	0.228	0.342
	0.083	1.26	1.90				
	0.063 [f2]	0.932	1.40	HSS1.25×	0.120	0.500	0.751
					0.109	0.461	0.692
HSS2×	0.180	1.94	2.92		0.083	0.367	0.551
	0.148	1.65	2.48		0.063	0.286	0.430
	0.120	1.38	2.07		0.049	0.229	0.345
	0.109	1.26	1.90		0.035 [f2]	0.162	0.243
	0.083	0.989	1.49				
	0.063 [f2]	0.751	1.13	HSS1×	0.120	0.303	0.456
	0.049 [f2]	0.570	0.857		0.109	0.282	0.424
	0.035 [f2]	0.393	0.590		0.083	0.227	0.341
					0.065	0.185	0.277
HSS1.9×	0.148	1.48	2.22		0.063	0.178	0.268
	0.120	1.24	1.86		0.049	0.144	0.216
	0.109	1.14	1.71		0.042	0.125	0.188
	0.083	0.889	1.34		0.035	0.106	0.159
	0.063	0.684	1.03		0.032 [f2]	0.096	0.144
	0.049 [f2]	0.515	0.775				
	0.035 [f2]	0.357	0.537				
HSS1.75×	0.120	1.03	1.56				
	0.109	0.954	1.43				
	0.083	0.749	1.13				
	0.063	0.577	0.868				
	0.049 [f2]	0.442	0.665				
	0.035 [f2]	0.305	0.459				

ASD	LRFD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



PIPE 12-PIPE 1

Table 3-12
Available Flexural Strength, kip-ft
Pipe

F_y = 65 ksi

Shape	M_n/Ω_b	$\varphi_b M_n$
	ASD	LRFD
Pipe 12 Std. 40S [f2]	183	275
Pipe 12 Std. 10S [f2]	81.5	122
Pipe 10 Std. 40S	129	194
Pipe 10 Std. 10S [f2]	53.4	80.2
Pipe 8 Std. 80S	107	161
Pipe 8 Std. 40S	72.0	108
Pipe 8 Std. 10S [f2]	31.0	46.6
Pipe 8 Std. 5S [f2]	22.3	33.5
Pipe 6 Std. 80S	53.8	80.9
Pipe 6 Std. 40S	36.7	55.1
Pipe 6 Std. 10S [f2]	16.7	25.2
Pipe 6 Std. 5S [f2]	13.4	20.2
Pipe 5 Std. 80S	32.8	49.2
Pipe 5 Std. 40S	23.5	35.4
Pipe 5 Std. 10S [f2]	12.0	18.1
Pipe 5 Std. 5S [f2]	9.60	14.4
Pipe 4 Std. 80S	19.0	28.5
Pipe 4 Std. 40S	14.0	21.0
Pipe 4 Std. 10S [f2]	7.13	10.7
Pipe 4 Std. 5S [f2]	4.76	7.15
Pipe 3½ Std. 80S	14.0	21.1
Pipe 3½ Std. 40S	10.4	15.7
Pipe 3½ Std. 10S [f2]	5.73	8.62
Pipe 3½ Std. 5S [f2]	3.80	5.71
Pipe 3 Std. 80S	9.99	15.0
Pipe 3 Std. 40S	7.56	11.4
Pipe 3 Std. 10S	4.44	6.68
Pipe 3 Std. 5S [f2]	2.95	4.43
Pipe 2½ Std. 80S	6.10	9.17
Pipe 2½ Std. 40S	4.74	7.12
Pipe 2½ Std. 10S	2.97	4.46
Pipe 2½ Std. 5S [f2]	2.04	3.07
Pipe 2 Std. 80S	3.31	4.97
Pipe 2 Std. 40S	2.48	3.72
Pipe 2 Std. 10S	1.83	2.74
Pipe 2 Std. 5S [f2]	1.08	1.63
Pipe 1½ Std. 80S	1.88	2.83
Pipe 1½ Std. 40S	1.45	2.18
Pipe 1½ Std. 10S	1.14	1.71
Pipe 1½ Std. 5S	0.710	1.07
Pipe 1¼ Std. 80S	1.34	2.02
Pipe 1¼ Std. 40S	1.05	1.58
Pipe 1¼ Std. 10S	0.853	1.28
Pipe 1¼ Std. 5S	0.535	0.804
Pipe 1 Std. 80S	0.762	1.15
Pipe 1 Std. 40S	0.610	0.917
Pipe 1 Std. 10S	0.519	0.780
Pipe 1 Std. 5S	0.331	0.497

ASD	LFRD
Ω_b = 1.67	φ_b = 0.90

[f2] Shape exceeds compact limit for flexure with F_y = 65 ksi.

PART 4: DESIGN OF COMPRESSION MEMBERS (F_y = 30 ksi)

Table 4-1

Available Strength in Axial Compression, kips

W-Shapes (Welded)

W24

F_y = 30 ksi

Shape		W24×											
lb/ft		131		117 ^{c1}		104 ^{c1}		94 ^{c1}		84 ^{c1}		76 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	688	1030	600	901	518	779	470	707	406	610	359	539
	6	658	990	577	868	499	750	434	653	375	563	331	498
	7	648	974	570	856	492	740	422	634	364	547	322	483
	8	636	956	561	843	485	728	408	613	352	529	311	467
	9	623	937	551	828	476	715	392	589	338	508	299	449
	10	609	915	539	811	466	701	375	563	324	486	286	429
	11	594	892	527	793	456	686	355	533	308	462	272	408
	12	577	867	514	772	445	669	333	501	291	437	257	386
	13	560	841	498	748	433	651	311	468	273	411	241	362
	14	542	814	481	723	420	632	289	434	253	381	225	338
	15	523	786	464	698	407	612	267	401	233	351	207	312
	16	503	757	447	671	393	591	245	369	214	321	189	285
	17	484	727	429	644	378	569	224	337	195	293	172	259
	18	463	696	410	617	362	544	204	306	176	265	155	234
	19	443	666	392	589	345	519	184	277	159	239	140	210
	20	422	635	373	561	328	494	166	250	144	216	126	190
	22	381	573	336	505	295	444	137	206	119	178	104	157
	24	341	512	300	451	263	395	115	173	99.7	150	87.6	132
	26	302	453	265	398	231	348	98.3	148	85.0	128	74.6	112
	28	264	397	231	348	202	303	84.8	127	73.3	110	64.4	96.7
	30	231	347	202	303	176	264	73.8	111	63.8	95.9	56.1	84.3
	32	203	305	177	267	154	232	64.9	97.5	56.1	84.3	49.3	74.1
	34	180	270	157	236	137	206						
	36	160	241	140	211	122	183						
	38	144	216	126	189	110	165						
	40	130	195	114	171	98.9	149						
Properties													
P_{wo}, kips		58.1	87.1	46.8	70.1	37.5	56.3	45.1	67.6	36.2	54.3	29.9	44.9
P_{wi}, kips/in.		12.1	18.2	11.0	16.5	10.0	15.0	10.3	15.5	9.40	14.1	8.80	13.2
P_{wb}, kips		129	194	97.0	146	72.9	109	79.8	120	60.6	91.1	49.8	74.8
P_{fb}, kips		103	156	81.1	122	63.2	94.9	86.0	129	66.6	100	51.9	78.0
A_g, in.^{2}		38.3		34.2		30.4		27.5		24.5		22.2	
I_x, in.^{4}		3990		3510		3080		2670		2340		2070	
I_y, in.^{4}		340		297		259		109		94.4		82.5	
r_y, in.		2.98		2.95		2.92		1.99		1.96		1.93	
r_x/r_y		3.42		3.42		3.46		4.95		4.99		5.01	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		110000		97000		85100		73800		64700		57200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		9400		8210		7160		3010		2610		2280	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

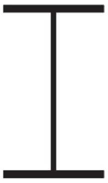
W24-W21

Shape		W24×						W21×					
lb/ft		68 ^{c1}		62 ^{c1}		55 ^{c1}		122		111		101 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	313	471	282	423	240	360	640	961	584	878	523	787
	6	289	434	243	365	207	311	611	918	558	838	503	756
	7	280	421	230	345	196	294	601	903	548	824	496	745
	8	271	407	215	323	183	276	590	886	538	809	487	733
	9	260	391	199	299	170	255	577	867	526	791	477	718
	10	248	373	181	273	155	232	563	846	514	772	466	700
	11	236	354	162	244	139	209	548	824	500	752	453	682
	12	222	334	143	214	122	184	533	800	486	730	440	662
	13	208	313	124	186	105	158	516	775	470	707	426	641
	14	194	292	107	160	90.8	136	499	749	454	683	412	619
	15	179	269	93.0	140	79.1	119	480	722	438	658	397	596
	16	163	245	81.7	123	69.5	104	462	694	421	632	381	573
	17	147	222	72.4	109	61.6	92.5	443	666	403	606	365	549
	18	132	199	64.6	97.0	54.9	82.5	424	637	386	580	349	525
	19	119	179	57.9	87.1	49.3	74.1	404	608	368	553	333	500
	20	107	161	52.3	78.6	44.5	66.9	385	578	350	526	317	476
	22	88.7	133	43.2	65.0	36.8	55.3	346	520	314	472	284	427
	24	74.5	112					308	462	279	420	252	379
	26	63.5	95.4					271	407	246	369	222	333
	28	54.7	82.3					236	355	214	322	193	290
	30	47.7	71.7					206	309	187	280	168	253
	32							181	272	164	246	148	222
	34							160	241	145	218	131	197
	36							143	215	130	195	117	176
	38							128	193	116	175	105	158
	40							116	174	105	158	94.6	142
Properties													
P_{wo}, kips		24.3	36.4	25.4	38.1	19.9	29.9	57.6	86.4	48.1	72.2	40.0	60.0
P_{wi}, kips/in.		8.30	12.5	8.60	12.9	7.90	11.9	12.0	18.0	11.0	16.5	10.0	15.0
P_{wb}, kips		41.8	62.8	46.5	69.9	35.9	54.0	144	216	111	167	83.2	125
P_{fb}, kips		38.4	57.8	39.1	58.7	28.6	43.0	103	156	86.0	129	71.9	108
A_g, in.^{2}		19.9		18.0		16.0		35.6		32.5		29.5	
I_x, in.^{4}		1800		1520		1320		2940		2650		2400	
I_y, in.^{4}		70.4		34.5		29.0		305		274		248	
r_y, in.		1.88		1.38		1.35		2.92		2.91		2.90	
r_x/r_y		5.07		6.67		6.73		3.11		3.11		3.11	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		49700		42000		36500		81200		73200		66300	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1950		953		801		8430		7570		6850	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.



W21

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W21×											
lb/ft		93		83 ^{c1}		73 ^{c1}		68 ^{c1}		62 ^{c1}		57 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	487	732	431	648	365	549	333	501	295	443	268	404
	6	434	653	385	579	332	499	303	455	268	403	229	344
	7	417	627	369	555	321	482	293	440	259	389	215	323
	8	398	597	352	529	308	462	281	422	248	373	200	301
	9	377	566	333	501	293	441	268	403	237	356	184	276
	10	355	533	313	471	276	415	254	381	224	337	165	248
	11	332	499	293	440	258	387	238	358	211	317	146	219
	12	309	464	272	408	239	359	221	332	197	296	128	192
	13	285	429	251	377	220	331	203	306	181	273	110	166
	14	262	393	230	345	202	303	186	280	165	249	95.0	143
	15	239	359	209	314	183	275	169	254	150	225	82.8	124
	16	216	325	189	284	166	249	153	229	135	202	72.7	109
	17	195	293	170	255	149	223	137	206	120	181	64.4	96.8
	18	175	263	152	228	133	200	122	184	107	161	57.5	86.4
	19	157	236	136	205	119	179	110	165	96.4	145	51.6	77.5
	20	141	213	123	185	108	162	99.0	149	87.0	131	46.6	70.0
	22	117	176	102	153	89.0	134	81.8	123	71.9	108	38.5	57.8
	24	98.3	148	85.5	129	74.7	112	68.7	103	60.4	90.8		
	26	83.7	126	72.9	109	63.7	95.7	58.6	88.0	51.5	77.4		
	28	72.2	108	62.8	94.4	54.9	82.5	50.5	75.9	44.4	66.7		
	30	62.9	94.5	54.7	82.2	47.8	71.9	44.0	66.1				
	32												
	34												
	36												
	38												
	40												

Properties

P_{wo}, kips	53.9	80.9	43.0	64.5	33.7	50.5	29.5	44.2	24.6	36.9	26.3	39.5
P_{wi}, kips/in.	11.6	17.4	10.3	15.5	9.10	13.7	8.60	12.9	8.00	12.0	8.10	12.2
P_{wb}, kips	130	196	91.2	137	62.9	94.6	53.1	79.8	42.6	64.1	44.2	66.4
P_{fb}, kips	97.1	146	78.3	118	61.5	92.4	52.7	79.2	42.5	63.8	47.4	71.3

A_g, in.^{2}	27.1	24.1	21.3	19.8	18.0	16.5
I_x, in.^{4}	2050	1810	1580	1460	1310	1150
I_y, in.^{4}	92.8	80.8	70.5	64.7	57.5	30.6
r_y, in.	1.85	1.83	1.82	1.81	1.78	1.36
r_x/r_y	4.70	4.73	4.74	4.74	4.79	6.13
$P_{ex}(KL)^2/10^4$, k-in.^{2}	56700	50000	43700	40300	36200	31800
$P_{ey}(KL)^2/10^4$, k-in.^{2}	2560	2230	1950	1790	1590	846

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W21-W18

Shape		W21×				W18×							
lb/ft		50 ^{c1}		44 ^{c1}		106		97		86		76 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	229	344	194	291	557	837	510	767	453	680	394	592
	6	194	291	164	246	527	792	483	726	428	643	375	564
	7	182	273	153	230	517	777	473	711	419	630	368	554
	8	168	253	142	213	505	759	463	695	410	616	360	542
	9	154	231	129	195	492	740	451	677	399	600	351	527
	10	139	208	116	174	478	719	438	658	388	582	341	512
	11	121	182	102	153	463	696	424	637	375	564	329	495
	12	105	158	87.4	131	447	672	409	615	362	544	318	478
	13	89.8	135	74.5	112	431	647	394	592	348	523	305	459
	14	77.5	116	64.3	96.6	413	621	378	568	334	502	293	440
	15	67.5	101	56.0	84.2	396	595	361	543	319	480	280	420
	16	59.3	89.1	49.2	74.0	377	567	345	518	304	457	266	400
	17	52.5	79.0	43.6	65.5	359	539	328	493	289	434	253	380
	18	46.9	70.4	38.9	58.4	340	512	311	467	274	411	239	359
	19	42.1	63.2	34.9	52.4	322	484	294	441	258	388	226	339
	20	38.0	57.1	31.5	47.3	303	456	276	416	243	365	212	319
	22					267	401	243	365	213	321	186	279
	24					232	349	211	317	185	278	161	241
	26					199	300	181	273	159	238	138	207
	28					172	259	156	235	137	205	119	178
	30					150	225	136	205	119	179	103	155
	32					132	198	120	180	105	157	90.8	136
	34					117	175	106	159	92.7	139	80.4	121
	36					104	156	94.6	142	82.7	124	71.8	108
	38					93.4	140	84.9	128	74.2	112	64.4	96.8
	40					84.3	127	76.6	115	67.0	101	58.1	87.4
Properties													
P_{wo}, kips		20.3	30.5	15.8	23.6	55.5	83.2	46.5	69.8	37.0	55.4	28.9	43.4
P_{wi}, kips/in.		7.60	11.4	7.00	10.5	11.8	17.7	10.7	16.1	9.60	14.4	8.50	12.8
P_{wb}, kips		36.6	55.1	28.5	42.9	161	242	120	180	86.4	130	60.0	90.2
P_{fb}, kips		32.1	48.3	22.7	34.2	99.2	149	85.0	128	66.6	100	51.9	78.0
A_g, in.^{2}		14.5		12.8		31.0		28.4		25.2		22.2	
I_x, in.^{4}		964		822		1900		1740		1520		1320	
I_y, in.^{4}		24.9		20.7		220		201		175		153	
r_y, in.		1.31		1.27		2.67		2.66		2.64		2.62	
r_x/r_y		6.22		6.32		2.93		2.94		2.94		2.95	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		26600		22700		52500		48100		42000		36500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		688		572		6080		5550		4840		4230	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W18

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W18×											
lb/ft		71		65		60 ^{c1}		55 ^{c1}		50 ^{c1}		46 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	372	559	341	513	308	462	277	416	242	363	223	335
	6	325	489	298	448	274	412	247	371	216	325	186	279
	7	310	466	284	427	261	392	237	356	207	311	173	260
	8	293	441	269	404	247	371	225	338	197	296	159	239
	9	275	414	252	379	231	347	211	317	186	280	143	215
	10	257	386	235	353	215	323	196	295	175	262	127	191
	11	237	357	217	326	199	299	181	272	162	243	111	167
	12	218	328	199	299	182	274	165	248	148	222	95.6	144
	13	199	299	181	272	166	249	150	225	134	201	81.8	123
	14	180	270	164	246	149	225	135	203	121	181	70.5	106
	15	162	243	147	221	134	201	121	181	108	162	61.4	92.3
	16	144	216	131	196	119	179	107	161	95.2	143	54.0	81.1
	17	128	192	116	174	106	159	94.8	142	84.4	127	47.8	71.9
	18	114	171	103	155	94.1	141	84.6	127	75.3	113	42.7	64.1
	19	102	154	92.8	140	84.5	127	75.9	114	67.5	102	38.3	57.5
	20	92.3	139	83.8	126	76.2	115	68.5	103	61.0	91.6	34.5	51.9
	22	76.3	115	69.2	104	63.0	94.7	56.6	85.1	50.4	75.7		
	24	64.1	96.4	58.2	87.4	52.9	79.6	47.6	71.5	42.3	63.6		
	26	54.6	82.1	49.6	74.5	45.1	67.8	40.5	60.9	36.1	54.2		
	28	47.1	70.8	42.7	64.2	38.9	58.5						
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		40.1	60.1	33.8	50.6	28.8	43.3	24.6	36.9	20.2	30.4	21.8	32.7
P_{wi}, kips/in.		9.90	14.9	9.00	13.5	8.30	12.5	7.80	11.7	7.10	10.7	7.20	10.8
P_{wb}, kips		94.6	142	71.0	107	56.0	84.2	46.4	69.7	35.0	52.5	36.4	54.7
P_{fb}, kips		73.7	111	63.2	94.9	54.2	81.5	44.6	67.0	36.5	54.8	41.1	61.8
A_g, in.^{2}		20.7		19.0		17.5		16.1		14.5		13.4	
I_x, in.^{4}		1160		1060		974		881		790		702	
I_y, in.^{4}		60.3		54.8		50.1		44.9		40.1		22.5	
r_y, in.		1.71		1.70		1.69		1.67		1.66		1.30	
r_x/r_y		4.38		4.40		4.41		4.43		4.44		5.57	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		32100		29300		26900		24300		21800		19400	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1670		1510		1380		1240		1110		622	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W18-W16

Shape	W18×				W16×							
lb/ft	40 ^{c1}		35 ^{c1}		100		89		77		67 ^{c1}	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y												
0	184	277	157	236	526	791	467	702	404	608	350	526
6	154	231	130	196	495	744	439	660	379	570	329	494
7	143	216	121	182	484	728	429	645	371	557	321	483
8	132	199	111	167	472	709	418	628	361	543	313	470
9	120	181	100	151	458	689	406	610	350	527	303	456
10	107	161	89.1	134	444	667	393	590	339	509	293	441
11	93.6	141	77.0	116	428	644	379	569	327	491	283	425
12	80.4	121	65.4	98.3	412	619	364	547	314	471	271	408
13	68.6	103	55.7	83.7	394	593	348	524	300	451	259	390
14	59.2	88.9	48.0	72.2	377	566	333	500	286	430	247	372
15	51.5	77.5	41.9	62.9	359	539	316	475	272	409	235	353
16	45.3	68.1	36.8	55.3	340	511	300	450	257	387	222	334
17	40.1	60.3	32.6	49.0	321	483	283	425	243	365	210	315
18	35.8	53.8	29.1	43.7	303	455	266	400	228	343	197	296
19	32.1	48.3	26.1	39.2	284	427	250	375	214	322	184	277
20	29.0	43.6	23.5	35.4	266	400	233	351	200	300	172	259
22					230	346	202	303	172	259	148	223
24					197	296	172	259	147	220	126	189
26					168	252	147	220	125	188	107	161
28					145	218	126	190	108	162	92.6	139
30					126	190	110	166	93.8	141	80.7	121
32					111	167	96.8	146	82.5	124	70.9	107
34					98.2	148	85.8	129	73.0	110	62.8	94.4
36					87.6	132	76.5	115	65.2	97.9	56.0	84.2
38					78.6	118	68.7	103	58.5	87.9	50.3	75.6
40					71.0	107	62.0	93.1	52.8	79.3	45.4	68.2
Properties												
P_{wo}, kips	16.5	24.8	12.8	19.1	57.6	86.4	45.9	68.9	34.6	51.9	26.3	39.4
P_{wi}, kips/in.	6.30	9.45	6.00	9.00	11.7	17.6	10.5	15.8	9.10	13.7	7.90	11.9
P_{wb}, kips	24.4	36.7	21.1	31.7	175	264	127	190	82.8	124	54.2	81.5
P_{fb}, kips	30.9	46.5	20.3	30.5	109	164	86.0	129	64.9	97.5	49.7	74.6
A_g, in.^{2}	11.6		10.2		29.3		26.0		22.5		19.5	
I_x, in.^{4}	602		500		1480		1290		1100		947	
I_y, in.^{4}	19.1		15.3		186		163		138		119	
r_y, in.	1.28		1.23		2.52		2.50		2.48		2.47	
r_x/r_y	5.63		5.71		2.82		2.82		2.82		2.82	
$P_{ex}(KL)^2/10^4$, k-in.^{2}	16600		13800		40900		35600		30400		26200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}	528		423		5140		4500		3810		3290	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W16

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W16×											
lb/ft		57		50^{c1}		45^{c1}		40^{c1}		36^{c1}		31^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	298	448	259	389	225	339	192	289	169	254	142	213
	6	257	386	225	338	198	298	169	254	149	223	114	171
	7	243	365	213	320	189	284	161	243	142	213	105	158
	8	228	343	200	301	178	268	153	230	134	201	95.1	143
	9	213	319	186	280	166	249	143	215	125	188	84.4	127
	10	196	295	172	258	152	229	133	200	116	174	73.2	110
	11	180	270	157	236	139	209	122	184	106	160	62.0	93.1
	12	163	245	143	214	126	189	111	166	95.9	144	52.1	78.4
	13	147	221	128	193	113	170	99.1	149	85.4	128	44.4	66.8
	14	131	198	114	172	101	151	88.0	132	75.4	113	38.3	57.6
	15	116	175	101	152	88.6	133	77.5	116	66.0	99.2	33.4	50.2
	16	103	154	89.1	134	78.0	117	68.2	102	58.0	87.2	29.3	44.1
	17	90.9	137	78.9	119	69.0	104	60.4	90.7	51.4	77.3	26.0	39.1
	18	81.0	122	70.4	106	61.6	92.6	53.8	80.9	45.9	68.9	23.2	34.8
	19	72.7	109	63.2	95.0	55.3	83.1	48.3	72.6	41.2	61.9	20.8	31.3
	20	65.6	98.7	57.0	85.7	49.9	75.0	43.6	65.6	37.1	55.8		
	22	54.2	81.5	47.1	70.8	41.2	62.0	36.0	54.2	30.7	46.1		
	24	45.6	68.5	39.6	59.5	34.6	52.1	30.3	45.5	25.8	38.8		
	26	38.8	58.4	33.7	50.7	29.5	44.4	25.8	38.8				
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		30.7	46.1	23.9	35.9	19.5	29.2	15.4	23.1	12.7	19.0	12.1	18.2
P_{wi}, kips/in.		8.60	12.9	7.60	11.4	6.90	10.4	6.10	9.15	5.90	8.85	5.50	8.25
P_{wb}, kips		70.0	105	48.1	72.2	36.1	54.3	24.9	37.5	22.5	33.8	18.2	27.4
P_{fb}, kips		57.4	86.3	44.6	67.0	35.8	53.9	28.6	43.0	20.8	31.2	21.7	32.7
A_g, in.^{2}		16.6		14.6		13.1		11.6		10.4		8.99	
I_x, in.^{4}		750		651		579		511		441		367	
I_y, in.^{4}		43.1		37.2		32.8		28.8		24.5		12.4	
r_y, in.		1.61		1.60		1.58		1.57		1.53		1.17	
r_x/r_y		4.17		4.18		4.20		4.22		4.25		5.46	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		20700		18000		16000		14100		12200		10100	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1190		1030		906		796		677		343	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W16-W14

Shape		W16x		W14×									
lb/ft		26 ^{c1}		120		109		99		90		82	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	114	171	629	945	569	856	517	778	471	707	426	640
	6	91.2	137	610	917	552	830	502	754	456	686	400	601
	7	83.8	126	605	909	547	822	497	746	451	678	391	588
	8	75.7	114	598	899	541	813	491	738	446	670	381	573
	9	67.0	101	591	888	535	803	485	729	440	662	370	556
	10	57.9	87.0	582	875	527	792	478	719	434	653	358	538
	11	48.6	73.1	573	861	519	780	471	708	428	643	345	519
	12	40.9	61.4	563	846	510	766	462	695	420	632	332	499
	13	34.8	52.3	552	830	500	751	454	682	412	620	318	477
	14	30.0	45.1	541	813	490	736	444	668	404	607	303	456
	15	26.1	39.3	529	795	479	720	434	653	395	593	288	433
	16	23.0	34.5	517	777	468	703	424	637	385	579	273	411
	17	20.4	30.6	504	757	456	685	413	621	375	564	258	388
	18	18.2	27.3	490	737	444	667	402	604	365	549	243	365
	19			477	717	431	648	391	587	355	533	228	342
	20			463	695	418	629	379	569	344	517	213	320
	22			434	652	392	589	355	533	322	484	184	276
	24			404	608	365	549	330	497	300	451	157	236
	26			375	563	338	508	306	459	277	417	134	201
	28			345	518	311	468	281	422	255	383	115	173
	30			315	474	285	428	257	386	233	350	100	151
	32			287	431	259	389	233	350	211	317	88.3	133
	34			259	390	234	351	210	316	190	286	78.2	118
	36			233	350	210	315	189	284	171	257	69.7	105
	38			209	314	188	283	169	254	153	230	62.6	94.1
	40			189	284	170	256	153	230	138	208	56.5	84.9
Properties													
P_{wo}, kips		8.63	12.9	55.5	83.2	45.2	67.7	37.8	56.7	31.2	46.9	43.6	65.4
P_{wi}, kips/in.		5.00	7.50	11.8	17.7	10.5	15.8	9.70	14.6	8.80	13.2	10.2	15.3
P_{wb}, kips		13.7	20.6	214	322	152	228	119	179	89	134	139	209
P_{fb}, kips		13.4	20.1	99.2	149	83.0	125	68.3	103	56.6	85.1	82.1	123
A_g, in.^{2}		7.55		35.0		31.7		28.8		26.2		23.7	
I_x, in.^{4}		294		1360		1230		1100		987		870	
I_y, in.^{4}		9.59		495		447		402		362		148	
r_y, in.		1.13		3.76		3.75		3.73		3.72		2.50	
r_x/r_y		5.52		1.66		1.66		1.65		1.65		2.42	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		8120		37600		34000		30400		27300		24000	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		265		13700		12400		11100		10000		4090	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

W14

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W14×											
lb/ft		74		68		61		53		48		43 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	386	581	354	532	316	475	275	413	248	373	216	325
	6	363	545	332	499	297	446	248	372	223	336	197	296
	7	355	533	325	488	290	436	239	359	215	323	190	286
	8	345	519	316	475	282	424	229	344	206	309	183	275
	9	335	504	307	461	274	412	218	327	196	294	174	261
	10	324	487	297	446	265	398	206	310	185	279	164	247
	11	313	470	286	430	255	383	194	292	174	262	154	232
	12	300	451	275	413	245	368	182	273	163	245	144	217
	13	287	432	263	395	234	352	169	254	152	228	134	201
	14	274	412	251	377	223	336	156	235	140	211	123	186
	15	261	392	238	358	212	319	144	216	129	194	113	170
	16	247	371	225	339	201	302	132	198	118	177	103	155
	17	233	350	213	320	189	284	120	180	107	161	93.7	141
	18	219	330	200	301	178	267	108	163	96.6	145	84.4	127
	19	206	309	187	282	167	250	97.3	146	86.9	131	75.8	114
	20	192	289	175	263	155	234	87.8	132	78.4	118	68.5	103
	22	166	249	151	227	134	201	72.6	109	64.8	97.4	56.6	85.0
	24	141	212	128	193	114	171	61.0	91.7	54.5	81.8	47.5	71.4
	26	120	181	109	164	96.9	146	52.0	78.1	46.4	69.7	40.5	60.9
	28	104	156	94.3	142	83.6	126	44.8	67.4	40.0	60.1	34.9	52.5
	30	90.4	136	82.1	123	72.8	109	39.0	58.7	34.9	52.4	30.4	45.7
	32	79.4	119	72.2	109	64.0	96.2	34.3	51.6	30.6	46.0		
	34	70.4	106	64.0	96.1	56.7	85.2						
	36	62.8	94.3	57.0	85.7	50.6	76.0						
	38	56.3	84.7	51.2	77.0	45.4	68.2						
	40	50.8	76.4	46.2	69.5	41.0	61.5						
Properties													
P_{wo}, kips		35.3	53.0	29.9	44.8	24.2	36.3	24.4	36.6	20.2	30.3	16.2	24.2
P_{wi}, kips/in.		9.00	13.5	8.30	12.5	7.50	11.3	7.40	11.1	6.80	10.2	6.10	9.15
P_{wb}, kips		95.0	143	75.0	113	55.1	82.8	53.0	79.7	41.1	61.7	29.6	44.4
P_{fb}, kips		69.2	104	58.2	87.5	46.7	70.2	48.9	73.5	39.7	59.7	31.5	47.4
A_g, in.^{2}		21.5		19.7		17.6		15.3		13.8		12.3	
I_x, in.^{4}		784		711		628		530		473		416	
I_y, in.^{4}		134		121		107		57.6		51.4		45.2	
r_y, in.		2.49		2.48		2.47		1.94		1.93		1.91	
r_x/r_y		2.43		2.42		2.42		3.03		3.03		3.04	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		21700		19600		17400		14600		13100		11500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		3700		3340		2960		1590		1420		1250	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

W14-W12

Shape		W14×										W12×	
lb/ft		38 c1		34 c1		30 c1		26 c1		22 c1		106	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	191	288	167	251	145	218	122	184	98.6	148	555	834
	6	167	251	146	219	126	189	94.3	142	75.5	114	533	802
	7	159	239	139	209	120	180	85.3	128	68.1	102	526	790
	8	149	223	131	197	113	169	75.5	113	60.0	90.2	517	777
	9	138	207	122	184	105	158	64.8	97.4	51.5	77.4	508	763
	10	127	190	112	169	96.6	145	54.5	81.9	42.8	64.3	497	747
	11	115	173	102	153	87.4	131	45.2	68.0	35.4	53.1	486	730
	12	104	156	91.7	138	78.2	118	38.0	57.1	29.7	44.7	473	711
	13	93.1	140	81.8	123	69.3	104	32.4	48.7	25.3	38.1	460	692
	14	82.6	124	72.3	109	60.9	91.5	27.9	42.0	21.8	32.8	447	672
	15	72.6	109	63.4	95.3	53.1	79.9	24.3	36.6	19.0	28.6	433	650
	16	63.8	95.9	55.7	83.8	46.7	70.2	21.4	32.1	16.7	25.1	418	629
	17	56.5	85.0	49.4	74.2	41.4	62.2	18.9	28.5	14.8	22.3	403	606
	18	50.4	75.8	44.0	66.2	36.9	55.5	16.9	25.4			388	583
	19	45.2	68.0	39.5	59.4	33.1	49.8					372	560
	20	40.8	61.4	35.7	53.6	29.9	44.9					357	536
	22	33.7	50.7	29.5	44.3	24.7	37.1					325	488
	24	28.4	42.6	24.8	37.2	20.8	31.2					294	441
	26	24.2	36.3									263	395
	28											233	351
	30											205	308
	32											180	271
	34											160	240
	36											143	214
	38											128	192
	40											115	174

Properties

P_{wo}, kips	16.0	23.9	13.0	19.5	10.4	15.6	10.7	16.1	7.71	11.6	60.4	90.6
P_{wi}, kips/in.	6.20	9.30	5.70	8.55	5.40	8.10	5.10	7.65	4.60	6.90	12.2	18.3
P_{wb}, kips	30.0	45.1	23.3	35.0	19.9	29.9	16.7	25.1	12.3	18.5	274	411
P_{fb}, kips	29.8	44.8	23.2	34.9	16.6	25.0	19.8	29.8	12.6	18.9	110	165

A_g, in.^{2}	11.0	9.86	8.71	7.55	6.36	30.9
I_x, in.^{4}	380	334	285	240	193	925
I_y, in.^{4}	26.7	23.3	19.6	8.90	6.99	301
r_y, in.	1.56	1.54	1.50	1.09	1.05	3.13
r_x/r_y	3.76	3.78	3.81	5.17	5.25	1.75
$P_{ex}(KL)^2/10^4$, k-in.^{2}	10500	9230	7880	6630	5330	25600
$P_{ey}(KL)^2/10^4$, k-in.^{2}	738	644	542	246	193	8320

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

W12

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W12×											
lb/ft		96		87		79		72		65		58	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	501	753	454	683	411	618	374	562	338	508	300	451
	6	481	724	436	656	394	593	358	538	323	486	282	424
	7	474	713	430	646	389	584	353	530	318	479	276	415
	8	467	701	423	635	382	574	347	522	313	471	269	405
	9	458	688	415	623	375	563	340	511	307	462	262	393
	10	448	673	406	610	367	551	333	500	301	452	253	381
	11	438	658	396	595	358	538	325	488	293	441	244	367
	12	427	641	386	580	349	524	316	475	286	429	235	353
	13	415	623	375	564	339	509	307	462	277	417	225	339
	14	402	605	364	547	328	494	298	448	269	404	215	324
	15	390	585	352	529	318	477	288	433	260	391	205	308
	16	376	565	340	511	306	461	278	418	251	377	194	292
	17	363	545	327	492	295	444	267	402	241	363	184	276
	18	349	524	315	473	283	426	257	386	232	348	173	261
	19	334	503	302	453	272	408	246	370	222	333	163	245
	20	320	481	289	434	260	390	235	354	212	319	152	229
	22	291	438	262	394	236	354	213	321	192	289	132	199
	24	263	395	236	355	212	319	192	288	173	260	113	170
	26	235	353	211	317	189	284	171	257	154	231	96.5	145
	28	208	313	187	281	167	251	151	227	136	204	83.2	125
	30	183	275	164	246	146	220	132	198	119	178	72.5	109
	32	161	242	144	216	129	193	116	174	104	157	63.7	95.7
	34	142	214	128	192	114	171	103	155	92.3	139	56.4	84.8
	36	127	191	114	171	102	153	91.7	138	82.3	124	50.3	75.6
	38	114	171	102	153	91.2	137	82.3	124	73.9	111	45.2	67.9
	40	103	155	92.1	138	82.3	124	74.3	112	66.7	100	40.8	61.3
Properties													
P_{wo}, kips		49.5	74.3	41.7	62.6	34.5	51.8	28.8	43.2	23.6	35.4	23.0	34.6
P_{wi}, kips/in.		11.0	16.5	10.3	15.5	9.40	14.1	8.60	12.9	7.80	11.7	7.20	10.8
P_{wb}, kips		201	302	165	249	125	188	95.5	144	71.7	108	56.3	84.6
P_{fb}, kips		90.9	137	73.7	111	60.7	91.2	50.4	75.8	41.1	61.8	46.0	69.1
A_g, in.^{2}		27.9		25.3		22.9		20.8		18.8		16.7	
I_x, in.^{4}		824		731		654		588		524		467	
I_y, in.^{4}		270		241		216		195		174		107	
r_y, in.		3.11		3.09		3.07		3.06		3.05		2.53	
r_x/r_y		1.75		1.74		1.74		1.74		1.73		2.09	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		22800		20200		18100		16200		14500		12900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		7460		6660		5970		5390		4810		2960	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

W12

Shape		W12×											
lb/ft		53		50		45		40		35 ^{c1}		30 ^{c1}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	275	413	259	389	232	348	207	311	185	277	150	226
	6	258	388	234	352	210	315	187	281	157	236	131	196
	7	252	379	226	340	202	304	180	271	148	222	124	186
	8	246	370	217	326	194	291	173	260	138	208	116	175
	9	239	359	207	311	185	278	165	248	128	192	108	162
	10	231	347	196	295	175	263	156	235	117	176	98.6	148
	11	223	335	185	278	165	248	147	221	106	160	89.5	134
	12	214	322	174	261	155	233	138	208	95.8	144	80.4	121
	13	205	308	162	244	145	217	129	194	85.5	128	71.6	108
	14	196	294	150	226	134	202	120	180	75.6	114	63.2	95.0
	15	186	280	139	209	124	186	110	166	66.2	99.6	55.4	83.2
	16	176	265	127	192	113	170	101	152	58.2	87.5	48.7	73.1
	17	167	250	116	175	103	155	92.2	139	51.6	77.5	43.1	64.8
	18	157	236	106	159	93.8	141	83.6	126	46.0	69.1	38.4	57.8
	19	147	221	95.4	143	84.6	127	75.4	113	41.3	62.1	34.5	51.9
	20	137	206	86.1	129	76.4	115	68.1	102	37.3	56.0	31.1	46.8
	22	119	178	71.2	107	63.1	94.9	56.3	84.6	30.8	46.3	25.7	38.7
	24	101	152	59.8	89.9	53.0	79.7	47.3	71.1	25.9	38.9	21.6	32.5
	26	86.3	130	51.0	76.6	45.2	67.9	40.3	60.6				
	28	74.4	112	43.9	66.0	39.0	58.6	34.7	52.2				
	30	64.8	97.4	38.3	57.5	33.9	51.0	30.3	45.5				
	32	57.0	85.6	33.6	50.6	29.8	44.8	26.6	40.0				
	34	50.5	75.9										
	36	45.0	67.7										
	38	40.4	60.7										
	40	36.5	54.8										

Properties

	53 ASD	53 LRFD	50 ASD	50 LRFD	45 ASD	45 LRFD	40 ASD	40 LRFD	35 ASD	35 LRFD	30 ASD	30 LRFD
P_{wo}, kips	19.8	29.8	23.7	35.5	19.3	28.9	15.2	22.8	15.6	23.4	11.4	17.2
P_{wi}, kips/in.	6.90	10.4	7.40	11.1	6.70	10.1	5.90	8.85	6.00	9.00	5.20	7.80
P_{wb}, kips	49.4	74.2	61.1	91.8	45.2	68.0	31.1	46.8	31.0	46.6	20.3	30.5
P_{fb}, kips	37.1	55.8	46.0	69.1	37.1	55.8	29.8	44.8	30.4	45.6	21.7	32.7

	53	50	45	40	35	30
A_g, in.^{2}	15.3	14.4	12.9	11.5	10.3	8.72
I_x, in.^{4}	417	385	342	303	283	236
I_y, in.^{4}	95.7	56.3	49.9	44.8	24.5	20.3
r_y, in.	2.50	1.98	1.97	1.97	1.54	1.53
r_x/r_y	2.09	2.62	2.61	2.60	3.41	3.40
$P_{ex}(KL)^2/10^4$, k-in.^{2}	11500	10600	9450	8370	7820	6520
$P_{ey}(KL)^2/10^4$, k-in.^{2}	2640	1560	1380	1240	677	561

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W12-W10

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape	W12×										W10×	
lb/ft	26 ^{c1}		22 ^{c1}		19 ^{c1}		16 ^{c1}		14 ^{c1}		88	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
0	126	190	109	164	89.4	134	72.6	109	61.0	91.8	462	694
6	110	165	67.3	101	55.9	84.0	43.8	65.9	36.8	55.3	437	656
7	104	156	55.4	83.3	45.5	68.3	34.7	52.2	29.2	43.9	428	643
8	97.9	147	44.3	66.6	35.9	53.9	26.8	40.4	22.5	33.8	418	628
9	91.2	137	35.1	52.7	28.3	42.6	21.2	31.9	17.8	26.7	407	612
10	84.1	126	28.4	42.7	23.0	34.5	17.2	25.8	14.4	21.6	395	594
11	76.5	115	23.5	35.3	19.0	28.5	14.2	21.3	11.9	17.9	383	575
12	68.6	103	19.7	29.6	15.9	24.0	11.9	17.9	10.0	15.0	369	555
13	60.9	91.6	16.8	25.3	13.6	20.4					355	534
14	53.6	80.5	14.5	21.8							340	512
15	46.8	70.4									325	489
16	41.1	61.8									310	466
17	36.4	54.8									295	443
18	32.5	48.9									279	419
19	29.2	43.9									263	396
20	26.3	39.6									248	373
22	21.8	32.7									218	327
24	18.3	27.5									189	283
26											162	243
28											139	210
30											121	183
32											107	160
34											94.5	142
36											84.3	127
38											75.7	114
40											68.3	103
Properties												
P_{wo}, kips	8.74	13.1	11.1	16.6	8.23	12.3	5.83	8.75	4.50	6.75	59.9	89.8
P_{wi}, kips/in.	4.60	6.90	5.20	7.80	4.70	7.05	4.40	6.60	4.00	6.00	12.1	18.2
P_{wb}, kips	14.0	21.1	20.2	30.4	14.9	22.3	12.2	18.4	9.20	13.8	331	497
P_{fb}, kips	16.2	24.4	20.3	30.5	13.8	20.7	7.88	11.9	5.68	8.54	110	165
A_g, in.^{2}	7.57		6.41		5.50		4.64		4.08		25.7	
I_x, in.^{4}	202		154		127		100		86.1		530	
I_y, in.^{4}	17.3		4.65		3.76		2.82		2.35		179	
r_y, in.	1.51		0.852		0.827		0.779		0.760		2.64	
r_x/r_y	3.42		5.75		5.82		5.97		6.04		1.72	
$P_{ex}(KL)^2/10^4$, k-in.^{2}	5580		4260		3510		2760		2380		14600	
$P_{ey}(KL)^2/10^4$, k-in.^{2}	478		129		104		78		65		4950	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

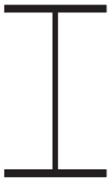
Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)



Shape		W10×											
lb/ft		77		68		60		54		49		45	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	402	605	356	535	313	470	280	421	255	383	234	351
	6	380	571	336	505	295	443	264	397	240	361	212	319
	7	372	560	329	494	289	434	259	389	235	354	205	308
	8	364	547	321	482	282	423	252	379	229	345	197	296
	9	354	532	312	470	274	412	245	369	223	335	188	283
	10	344	516	303	455	266	399	238	357	216	325	179	269
	11	332	500	293	440	257	386	230	345	209	314	169	255
	12	321	482	282	424	247	372	221	333	201	302	159	239
	13	308	463	271	408	237	357	212	319	193	290	149	224
	14	295	444	260	390	227	341	203	305	184	277	139	209
	15	282	424	248	373	217	326	194	291	176	264	128	193
	16	269	404	236	355	206	310	184	277	167	251	118	178
	17	255	383	224	336	195	293	174	262	158	238	108	163
	18	241	363	212	318	184	277	165	248	149	224	98.8	148
	19	228	342	199	300	174	261	155	233	140	211	89.5	135
	20	214	322	187	282	163	245	145	219	132	198	80.9	122
	22	187	282	164	246	142	214	127	190	115	172	66.9	101
	24	162	244	141	212	122	184	109	164	98.4	148	56.2	84.5
	26	139	209	121	182	105	157	93.0	140	84.0	126	47.9	72.0
	28	120	180	104	157	90.1	135	80.2	121	72.4	109	41.3	62.1
	30	104	157	90.7	136	78.5	118	69.9	105	63.1	94.8	36.0	54.1
	32	91.6	138	79.8	120	69.0	104	61.4	92.3	55.5	83.3	31.6	47.5
	34	81.2	122	70.7	106	61.1	91.9	54.4	81.7	49.1	73.8		
	36	72.4	109	63.0	94.7	54.5	82.0	48.5	72.9	43.8	65.9		
	38	65.0	97.7	56.6	85.0	48.9	73.6	43.5	65.4	39.3	59.1		
	40	58.6	88.1	51.0	76.7	44.2	66.4	39.3	59.1	35.5	53.3		
Properties													
P_{wo}, kips		46.1	69.2	36.2	54.3	28.6	42.8	22.8	34.1	19.0	28.6	21.7	32.6
P_{wi}, kips/in.		10.6	15.9	9.40	14.1	8.40	12.6	7.40	11.1	6.80	10.2	7.00	10.5
P_{wb}, kips		221	333	154	232	110	166	75.2	113	58.4	87.8	63.7	95.8
P_{fb}, kips		85.0	128	66.6	100	51.9	78.0	42.5	63.8	35.2	52.9	43.2	64.9

	77	68	60	54	49	45
A_g, in.^{2}	22.4	19.8	17.4	15.6	14.2	13.0
I_x, in.^{4}	451	390	337	299	268	244
I_y, in.^{4}	154	133	116	103	93.4	53.3
r_y, in.	2.62	2.60	2.58	2.57	2.56	2.02
r_x/r_y	1.71	1.71	1.71	1.70	1.70	2.14
$P_{ex}(KL)^2/10^4$, k-in.^{2}	12500	10800	9310	8260	7410	6740
$P_{ey}(KL)^2/10^4$, k-in.^{2}	4260	3680	3210	2850	2580	1470

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

W10

Table 4-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

F_y = 30 ksi

Shape		W10×											
lb/ft		39		33		30		26		22 ^{c1}		19	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	203	305	170	256	157	237	135	203	114	171	99.5	150
	6	184	277	154	231	128	193	110	165	92.4	139	60.1	90.4
	7	178	267	148	223	119	179	102	153	85.3	128	50.1	75.4
	8	171	257	142	214	109	164	93.5	141	77.8	117	40.6	61.1
	9	163	245	136	204	99.3	149	84.7	127	70.1	105	32.3	48.6
	10	155	233	129	193	89.1	134	75.9	114	62.4	93.8	26.2	39.3
	11	146	220	121	182	79.1	119	67.3	101	54.9	82.5	21.6	32.5
	12	137	207	114	171	69.4	104	58.9	88.5	47.7	71.6	18.2	27.3
	13	128	193	106	159	60.2	90.4	51.0	76.6	40.9	61.5	15.5	23.3
	14	119	179	98.1	147	51.9	78.1	44.0	66.1	35.3	53.1	13.4	20.1
	15	110	166	90.4	136	45.2	68.0	38.3	57.6	30.8	46.2		
	16	101	152	82.8	124	39.8	59.8	33.7	50.6	27.0	40.6		
	17	92.8	139	75.4	113	35.2	52.9	29.8	44.9	23.9	36.0		
	18	84.4	127	68.4	103	31.4	47.2	26.6	40.0	21.4	32.1		
	19	76.3	115	61.6	92.6	28.2	42.4	23.9	35.9	19.2	28.8		
	20	69.0	104	55.6	83.6	25.4	38.3	21.6	32.4	17.3	26.0		
	22	57.0	85.6	46.0	69.1	21.0	31.6	17.8	26.8	14.3	21.5		
	24	47.9	72.0	38.6	58.0								
	26	40.8	61.3	32.9	49.5								
	28	35.2	52.9	28.4	42.6								
	30	30.6	46.1	24.7	37.2								
	32	26.9	40.5	21.7	32.7								
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		16.7	25.0	12.6	18.9	15.3	23.0	11.4	17.2	8.64	13.0	9.88	14.8
P_{wi}, kips/in.		6.30	9.45	5.80	8.70	6.00	9.00	5.20	7.80	4.80	7.20	5.00	7.50
P_{wb}, kips		46.5	69.8	36.3	54.5	37.5	56.4	24.6	36.9	19.2	28.9	21.9	32.9
P_{fb}, kips		31.5	47.4	21.2	31.9	29.2	43.9	21.7	32.7	14.6	21.9	17.5	26.3
A_g, in.^{2}		11.3		9.49		8.76		7.53		6.41		5.54	
I_x, in.^{4}		205		166		168		143		117		94.6	
I_y, in.^{4}		45.0		36.6		16.7		14.1		11.4		4.29	
r_y, in.		2.00		1.96		1.38		1.37		1.33		0.880	
r_x/r_y		2.14		2.14		3.17		3.18		3.20		4.69	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		5670		4590		4640		3950		3230		2610	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1240		1010		462		390		315		119	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W10-W8

Shape		W10×						W8×					
lb/ft		17 ^{c1}		15 ^{c1}		12 ^{c1}		67		58		48	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	86.9	131	75.2	113	55.5	83.4	350	527	305	459	251	378
	6	51.5	77.4	43.4	65.2	33.5	50.3	321	483	280	420	230	346
	7	42.4	63.7	35.1	52.8	26.8	40.2	312	468	271	407	223	335
	8	33.9	50.9	27.6	41.4	20.8	31.3	301	452	261	392	215	323
	9	26.8	40.3	21.8	32.7	16.4	24.7	289	434	250	376	206	309
	10	21.7	32.6	17.6	26.5	13.3	20.0	276	415	239	359	196	295
	11	17.9	27.0	14.6	21.9	11.0	16.5	262	394	227	341	186	280
	12	15.1	22.6	12.2	18.4	9.24	13.9	248	373	214	322	176	264
	13	12.8	19.3	10.4	15.7	7.88	11.8	234	352	202	303	165	249
	14	11.1	16.6					219	330	189	284	155	232
	15							205	308	176	264	144	216
	16							190	286	163	245	133	200
	17							176	264	150	226	123	185
	18							162	243	138	207	113	169
	19							148	222	126	189	103	154
	20							135	203	114	172	93.2	140
	22							112	168	94.5	142	77.1	116
	24							93.7	141	79.4	119	64.8	97.4
	26							79.9	120	67.7	102	55.2	83.0
	28							68.9	103	58.4	87.7	47.6	71.5
	30							60.0	90.2	50.8	76.4	41.5	62.3
	32							52.7	79.2	44.7	67.1	36.4	54.8
	34							46.7	70.2	39.6	59.5	32.3	48.5
	36												
	38												
	40												
Properties													
P_{wo}, kips		7.92	11.9	6.21	9.32	3.99	5.99	53.3	79.9	41.3	62.0	27.4	41.1
P_{wi}, kips/in.		4.80	7.20	4.60	6.90	3.80	5.70	11.4	17.1	10.2	15.3	8.00	12.0
P_{wb}, kips		19.3	29.0	17.0	25.5	9.56	14.4	342	514	245	368	118	178
P_{fb}, kips		12.2	18.4	8.18	12.3	4.95	7.44	98.2	148	73.7	111	52.7	79.2
A_g, in.^{2}		4.91		4.33		3.46		19.5		17.0		14.0	
I_x, in.^{4}		80.2		67.2		52.2		270		226		182	
I_y, in.^{4}		3.56		2.89		2.18		88.6		75.1		60.9	
r_y, in.		0.851		0.817		0.794		2.13		2.10		2.09	
r_x/r_y		4.75		4.82		4.89		1.75		1.74		1.73	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		2220		1860		1440		7460		6250		5030	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		98.4		79.9		60.2		2450		2080		1680	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W8

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		W8×											
lb/ft		40		35		31		28		24		21	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	208	313	183	275	161	243	146	219	125	187	109	164
	6	190	286	167	251	147	221	126	189	107	161	85.9	129
	7	184	276	161	243	142	213	119	179	102	153	78.7	118
	8	177	266	155	234	136	205	112	169	95.7	144	71.2	107
	9	169	255	149	223	131	196	105	157	89.2	134	63.5	95.4
	10	161	243	142	213	124	187	96.9	146	82.5	124	55.9	84.0
	11	153	230	134	202	117	177	88.9	134	75.6	114	48.5	72.9
	12	144	217	126	190	111	166	81.0	122	68.8	103	41.6	62.5
	13	135	203	119	178	104	156	73.1	110	62.0	93.3	35.5	53.3
	14	126	190	111	166	96.5	145	65.5	98.5	55.5	83.4	30.6	46.0
	15	117	176	103	154	89.4	134	58.2	87.5	49.2	74.0	26.6	40.0
	16	108	163	94.7	142	82.4	124	51.4	77.2	43.4	65.3	23.4	35.2
	17	99.6	150	87.0	131	75.5	114	45.5	68.4	38.5	57.8	20.7	31.2
	18	91.1	137	79.5	119	68.9	104	40.6	61.0	34.3	51.6	18.5	27.8
	19	82.9	125	72.2	109	62.5	93.9	36.4	54.7	30.8	46.3	16.6	25.0
	20	75.1	113	65.4	98.3	56.5	84.9	32.9	49.4	27.8	41.8	15.0	22.5
	22	62.1	93.3	54.0	81.2	46.7	70.2	27.2	40.8	23.0	34.5		
	24	52.1	78.4	45.4	68.3	39.2	59.0	22.8	34.3	19.3	29.0		
	26	44.4	66.8	38.7	58.2	33.4	50.3	19.5	29.2	16.4	24.7		
	28	38.3	57.6	33.4	50.1	28.8	43.3						
	30	33.4	50.2	29.1	43.7	25.1	37.8						
	32	29.3	44.1	25.5	38.4	22.1	33.2						
	34	26.0	39.1	22.6	34.0								
	36												
	38												
	40												
Properties													
P_{wo}, kips		20.2	30.2	15.3	23.0	12.4	18.6	13.3	19.9	9.80	14.7	10.0	15.0
P_{wi}, kips/in.		7.20	10.8	6.20	9.30	5.70	8.55	5.70	8.55	4.90	7.35	5.00	7.50
P_{wb}, kips		86.2	130	55.0	82.7	42.8	64.3	42.8	64.3	27.2	40.8	27.5	41.4
P_{fb}, kips		35.2	52.9	27.5	41.3	21.2	31.9	24.3	36.5	18.0	27.0	18.0	27.0
A_g, in.^{2}		11.6		10.2		8.99		8.11		6.94		6.09	
I_x, in.^{4}		145		125		108		96.4		81.1		74.2	
I_y, in.^{4}		49.1		42.6		37.1		21.6		18.3		9.77	
r_y, in.		2.06		2.05		2.03		1.63		1.62		1.27	
r_x/r_y		1.71		1.71		1.71		2.12		2.11		2.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		4010		3450		2980		2660		2240		2050	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1360		1180		1030		597		506		270	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

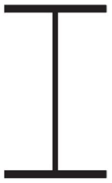
[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)



W8-W6

Shape		W8×								W6×			
lb/ft		18		15		13		10 ^{c1}		25		20	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	93.2	140	78.3	118	67.5	102	49.2	74.0	131	197	105	157
	6	72.3	109	47.5	71.5	39.5	59.3	30.3	45.5	111	166	88.1	132
	7	66.0	99.2	39.7	59.7	32.5	48.9	24.9	37.5	104	157	82.8	124
	8	59.4	89.3	32.2	48.5	26.0	39.1	19.9	29.9	97.2	146	77.1	116
	9	52.7	79.2	25.7	38.6	20.6	30.9	15.8	23.7	89.9	135	71.1	107
	10	46.1	69.3	20.8	31.2	16.7	25.0	12.8	19.2	82.3	124	65.0	97.7
	11	39.7	59.7	17.2	25.8	13.8	20.7	10.6	15.9	74.7	112	58.8	88.4
	12	33.8	50.8	14.4	21.7	11.6	17.4	8.87	13.3	67.2	101	52.7	79.3
	13	28.8	43.3	12.3	18.5	9.85	14.8	7.56	11.4	59.8	89.9	46.8	70.4
	14	24.8	37.3	10.6	15.9	8.50	12.8	6.52	9.79	52.8	79.3	41.2	61.9
	15	21.6	32.5							46.2	69.5	36.0	54.1
	16	19.0	28.6							40.6	61.1	31.6	47.5
	17	16.8	25.3							36.0	54.1	28.0	42.1
	18	15.0	22.6							32.1	48.2	25.0	37.6
	19	13.5	20.3							28.8	43.3	22.4	33.7
	20	12.2	18.3							26.0	39.1	20.2	30.4
	22									21.5	32.3	16.7	25.1
	24									18.1	27.1	14.1	21.1
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		7.59	11.4	7.72	11.6	5.87	8.80	3.49	5.23	14.6	21.8	9.49	14.2
P_{wi}, kips/in.		4.60	6.90	4.90	7.35	4.60	6.90	3.40	5.10	6.40	9.60	5.20	7.80
P_{wb}, kips		21.4	32.2	25.9	38.9	21.4	32.2	8.65	13.0	78.9	119	42.3	63.6
P_{fb}, kips		12.2	18.4	11.1	16.7	7.30	11.0	4.72	7.09	23.2	34.9	15.0	22.5
A_g, in.^{2}		5.19		4.36		3.76		2.89		7.28		5.82	
I_x, in.^{4}		60.9		47.0		38.5		29.8		53.0		41.0	
I_y, in.^{4}		7.97		3.41		2.73		2.09		17.1		13.3	
r_y, in.		1.24		0.884		0.852		0.851		1.53		1.51	
r_x/r_y		2.77		3.71		3.76		3.77		1.76		1.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		1680		1300		1060		824		1460		1130	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		220		94.2		75.4		57.8		473		368	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

W6-W5

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 30 ksi

Shape		**W6×**								**W5×**			
lb/ft		**16**		**15**		**12**		**9**		**19**		**18.9**	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	**0**	84.3	127	78.5	118	62.9	94.5	47.1	70.7	98.4	148	98.4	148
	6	55.8	83.8	65.4	98.3	39.9	59.9	29.5	44.3	77.9	117	77.0	116
	7	48.0	72.2	61.2	92.0	33.8	50.8	24.9	37.5	71.6	108	70.5	106
	8	40.4	60.8	56.7	85.2	28.0	42.0	20.5	30.8	64.9	97.5	63.6	95.6
	9	33.3	50.0	52.0	78.2	22.6	33.9	16.5	24.8	58.1	87.3	56.6	85.1
	10	27.0	40.6	47.2	71.0	18.3	27.5	13.4	20.1	51.3	77.2	49.7	74.8
	11	22.3	33.6	42.4	63.8	15.1	22.7	11.0	16.6	44.8	67.3	43.1	64.8
	12	18.8	28.2	37.8	56.7	12.7	19.1	9.27	13.9	38.5	57.9	36.8	55.4
	13	16.0	24.0	33.3	50.0	10.8	16.3	7.90	11.9	32.9	49.5	31.4	47.2
	14	13.8	20.7	29.0	43.6	9.32	14.0	6.81	10.2	28.4	42.7	27.1	40.7
	15	12.0	18.1	25.3	38.0	8.12	12.2	5.94	8.92	24.7	37.2	23.6	35.5
	16	10.6	15.9	22.2	33.4					21.7	32.7	20.7	31.2
	17			19.7	29.6					19.3	28.9	18.4	27.6
	18			17.5	26.4					17.2	25.8	16.4	24.6
	19			15.7	23.7					15.4	23.2	14.7	22.1
	20			14.2	21.4					13.9	20.9	13.3	19.9
	22			11.7	17.7								
	24			9.87	14.8								
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		10.5	15.8	5.98	8.97	6.44	9.66	3.66	5.48	11.6	17.4	13.1	19.7
P_{wi}, kips/in.		5.20	7.80	4.60	6.90	4.60	6.90	3.40	5.10	5.40	8.10	6.32	9.48
P_{wb}, kips		42.3	63.6	29.3	44.0	29.3	44.0	11.8	17.8	60.4	90.8	99.7	150
P_{fb}, kips		18.4	27.7	7.59	11.4	8.80	13.2	5.19	7.80	20.8	31.2	19.4	29.2
A_g, in.^{2}		4.69		4.37		3.50		2.62		5.48		5.48	
I_x, in.^{4}		31.8		28.7		21.7		16.0		25.9		23.8	
I_y, in.^{4}		4.43		9.32		2.99		2.19		9.13		8.69	
r_y, in.		0.972		1.46		0.925		0.914		1.29		1.26	
r_x/r_y		2.67		1.75		2.69		2.70		1.68		1.66	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		879		793		600		442		716		658	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		122		258		82.6		60.5		252		240	

ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W5-W4

Shape		W5×		W4×	
lb/ft		16		13	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	83.2	125	67.7	102
	6	65.3	98.2	46.2	69.4
	7	59.8	89.9	40.2	60.5
	8	54.1	81.3	34.3	51.6
	9	48.3	72.5	28.6	43.1
	10	42.5	63.9	23.5	35.3
	11	36.9	55.5	19.4	29.1
	12	31.6	47.5	16.3	24.5
	13	27.0	40.5	13.9	20.9
	14	23.2	34.9	12.0	18.0
	15	20.3	30.4	10.4	15.7
	16	17.8	26.8	9.17	13.8
	17	15.8	23.7		
	18	14.1	21.1		
	19	12.6	19.0		
	20	11.4	17.1		
	22				
	24				
	26				
	28				
	30				
	32				
	34				
	36				
	38				
	40				

Properties

	W5× 16 ASD	W5× 16 LRFD	W4× 13 ASD	W4× 13 LRFD
P_{wo}, kips	8.64	13.0	9.66	14.5
P_{wi}, kips/in.	4.80	7.20	5.60	8.40
P_{wb}, kips	42.4	63.8	83.3	125
P_{fb}, kips	14.6	21.9	13.4	20.1

	W5× 16	W4× 13
A_g, in.^{2}	4.63	3.77
I_x, in.^{4}	21.1	11.2
I_y, in.^{4}	7.50	3.85
r_y, in.	1.27	1.01
r_x/r_y	1.68	1.70
$P_{ex}(KL)^2/10^4$, k-in.^{2}	583	310
$P_{ey}(KL)^2/10^4$, k-in.^{2}	207	106

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS16-HSS14

Table 4-2
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS16×8×								HSS14×10×			
		0.500		0.375 [c1]		0.312 [c1]		0.250 [c1]		0.500		0.375	
t_{design}, in.		0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft		76.9		59.2		49.5		40.2		76.9		59.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	399	599	304	456	231	347	164	247	399	599	307	462
	6	385	578	296	445	226	340	161	242	389	585	300	451
	7	380	571	293	440	224	337	160	240	386	580	298	447
	8	374	562	289	434	222	333	159	238	382	574	295	443
	9	368	553	284	427	219	330	157	236	378	568	291	438
	10	361	542	279	419	217	326	155	234	373	560	288	433
	11	353	531	274	411	214	321	154	231	368	552	284	427
	12	345	519	268	402	210	316	151	228	362	544	280	420
	13	337	506	261	393	207	311	149	224	356	535	275	414
	14	328	493	255	383	203	305	147	221	349	525	270	406
	15	318	479	248	372	199	299	144	217	343	515	265	399
	16	309	464	240	361	195	292	142	213	336	504	260	391
	17	299	449	233	350	190	285	139	209	328	493	255	383
	18	288	433	225	338	185	278	136	204	321	482	249	374
	19	278	418	217	327	180	271	133	200	313	470	243	365
	20	267	402	209	315	175	263	130	195	305	458	237	356
	21	256	385	201	302	169	254	126	190	296	445	231	346
	22	246	369	193	290	162	244	123	184	288	433	224	337
	23	235	353	185	278	156	234	119	179	279	420	218	327
	24	224	337	177	266	149	224	115	173	271	407	211	317
	25	213	321	169	253	142	213	111	167	262	393	205	307
	26	203	305	161	241	135	203	107	161	253	380	198	297
	27	192	289	153	229	129	193	103	155	244	367	191	287
	28	182	273	145	218	122	184	98.6	148	235	353	184	277
	29	172	258	137	206	116	174	94.2	142	226	340	178	267
	30	162	243	129	195	109	164	89.6	135	217	327	171	257
	32	143	215	115	173	97.3	146	80.3	121	200	301	158	237
	34	127	191	102	153	86.2	130	71.2	107	183	275	145	218
	36	113	170	90.9	137	76.9	116	63.5	95.5	167	250	132	199
	38	102	153	81.6	123	69.0	104	57.0	85.7	151	227	120	180
	40	91.6	138	73.6	111	62.3	93.6	51.4	77.3	136	205	109	163

Properties

A_g, in.^{2}	22.2	17.1	14.3	11.6	22.2	17.1
I_x, in.^{4}	711	565	476	393	600	476
I_y, in.^{4}	241	193	163	135	357	284
r_y, in.	3.29	3.36	3.38	3.41	4.01	4.08
r_x/r_y	1.72	1.71	1.71	1.71	1.30	1.29

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS14

Shape		HSS14×10×				HSS14×8×							
		0.312 ^{c1}		0.250 ^{c1}		0.500		0.375		0.312 ^{c1}		0.250 ^{c1}	
t_{design}, in.		0.312		0.250		0.500		0.375		0.312		0.250	
lb/ft		49.5		40.2		70.0		54.0		45.2		36.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	250	376	181	272	363	545	280	421	227	341	163	245
	6	246	370	178	268	350	526	270	406	221	333	159	239
	7	244	367	177	266	345	519	267	401	219	329	158	237
	8	243	365	176	264	340	511	263	395	217	326	156	235
	9	241	362	175	262	334	502	259	389	214	322	155	233
	10	238	358	173	260	327	492	254	382	211	317	153	230
	11	236	354	171	258	321	482	249	374	208	312	151	227
	12	233	350	170	255	313	471	243	365	203	305	148	223
	13	230	346	168	252	305	459	237	356	198	298	146	220
	14	226	340	166	249	297	446	231	347	193	290	143	216
	15	222	334	164	246	288	433	224	337	188	282	141	211
	16	218	327	161	243	279	419	218	327	182	274	138	207
	17	213	320	159	239	270	405	211	316	176	265	135	202
	18	208	313	156	235	260	391	203	306	170	256	131	197
	19	204	306	154	231	251	377	196	295	164	247	128	192
	20	199	298	151	227	241	362	189	284	158	238	124	187
	21	193	291	148	222	231	347	181	272	152	229	120	181
	22	188	283	145	218	221	332	174	261	146	219	117	175
	23	183	275	142	213	211	317	166	250	140	210	113	169
	24	177	266	138	208	201	302	159	238	133	201	108	163
	25	172	258	135	203	191	287	151	227	127	191	104	156
	26	166	250	132	198	181	273	144	216	121	182	100	150
	27	161	241	128	192	172	258	136	205	115	173	94.6	142
	28	155	233	124	187	162	244	129	194	109	164	89.7	135
	29	149	225	121	181	153	230	122	183	103	155	84.9	128
	30	144	216	117	176	144	217	115	173	97.4	146	80.3	121
	32	133	200	109	163	127	191	102	153	86.4	130	71.3	107
	34	122	183	100	150	113	169	90.2	136	76.6	115	63.2	94.9
	36	111	167	91.5	137	100	151	80.5	121	68.3	103	56.3	84.7
	38	101	152	83.3	125	90.2	136	72.2	109	61.3	92.1	50.6	76.0
	40	91.7	138	75.5	113	81.4	122	65.2	98.0	55.3	83.1	45.6	68.6

Properties

A_g, in.^{2}	14.3	11.6	20.2	15.6	13.0	10.6
I_x, in.^{4}	401	331	509	407	343	284
I_y, in.^{4}	240	198	213	171	145	120
r_y, in.	4.10	4.13	3.25	3.31	3.34	3.36
r_x/r_y	1.29	1.29	1.54	1.54	1.54	1.54

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS14-HSS12

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS14×6×								HSS12×10×			
		0.500		0.375		0.312 [c1]		0.250 [c1]		0.500		0.375	
t_{design}, in.		0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft		63.1		48.8		40.8		33.3		70.0		54.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	327	491	253	381	206	309	145	218	363	545	280	421
	6	307	461	238	358	197	296	140	210	354	532	273	411
	7	299	450	233	350	194	291	138	207	351	527	271	407
	8	292	438	227	341	190	286	135	204	347	521	268	403
	9	283	425	220	331	185	278	133	200	343	515	265	399
	10	273	411	213	321	179	269	130	196	338	508	262	394
	11	263	396	206	309	173	260	127	191	333	501	258	388
	12	253	380	198	297	166	250	124	187	328	493	254	382
	13	242	363	189	285	160	240	121	181	322	484	250	376
	14	230	346	181	272	153	229	117	176	316	475	245	369
	15	219	328	172	259	145	218	113	170	310	466	241	362
	16	207	311	163	245	138	207	109	163	303	456	236	354
	17	195	293	154	232	130	196	104	157	296	445	230	346
	18	183	275	145	218	123	185	100	150	289	435	225	338
	19	171	257	136	205	116	174	94.7	142	282	423	219	330
	20	160	240	127	191	108	163	89.4	134	274	412	214	321
	21	148	223	119	178	101	152	83.6	126	266	400	208	312
	22	137	207	110	166	94.0	141	77.9	117	258	388	202	303
	23	127	191	102	153	87.2	131	72.3	109	250	376	196	294
	24	117	175	94.1	141	80.6	121	67.0	101	242	364	190	285
	25	108	162	86.7	130	74.3	112	61.8	92.9	234	352	184	276
	26	99.4	149	80.2	121	68.7	103	57.2	85.9	226	339	177	266
	27	92.2	139	74.4	112	63.7	95.8	53.0	79.7	218	327	171	257
	28	85.7	129	69.1	104	59.3	89.1	49.3	74.1	209	315	165	248
	29	79.9	120	64.5	96.9	55.2	83.0	46.0	69.1	201	302	159	238
	30	74.7	112	60.2	90.5	51.6	77.6	42.9	64.5	193	290	152	229
	32	65.6	98.6	52.9	79.6	45.4	68.2	37.7	56.7	177	266	140	211
	34	58.1	87.4	46.9	70.5	40.2	60.4	33.4	50.3	161	242	128	193
	36	51.9	77.9	41.8	62.9	35.8	53.9	29.8	44.8	146	220	117	175
	38	46.5	70.0	37.5	56.4	32.2	48.4	26.8	40.2	132	198	105	158
	40	42.0	63.1	33.9	50.9	29.0	43.6	24.2	36.3	119	179	95.2	143

Properties

A_g, in.^{2}	18.2	14.1	11.8	9.59	20.2	15.6
I_x, in.^{4}	417	337	284	237	413	330
I_y, in.^{4}	110	89.1	76.0	63.4	312	249
r_y, in.	2.46	2.51	2.54	2.57	3.93	4.00
r_x/r_y	1.95	1.95	1.93	1.93	1.15	1.15

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS12

Shape		HSS12×10×				HSS12×8×							
		0.312		0.250 ^{c1}		0.500		0.375		0.312		0.250 ^{c1}	
t_{design}, in.		0.312		0.250		0.500		0.375		0.312		0.250	
lb/ft		45.2		36.7		63.1		48.8		40.8		33.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	234	351	179	269	327	491	253	381	212	319	161	241
	6	228	343	176	264	315	473	244	367	204	307	157	235
	7	226	340	174	262	310	466	241	362	202	303	155	233
	8	224	336	173	260	305	459	237	357	199	299	153	231
	9	221	333	172	258	300	451	233	350	195	294	151	228
	10	218	328	170	256	294	442	229	344	192	288	149	225
	11	215	324	168	253	287	432	224	336	188	282	147	221
	12	212	319	166	250	280	422	219	328	183	276	145	217
	13	209	314	164	247	273	410	213	320	179	269	142	213
	14	205	308	162	243	265	399	207	311	174	262	139	209
	15	201	302	160	240	257	387	201	302	169	254	136	204
	16	197	296	157	236	249	374	195	293	164	246	133	199
	17	193	289	154	232	240	361	188	283	158	238	129	194
	18	188	283	151	228	232	348	182	273	153	230	125	188
	19	184	276	148	223	223	335	175	263	147	221	121	181
	20	179	269	145	218	214	321	168	253	142	213	116	174
	21	174	262	142	213	204	307	161	242	136	204	111	167
	22	169	254	138	208	195	294	154	232	130	196	107	160
	23	164	247	134	202	186	280	147	221	124	187	102	153
	24	159	239	130	196	177	266	140	211	119	178	97.5	146
	25	154	231	126	189	168	253	133	201	113	170	92.8	140
	26	149	224	122	183	159	239	127	190	107	161	88.3	133
	27	144	216	118	177	150	226	120	180	102	153	83.8	126
	28	138	208	113	171	142	213	113	170	96.2	145	79.3	119
	29	133	200	109	164	134	201	107	161	90.9	137	75.0	113
	30	128	193	105	158	125	188	101	151	85.6	129	70.7	106
	32	118	177	96.8	146	110	166	88.7	133	75.6	114	62.6	94.1
	34	108	162	88.7	133	97.8	147	78.6	118	67.0	101	55.5	83.4
	36	98.4	148	80.9	122	87.2	131	70.1	105	59.8	89.8	49.5	74.4
	38	89.1	134	73.4	110	78.3	118	62.9	94.6	53.6	80.6	44.4	66.7
	40	80.5	121	66.3	100	70.6	106	56.8	85.4	48.4	72.8	40.1	60.2

Properties

A_g, in.^{2}	13.0	10.6	18.2	14.1	11.8	9.59
I_x, in.^{4}	278	230	347	279	236	196
I_y, in.^{4}	211	174	185	149	127	105
r_y, in.	4.03	4.05	3.19	3.25	3.28	3.31
r_x/r_y	1.15	1.15	1.37	1.37	1.36	1.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape	HSS12×6×								HSS12×4×			
	0.500		0.375		0.312		0.250 c1		0.500		0.375	
t_{design}, in.	0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft	56.1		43.6		36.5		29.8		49.2		38.4	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y 0	291	437	226	340	189	284	143	214	255	383	199	300
6	272	409	212	319	177	266	137	206	219	329	173	260
7	266	399	208	312	173	261	135	202	207	312	164	247
8	258	388	202	304	169	254	132	199	195	292	155	233
9	250	376	196	295	164	247	129	195	181	272	145	218
10	241	363	190	285	159	239	126	190	167	251	135	202
11	232	349	183	275	153	230	123	185	153	230	124	186
12	222	334	176	264	147	221	119	180	139	208	113	170
13	212	319	168	253	141	212	116	174	125	187	103	154
14	202	303	160	241	135	202	111	166	111	167	92.3	139
15	191	287	152	229	128	193	105	158	98.4	148	82.3	124
16	181	271	144	217	121	183	100	150	86.6	130	72.9	110
17	170	255	136	204	115	172	94.6	142	76.8	115	64.6	97.1
18	159	239	128	192	108	162	89.2	134	68.5	103	57.6	86.6
19	148	223	120	180	101	152	83.8	126	61.4	92.4	51.7	77.7
20	138	207	112	168	94.8	142	78.4	118	55.5	83.3	46.7	70.1
21	128	192	104	156	88.3	133	73.1	110	50.3	75.6	42.3	63.6
22	118	177	96.5	145	82.0	123	68.0	102	45.8	68.9	38.6	58.0
23	108	163	89.1	134	75.9	114	63.0	94.7	41.9	63.0	35.3	53.0
24	99.7	150	82.1	123	70.0	105	58.2	87.5	38.5	57.9	32.4	48.7
25	91.9	138	75.7	114	64.6	97.1	53.7	80.7	35.5	53.3	29.9	44.9
26	84.9	128	70.0	105	59.7	89.7	49.6	74.6	32.8	49.3	27.6	41.5
27	78.8	118	64.9	97.5	55.4	83.2	46.0	69.2			25.6	38.5
28	73.2	110	60.3	90.7	51.5	77.4	42.8	64.3				
29	68.3	103	56.2	84.5	48.0	72.1	39.9	60.0				
30	63.8	95.9	52.5	79.0	44.9	67.4	37.3	56.0				
32	56.1	84.3	46.2	69.4	39.4	59.2	32.8	49.2				
34	49.7	74.6	40.9	61.5	34.9	52.5	29.0	43.6				
36	44.3	66.6	36.5	54.8	31.1	46.8	25.9	38.9				
38	39.8	59.8	32.7	49.2	28.0	42.0	23.2	34.9				
40	35.9	53.9	29.6	44.4	25.2	37.9	21.0	31.5				

Properties

A_g, in.^{2}	16.2	12.6	10.5	8.59	14.2	11.1
I_x, in.^{4}	281	228	193	161	215	178
I_y, in.^{4}	94.4	77.2	65.9	55.2	36.2	30.5
r_y, in.	2.41	2.48	2.51	2.53	1.60	1.66
r_x/r_y	1.73	1.71	1.71	1.71	2.43	2.41

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS12-HSS10

Shape		HSS12×4×						HSS10×8×					
		0.312		0.250 ^{c1}		0.180 ^{c1}		0.500		0.375		0.312	
t_{design}, in.		0.312		0.250		0.180		0.500		0.375		0.312	
lb/ft		32.2		26.3		19.2		56.1		43.6		36.5	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	167	251	125	187	74.0	111	291	437	226	340	189	284
	6	145	218	114	171	69.1	104	280	420	218	327	182	273
	7	138	208	110	166	67.3	101	275	414	215	323	179	269
	8	130	196	106	159	65.2	98.1	271	407	211	318	176	265
	9	122	184	101	152	63.0	94.6	266	399	207	312	173	260
	10	114	171	94.1	141	60.4	90.8	260	391	203	305	170	255
	11	105	157	87.1	131	57.6	86.6	254	382	199	299	166	250
	12	95.9	144	80.0	120	54.6	82.1	248	372	194	291	162	244
	13	87.1	131	72.9	110	51.3	77.2	241	362	189	284	158	237
	14	78.6	118	66.0	99.1	47.8	71.9	234	351	183	275	153	231
	15	70.3	106	59.2	89.0	44.1	66.2	226	340	178	267	149	224
	16	62.4	93.8	52.8	79.4	40.1	60.2	218	328	172	258	144	217
	17	55.3	83.1	46.9	70.4	35.8	53.8	211	316	166	249	139	209
	18	49.3	74.1	41.8	62.8	32.0	48.0	202	304	160	240	134	202
	19	44.3	66.5	37.5	56.4	28.7	43.1	194	292	153	231	129	194
	20	40.0	60.1	33.9	50.9	25.9	38.9	186	279	147	221	124	186
	21	36.2	54.5	30.7	46.2	23.5	35.3	178	267	141	211	119	178
	22	33.0	49.6	28.0	42.1	21.4	32.1	169	254	134	202	113	170
	23	30.2	45.4	25.6	38.5	19.6	29.4	161	242	128	192	108	163
	24	27.7	41.7	23.5	35.3	18.0	27.0	153	229	122	183	103	155
	25	25.6	38.4	21.7	32.6	16.6	24.9	144	217	115	173	97.8	147
	26	23.6	35.5	20.0	30.1	15.3	23.0	136	205	109	164	92.7	139
	27	21.9	33.0	18.6	27.9	14.2	21.3	129	193	103	155	87.6	132
	28	20.4	30.6	17.3	26.0	13.2	19.8	121	182	97.2	146	82.7	124
	29					12.3	18.5	113	170	91.4	137	77.9	117
	30							106	160	85.8	129	73.2	110
	32							93.4	140	75.5	113	64.5	96.9
	34							82.7	124	66.8	100	57.1	85.8
	36							73.8	111	59.6	89.6	50.9	76.6
	38							66.2	99.5	53.5	80.4	45.7	68.7
	40							59.8	89.8	48.3	72.6	41.3	62.0

Properties

A_g, in.^{2}	9.28	7.59	5.54	16.2	12.6	10.5
I_x, in.^{4}	151	127	94.5	222	180	152
I_y, in.^{4}	26.3	22.3	16.9	157	127	108
r_y, in.	1.68	1.71	1.75	3.11	3.17	3.21
r_x/r_y	2.40	2.39	2.36	1.19	1.19	1.18

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS10

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS10×8×		HSS10×6×									
		0.250		0.500		0.375		0.312		0.250		0.180 [c1]	
t_{design}, in.		0.250		0.500		0.375		0.312		0.250		0.180	
lb/ft		29.8		49.2		38.4		32.2		26.3		19.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	154	232	255	383	199	300	167	251	136	205	85.9	129
	6	149	223	238	357	187	281	156	235	128	192	82.4	124
	7	147	220	232	349	182	274	153	229	125	188	81.2	122
	8	144	217	225	339	177	266	149	223	122	183	79.8	120
	9	142	213	218	328	172	258	144	216	118	178	78.2	118
	10	139	209	210	316	166	249	139	209	114	172	76.4	115
	11	136	205	202	303	160	240	134	201	110	166	74.5	112
	12	133	200	193	290	153	230	129	193	106	159	72.4	109
	13	130	195	184	276	146	220	123	185	101	153	70.2	105
	14	126	189	174	262	139	209	117	176	96.8	145	67.8	102
	15	122	184	165	247	132	198	111	167	92.0	138	65.2	98.0
	16	118	178	155	233	125	187	105	158	87.2	131	62.6	94.0
	17	115	172	145	219	117	176	98.9	149	82.3	124	59.7	89.8
	18	110	166	136	204	110	165	92.9	140	77.4	116	56.8	85.4
	19	106	160	126	190	103	155	86.9	131	72.6	109	53.8	80.8
	20	102	153	117	176	95.7	144	81.0	122	67.8	102	50.3	75.6
	21	97.9	147	108	163	88.8	133	75.2	113	63.1	94.8	46.9	70.5
	22	93.6	141	100	150	82.0	123	69.6	105	58.5	88.0	43.6	65.5
	23	89.4	134	91.2	137	75.5	114	64.2	96.4	54.1	81.3	40.4	60.7
	24	85.2	128	83.8	126	69.4	104	59.0	88.7	49.9	74.9	37.2	56.0
	25	81.0	122	77.2	116	64.0	96.2	54.4	81.7	45.9	69.1	34.3	51.6
	26	76.8	115	71.4	107	59.2	88.9	50.3	75.6	42.5	63.8	31.8	47.7
	27	72.7	109	66.2	100	54.9	82.5	46.6	70.1	39.4	59.2	29.4	44.3
	28	68.7	103	61.6	92.5	51.0	76.7	43.4	65.2	36.6	55.0	27.4	41.2
	29	64.8	97.4	57.4	86.2	47.6	71.5	40.4	60.7	34.1	51.3	25.5	38.4
	30	60.9	91.6	53.6	80.6	44.4	66.8	37.8	56.8	31.9	48.0	23.9	35.9
	32	53.7	80.8	47.1	70.8	39.1	58.7	33.2	49.9	28.0	42.1	21.0	31.5
	34	47.6	71.5	41.7	62.7	34.6	52.0	29.4	44.2	24.8	37.3	18.6	27.9
	36	42.5	63.8	37.2	56.0	30.9	46.4	26.2	39.4	22.2	33.3	16.6	24.9
	38	38.1	57.3	33.4	50.2	27.7	41.6	23.5	35.4	19.9	29.9	14.9	22.3
	40	34.4	51.7			25.0	37.6	21.2	31.9	17.9	27.0	13.4	20.2

Properties

	HSS10×8×0.250	HSS10×6×0.500	0.375	0.312	0.250	0.180
A_g, in.^{2}	8.59	14.2	11.1	9.28	7.59	5.54
I_x, in.^{4}	127	176	145	123	103	76.8
I_y, in.^{4}	90.2	79.3	65.4	55.8	46.9	35.1
r_y, in.	3.24	2.36	2.43	2.45	2.49	2.52
r_x/r_y	1.19	1.49	1.49	1.49	1.48	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS10

Shape		HSS10×4×								HSS10×2×			
		0.500		0.375		0.312		0.250		0.375		0.250	
t_{design}, in.		0.500		0.375		0.312		0.250		0.375		0.250	
lb/ft		42.3		33.2		27.8		22.9		28.0		19.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	219	329	172	259	144	217	118	178	145	218	100	151
	6	187	281	149	223	125	188	103	155	75.8	114	57.0	85.7
	7	177	266	141	212	119	179	98.3	148	60.0	90.1	46.5	69.8
	8	165	249	133	199	112	169	92.9	140	46.3	69.5	36.7	55.2
	9	154	231	124	186	105	158	87.1	131	36.6	54.9	29.0	43.6
	10	141	212	114	172	97.4	146	81.0	122	29.6	44.5	23.5	35.3
	11	129	194	105	158	89.6	135	74.8	112	24.5	36.8	19.4	29.2
	12	116	175	95.7	144	81.9	123	68.6	103	20.6	30.9	16.3	24.5
	13	104	157	86.4	130	74.2	112	62.4	93.7			13.9	20.9
	14	92.6	139	77.4	116	66.7	100	56.3	84.6				
	15	81.5	123	68.7	103	59.5	89.5	50.4	75.8				
	16	71.7	108	60.7	91.2	52.7	79.3	44.8	67.4				
	17	63.5	95.4	53.7	80.8	46.7	70.2	39.7	59.7				
	18	56.6	85.1	47.9	72.0	41.7	62.6	35.4	53.3				
	19	50.8	76.4	43.0	64.7	37.4	56.2	31.8	47.8				
	20	45.9	68.9	38.8	58.4	33.8	50.7	28.7	43.2				
	21	41.6	62.5	35.2	52.9	30.6	46.0	26.0	39.1				
	22	37.9	57.0	32.1	48.2	27.9	41.9	23.7	35.7				
	23	34.7	52.1	29.4	44.1	25.5	38.4	21.7	32.6				
	24	31.9	47.9	27.0	40.5	23.4	35.2	19.9	30.0				
	25	29.4	44.1	24.9	37.4	21.6	32.5	18.4	27.6				
	26	27.1	40.8	23.0	34.5	20.0	30.0	17.0	25.5				
	27			21.3	32.0	18.5	27.8	15.8	23.7				
	28							14.6	22.0				
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties						
A_g, in.^{2}	12.2	9.58	8.03	6.59	8.08	5.59
I_x, in.^{4}	131	110	93.6	79.3	75.4	55.5
I_y, in.^{4}	30.1	25.5	22.1	18.8	4.85	3.85
r_y, in.	1.57	1.63	1.66	1.69	0.775	0.830
r_x/r_y	2.09	2.08	2.05	2.05	3.94	3.80

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS10-HSS9

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS10×2×		HSS9×5×						HSS9×3×			
		0.180 [c1]		0.500		0.375		0.250		0.500		0.375	
t_{design}, in.		0.180		0.500		0.375		0.250		0.500		0.375	
lb/ft		14.2		42.3		33.2		22.9		35.3		28.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	60.0	90.2	219	329	172	259	118	178	183	275	145	218
	6	42.8	64.3	198	297	156	235	108	162	136	204	111	166
	7	36.0	54.1	191	286	151	227	105	157	122	183	100	151
	8	28.9	43.4	183	274	145	218	101	151	107	162	89.7	135
	9	22.9	34.4	174	262	138	208	96.5	145	93.3	140	78.9	119
	10	18.5	27.9	165	248	132	198	91.9	138	79.6	120	68.4	103
	11	15.3	23.0	155	233	124	187	87.2	131	66.8	100	58.4	87.8
	12	12.9	19.4	145	219	117	176	82.3	124	56.2	84.4	49.3	74.1
	13	11.0	16.5	135	204	109	164	77.2	116	47.9	71.9	42.0	63.1
	14	9.46	14.2	125	188	102	153	72.1	108	41.3	62.0	36.2	54.4
	15			115	173	94.1	141	67.0	101	36.0	54.0	31.6	47.4
	16			106	159	86.6	130	62.0	93.1	31.6	47.5	27.7	41.7
	17			96.2	145	79.3	119	57.0	85.7	28.0	42.1	24.6	36.9
	18			87.1	131	72.2	108	52.2	78.4	25.0	37.5	21.9	32.9
	19			78.4	118	65.4	98.2	47.5	71.4	22.4	33.7	19.7	29.6
	20			70.8	106	59.0	88.7	43.1	64.7			17.7	26.7
	21			64.2	96.5	53.6	80.5	39.1	58.7				
	22			58.5	87.9	48.8	73.3	35.6	53.5				
	23			53.5	80.4	44.6	67.1	32.6	49.0				
	24			49.1	73.9	41.0	61.6	29.9	45.0				
	25			45.3	68.1	37.8	56.8	27.6	41.4				
	26			41.9	62.9	34.9	52.5	25.5	38.3				
	27			38.8	58.4	32.4	48.7	23.6	35.5				
	28			36.1	54.3	30.1	45.3	22.0	33.0				
	29			33.7	50.6	28.1	42.2	20.5	30.8				
	30			31.5	47.3	26.2	39.4	19.1	28.8				
	32			27.6	41.5	23.1	34.7	16.8	25.3				
	34							14.9	22.4				
	36												
	38												
	40												

Properties

A_g, in.^{2}	4.10	12.2	9.58	6.59	10.2	8.08
I_x, in.^{4}	42.1	117	97.8	70.3	80.9	69.9
I_y, in.^{4}	3.04	46.3	38.8	28.2	13.3	11.7
r_y, in.	0.861	1.95	2.01	2.07	1.14	1.20
r_x/r_y	3.72	1.59	1.59	1.58	2.47	2.45

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS9-HSS8

Shape		HSS9×3×				HSS8×6×							
		0.250		0.180 ^{c1}		0.500		0.375		0.312		0.250	
t_{design}, in.		0.250		0.180		0.500		0.375		0.312		0.250	
lb/ft		19.4		14.2		42.3		33.2		27.8		22.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	100	151	65.8	98.8	219	329	172	259	144	217	118	178
	6	78.5	118	56.2	84.4	203	306	160	241	135	202	111	166
	7	71.9	108	52.8	79.3	198	298	156	235	131	198	108	163
	8	64.9	97.5	48.6	73.0	192	289	152	228	128	192	105	158
	9	57.8	86.8	43.5	65.3	185	279	147	221	124	186	102	153
	10	50.7	76.3	38.4	57.7	178	268	142	213	119	179	98.4	148
	11	44.0	66.1	33.5	50.3	171	257	136	204	115	172	94.6	142
	12	37.6	56.5	28.8	43.3	163	245	130	195	110	165	90.7	136
	13	32.0	48.2	24.6	37.0	155	232	124	186	105	157	86.6	130
	14	27.6	41.5	21.2	31.9	146	220	118	177	99.5	149	82.4	124
	15	24.1	36.2	18.5	27.8	138	207	111	167	94.1	141	78.1	117
	16	21.2	31.8	16.3	24.4	129	194	105	157	88.8	133	73.7	111
	17	18.7	28.2	14.4	21.7	121	181	98.1	147	83.4	125	69.4	104
	18	16.7	25.1	12.8	19.3	112	169	91.6	138	78.0	117	65.0	97.7
	19	15.0	22.5	11.5	17.3	104	156	85.3	128	72.7	109	60.7	91.2
	20	13.5	20.3	10.4	15.6	95.9	144	79.0	119	67.5	102	56.5	84.9
	21	12.3	18.5	9.44	14.2	88.1	132	73.0	110	62.5	93.9	52.4	78.7
	22					80.7	121	67.1	101	57.6	86.6	48.3	72.7
	23					73.8	111	61.5	92.5	52.9	79.5	44.5	66.9
	24					67.8	102	56.5	85.0	48.6	73.0	40.9	61.5
	25					62.5	93.9	52.1	78.3	44.8	67.3	37.7	56.6
	26					57.8	86.8	48.2	72.4	41.4	62.2	34.8	52.4
	27					53.6	80.5	44.7	67.1	38.4	57.7	32.3	48.6
	28					49.8	74.8	41.5	62.4	35.7	53.7	30.0	45.1
	29					46.4	69.8	38.7	58.2	33.3	50.0	28.0	42.1
	30					43.4	65.2	36.2	54.4	31.1	46.7	26.2	39.3
	32					38.1	57.3	31.8	47.8	27.3	41.1	23.0	34.6
	34					33.8	50.8	28.2	42.3	24.2	36.4	20.4	30.6
	36					30.1	45.3	25.1	37.8	21.6	32.5	18.2	27.3
	38					27.0	40.6	22.5	33.9	19.4	29.1	16.3	24.5
	40											14.7	22.1

Properties

A_g, in.^{2}	5.59	4.10	12.2	9.58	8.03	6.59
I_x, in.^{4}	51.1	38.6	101	83.7	71.2	60.1
I_y, in.^{4}	8.84	6.81	64.1	53.5	45.7	38.6
r_y, in.	1.26	1.29	2.29	2.36	2.39	2.42
r_x/r_y	2.40	2.38	1.26	1.25	1.25	1.25

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS8

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS8×6×		HSS8×4×									
		0.180 [c1]		0.500		0.375		0.312		0.250		0.180 [c1]	
t_{design}, in.		0.180		0.500		0.375		0.312		0.250		0.180	
lb/ft		16.7		35.3		28.0		23.5		19.4		14.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	84.2	127	183	275	145	218	122	183	100	151	71.3	107
	6	80.1	120	155	233	125	187	105	158	87.0	131	64.1	96.4
	7	78.7	118	146	220	118	177	99.5	150	82.6	124	61.0	91.7
	8	77.0	116	136	205	111	166	93.5	141	77.8	117	57.6	86.6
	9	74.8	112	126	189	103	155	87.2	131	72.7	109	54.0	81.1
	10	72.3	109	115	173	95.1	143	80.6	121	67.4	101	50.2	75.4
	11	69.6	105	105	157	87.0	131	73.9	111	62.0	93.2	46.3	69.6
	12	66.8	100	94.1	141	78.9	119	67.2	101	56.6	85.1	42.4	63.7
	13	63.8	95.9	83.8	126	71.0	107	60.6	91.1	51.3	77.0	38.5	57.9
	14	60.8	91.4	74.0	111	63.3	95.2	54.2	81.5	46.0	69.2	34.7	52.2
	15	57.7	86.7	64.8	97.3	56.0	84.2	48.1	72.3	41.0	61.6	31.0	46.7
	16	54.5	82.0	56.9	85.5	49.3	74.1	42.4	63.7	36.3	54.5	27.6	41.4
	17	51.4	77.2	50.4	75.8	43.7	65.6	37.6	56.5	32.1	48.3	24.4	36.7
	18	48.2	72.5	45.0	67.6	39.0	58.6	33.5	50.4	28.7	43.1	21.8	32.8
	19	45.1	67.8	40.4	60.7	35.0	52.6	30.1	45.2	25.7	38.7	19.6	29.4
	20	42.1	63.2	36.4	54.7	31.6	47.4	27.1	40.8	23.2	34.9	17.7	26.5
	21	39.1	58.7	33.0	49.7	28.6	43.0	24.6	37.0	21.1	31.6	16.0	24.1
	22	36.1	54.3	30.1	45.2	26.1	39.2	22.4	33.7	19.2	28.8	14.6	21.9
	23	33.3	50.1	27.5	41.4	23.9	35.9	20.5	30.8	17.6	26.4	13.3	20.1
	24	30.6	46.1	25.3	38.0	21.9	32.9	18.8	28.3	16.1	24.2	12.3	18.4
	25	28.2	42.5	23.3	35.0	20.2	30.4	17.4	26.1	14.9	22.3	11.3	17.0
	26	26.1	39.3			18.7	28.1	16.1	24.1	13.7	20.6	10.4	15.7
	27	24.2	36.4					14.9	22.4	12.7	19.1	9.69	14.6
	28	22.5	33.8									9.01	13.5
	29	21.0	31.6										
	30	19.6	29.5										
	32	17.2	25.9										
	34	15.3	23.0										
	36	13.6	20.5										
	38	12.2	18.4										
	40	11.0	16.6										
Properties													
A_g, in.^{2}		4.82		10.2		8.08		6.78		5.59		4.10	
I_x, in.^{4}		45.0		72.3		61.9		52.8		45.1		34.0	
I_y, in.^{4}		29.0		23.9		20.6		17.8		15.3		11.6	
r_y, in.		2.45		1.53		1.60		1.62		1.65		1.68	
r_x/r_y		1.25		1.74		1.73		1.72		1.72		1.71	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS8

Shape		HSS8×4×		HSS8×2×									
		0.120 ^{c1}		0.375		0.312		0.250		0.180 ^{c1}		0.120 ^{c1}	
t_{design}, in.		0.120		0.375		0.312		0.250		0.180		0.120	
lb/ft		9.67		22.8		19.2		15.9		11.7		8.01	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	38.5	57.9	118	178	99.3	149	82.5	124	58.4	87.7	29.9	45.0
	6	35.6	53.5	60.7	91.2	53.2	79.9	46.1	69.3	35.4	53.2	22.5	33.9
	7	34.6	51.9	47.7	71.7	42.4	63.8	37.4	56.2	29.1	43.8	19.9	29.9
	8	33.4	50.2	36.7	55.2	32.9	49.5	29.4	44.1	23.3	34.9	16.8	25.2
	9	32.0	48.2	29.0	43.6	26.0	39.1	23.2	34.9	18.4	27.7	13.4	20.2
	10	30.6	46.0	23.5	35.3	21.1	31.7	18.8	28.2	14.9	22.4	10.9	16.3
	11	29.0	43.6	19.4	29.2	17.4	26.2	15.5	23.3	12.3	18.5	8.98	13.5
	12	27.3	41.0	16.3	24.5	14.6	22.0	13.0	19.6	10.3	15.6	7.55	11.3
	13	25.5	38.3			12.5	18.7	11.1	16.7	8.82	13.3	6.43	9.66
	14	23.5	35.4							7.60	11.4	5.54	8.33
	15	21.5	32.3										
	16	19.4	29.1										
	17	17.2	25.9										
	18	15.4	23.1										
	19	13.8	20.7										
	20	12.4	18.7										
	21	11.3	17.0										
	22	10.3	15.5										
	23	9.41	14.1										
	24	8.64	13.0										
	25	7.97	12.0										
	26	7.36	11.1										
	27	6.83	10.3										
	28	6.35	9.54										
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	2.79	6.58	5.53	4.59	3.38	2.31
I_x, in.^{4}	23.7	40.1	34.3	30.1	23.0	16.3
I_y, in.^{4}	8.16	3.85	3.45	3.08	2.44	1.78
r_y, in.	1.71	0.765	0.790	0.819	0.850	0.878
r_x/r_y	1.70	3.23	3.15	3.13	3.07	3.03

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS7

F_y = 30 ksi

Shape		HSS7×5×								HSS7×4×			
		0.500		0.375		0.250		0.180		0.500		0.375	
t_{design}, in.		0.500		0.375		0.250		0.180		0.500		0.375	
lb/ft		35.3		28.0		19.4		14.2		31.9		25.4	
Design		P_n/Ω_c	φ_cP_n	P_n/Ω_c	φ_cP_n	P_n/Ω_c	φ_cP_n	P_n/Ω_c	φ_cP_n	P_n/Ω_c	φ_cP_n	P_n/Ω_c	φ_cP_n
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	183	275	145	218	100	151	73.7	111	165	248	132	198
	6	164	247	131	197	91.2	137	67.1	101	139	209	112	169
	7	158	237	126	190	88.1	132	64.8	97.4	131	196	106	160
	8	151	226	121	182	84.6	127	62.3	93.7	122	183	99.4	149
	9	143	215	115	173	80.8	121	59.6	89.7	112	169	92.2	139
	10	135	203	109	164	76.8	115	56.8	85.3	103	154	84.8	128
	11	126	190	103	155	72.6	109	53.7	80.8	92.8	139	77.4	116
	12	118	177	96.3	145	68.2	103	50.6	76.1	83.2	125	69.9	105
	13	109	164	89.7	135	63.8	95.9	47.4	71.3	73.9	111	62.6	94.2
	14	100	151	83.0	125	59.4	89.2	44.2	66.5	65.0	97.7	55.6	83.6
	15	91.9	138	76.4	115	54.9	82.5	41.0	61.6	56.8	85.3	49.0	73.6
	16	83.6	126	70.0	105	50.5	76.0	37.8	56.8	49.9	75.0	43.1	64.7
	17	75.5	114	63.7	95.7	46.3	69.5	34.7	52.2	44.2	66.4	38.1	57.3
	18	67.9	102	57.7	86.7	42.1	63.3	31.7	47.6	39.4	59.2	34.0	51.1
	19	60.9	91.6	51.9	78.1	38.1	57.3	28.8	43.2	35.4	53.2	30.5	45.9
	20	55.0	82.7	46.9	70.4	34.5	51.8	26.0	39.1	31.9	48.0	27.6	41.4
	21	49.9	75.0	42.5	63.9	31.2	47.0	23.6	35.5	29.0	43.5	25.0	37.6
	22	45.5	68.3	38.7	58.2	28.5	42.8	21.5	32.3	26.4	39.7	22.8	34.2
	23	41.6	62.5	35.4	53.3	26.1	39.2	19.7	29.6	24.1	36.3	20.8	31.3
	24	38.2	57.4	32.5	48.9	23.9	36.0	18.1	27.2	22.2	33.3	19.1	28.8
	25	35.2	52.9	30.0	45.1	22.0	33.1	16.7	25.0	20.4	30.7	17.6	26.5
	26	32.5	48.9	27.7	41.7	20.4	30.6	15.4	23.1			16.3	24.5
	27	30.2	45.4	25.7	38.7	18.9	28.4	14.3	21.5				
	28	28.1	42.2	23.9	35.9	17.6	26.4	13.3	20.0				
	29	26.2	39.3	22.3	33.5	16.4	24.6	12.4	18.6				
	30	24.4	36.7	20.8	31.3	15.3	23.0	11.6	17.4				
	32			18.3	27.5	13.5	20.2	10.2	15.3				
	34							9.01	13.5				
	36												
	38												
	40												

Properties

	HSS7×5×0.500	HSS7×5×0.375	HSS7×5×0.250	HSS7×5×0.180	HSS7×4×0.500	HSS7×4×0.375
A_g, in.^{2}	10.2	8.08	5.59	4.10	9.18	7.33
I_x, in.^{4}	61.4	52.2	38.0	28.7	50.8	44.0
I_y, in.^{4}	36.1	30.8	22.6	17.1	20.8	18.1
r_y, in.	1.88	1.95	2.01	2.04	1.51	1.57
r_x/r_y	1.30	1.30	1.30	1.30	1.56	1.56

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS7-HSS6

Shape		HSS7×4×		HSS7×3×								HSS6×4×	
		0.250		0.500		0.375		0.250		0.180		0.500	
t_{design}, in.		0.250		0.500		0.375		0.250		0.180		0.500	
lb/ft		17.6		28.4		22.8		15.9		11.7		28.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	91.4	137	147	221	118	178	82.5	124	60.7	91.3	147	221
	6	79.0	119	107	161	88.9	134	63.7	95.8	47.5	71.4	123	184
	7	74.9	113	95.5	144	80.2	121	58.1	87.2	43.5	65.3	115	173
	8	70.4	106	83.7	126	71.2	107	52.1	78.4	39.2	59.0	107	160
	9	65.7	98.8	72.1	108	62.3	93.6	46.2	69.4	34.9	52.5	97.9	147
	10	60.8	91.4	61.0	91.7	53.6	80.5	40.3	60.6	30.7	46.1	89.0	134
	11	55.8	83.9	50.8	76.4	45.4	68.2	34.7	52.1	26.6	40.0	80.1	120
	12	50.8	76.4	42.7	64.2	38.2	57.4	29.4	44.2	22.7	34.2	71.4	107
	13	45.9	69.0	36.4	54.7	32.5	48.9	25.1	37.7	19.4	29.1	63.0	94.6
	14	41.1	61.8	31.4	47.2	28.0	42.1	21.6	32.5	16.7	25.1	55.0	82.7
	15	36.5	54.9	27.3	41.1	24.4	36.7	18.8	28.3	14.6	21.9	47.9	72.1
	16	32.2	48.4	24.0	36.1	21.5	32.3	16.6	24.9	12.8	19.2	42.1	63.3
	17	28.6	42.9	21.3	32.0	19.0	28.6	14.7	22.0	11.3	17.0	37.3	56.1
	18	25.5	38.3	19.0	28.5	17.0	25.5	13.1	19.7	10.1	15.2	33.3	50.0
	19	22.9	34.4			15.2	22.9	11.7	17.6	9.07	13.6	29.9	44.9
	20	20.6	31.0					10.6	15.9	8.19	12.3	27.0	40.5
	21	18.7	28.1							7.42	11.2	24.5	36.8
	22	17.0	25.6									22.3	33.5
	23	15.6	23.4									20.4	30.6
	24	14.3	21.5									18.7	28.1
	25	13.2	19.8										
	26	12.2	18.3										
	27	11.3	17.0										
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	5.09	8.18	6.58	4.59	3.38	8.18
I_x, in.^{4}	32.3	40.2	35.7	26.6	20.3	33.8
I_y, in.^{4}	13.5	10.1	9.08	6.95	5.38	17.7
r_y, in.	1.63	1.11	1.17	1.23	1.26	1.47
r_x/r_y	1.55	2.00	1.99	1.96	1.94	1.38

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS6

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS6×4×										HSS6×3×	
		0.375		0.312		0.250		0.180		0.120 ^{c1}		0.500	
t_{design}, in.		0.375		0.312		0.250		0.180		0.120		0.500	
lb/ft		22.8		19.2		15.9		11.7		8.01		24.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	118	178	99.3	149	82.5	124	60.7	91.3	37.8	56.7	129	194
	6	100	151	84.6	127	70.8	106	52.4	78.8	34.1	51.2	92.9	140
	7	94.5	142	79.9	120	67.0	101	49.7	74.7	32.8	49.3	82.5	124
	8	88.2	133	74.7	112	62.9	94.5	46.8	70.3	31.3	47.1	72.0	108
	9	81.6	123	69.3	104	58.5	88.0	43.6	65.6	29.7	44.7	61.6	92.6
	10	74.9	113	63.6	95.7	54.0	81.2	40.4	60.7	27.9	42.0	51.8	77.9
	11	68.0	102	58.0	87.1	49.4	74.3	37.1	55.7	25.8	38.8	43.0	64.7
	12	61.2	92.0	52.3	78.6	44.8	67.4	33.7	50.7	23.6	35.4	36.1	54.3
	13	54.6	82.1	46.8	70.4	40.3	60.6	30.5	45.8	21.4	32.1	30.8	46.3
	14	48.3	72.6	41.5	62.4	36.0	54.1	27.3	41.0	19.2	28.9	26.6	39.9
	15	42.3	63.6	36.5	54.9	31.8	47.8	24.3	36.5	17.1	25.7	23.1	34.8
	16	37.2	55.9	32.1	48.2	28.0	42.1	21.4	32.2	15.2	22.8	20.3	30.6
	17	32.9	49.5	28.4	42.7	24.8	37.3	19.0	28.5	13.4	20.2	18.0	27.1
	18	29.4	44.2	25.3	38.1	22.1	33.3	16.9	25.4	12.0	18.0	16.1	24.1
	19	26.4	39.6	22.7	34.2	19.9	29.9	15.2	22.8	10.8	16.2		
	20	23.8	35.8	20.5	30.9	17.9	26.9	13.7	20.6	9.71	14.6		
	21	21.6	32.5	18.6	28.0	16.3	24.4	12.4	18.7	8.81	13.2		
	22	19.7	29.6	17.0	25.5	14.8	22.3	11.3	17.0	8.03	12.1		
	23	18.0	27.1	15.5	23.3	13.6	20.4	10.4	15.6	7.34	11.0		
	24	16.5	24.8	14.3	21.4	12.4	18.7	9.51	14.3	6.74	10.1		
	25	15.2	22.9	13.1	19.7	11.5	17.2	8.77	13.2	6.21	9.34		
	26			12.1	18.3	10.6	15.9	8.11	12.2	5.75	8.64		
	27							7.52	11.3	5.33	8.01		
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	6.58	5.53	4.59	3.38	2.31	7.18
I_x, in.^{4}	29.7	25.5	22.1	16.8	11.8	26.2
I_y, in.^{4}	15.6	13.5	11.7	8.99	6.36	8.53
r_y, in.	1.54	1.56	1.60	1.63	1.66	1.09
r_x/r_y	1.38	1.38	1.37	1.37	1.36	1.75

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS6

Shape		HSS6×3×										HSS6×2×	
		0.375		0.312		0.250		0.180		0.120 [c1]		0.375	
t_{design}, in.		0.375		0.312		0.250		0.180		0.120		0.375	
lb/ft		20.2		17.0		14.2		10.5		7.18		17.6	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	105	157	88.2	133	73.5	110	54.3	81.5	33.4	50.3	91.3	137
	6	78.4	118	66.7	100	56.3	84.6	42.1	63.3	28.2	42.4	45.4	68.3
	7	70.6	106	60.2	90.5	51.1	76.8	38.4	57.7	26.4	39.6	35.3	53.1
	8	62.6	94.0	53.6	80.6	45.8	68.8	34.6	51.9	24.2	36.4	27.1	40.7
	9	54.6	82.0	47.0	70.6	40.3	60.6	30.7	46.1	21.6	32.4	21.4	32.2
	10	46.8	70.4	40.5	60.9	35.1	52.7	26.8	40.3	19.0	28.5	17.3	26.1
	11	39.5	59.4	34.4	51.7	30.0	45.1	23.1	34.8	16.5	24.8	14.3	21.5
	12	33.2	50.0	29.0	43.5	25.4	38.1	19.7	29.6	14.1	21.2	12.0	18.1
	13	28.3	42.6	24.7	37.1	21.6	32.5	16.8	25.2	12.1	18.1		
	14	24.4	36.7	21.3	32.0	18.6	28.0	14.5	21.7	10.4	15.6		
	15	21.3	32.0	18.5	27.9	16.2	24.4	12.6	18.9	9.05	13.6		
	16	18.7	28.1	16.3	24.5	14.3	21.5	11.1	16.6	7.96	12.0		
	17	16.6	24.9	14.4	21.7	12.6	19.0	9.80	14.7	7.05	10.6		
	18	14.8	22.2	12.9	19.4	11.3	17.0	8.75	13.1	6.29	9.45		
	19	13.3	19.9	11.6	17.4	10.1	15.2	7.85	11.8	5.64	8.48		
	20					9.13	13.7	7.08	10.6	5.09	7.66		
	21									4.62	6.94		
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	5.83	4.91	4.09	3.02	2.07	5.08
I_x, in.^{4}	23.8	20.5	17.9	13.8	9.76	17.8
I_y, in.^{4}	7.78	6.82	6.00	4.66	3.34	2.84
r_y, in.	1.16	1.18	1.21	1.24	1.27	0.748
r_x/r_y	1.74	1.73	1.73	1.73	1.71	2.50

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS6-HSS5

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS6×2×								HSS5×4×			
		0.312		0.250		0.180		0.120 [c1]		0.500		0.375	
t_{design}, in.		0.312		0.250		0.180		0.120		0.500		0.375	
lb/ft		14.9		12.4		9.23		6.35		24.9		20.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	76.9	116	64.5	96.9	47.8	71.8	29.1	43.8	129	194	105	157
	6	40.0	60.1	35.2	52.9	27.2	40.9	19.4	29.1	107	160	88.1	132
	7	31.5	47.4	28.2	42.5	22.2	33.4	16.0	24.1	99.5	150	82.7	124
	8	24.3	36.6	22.0	33.1	17.6	26.4	12.8	19.3	91.9	138	77.0	116
	9	19.2	28.9	17.4	26.1	13.9	20.8	10.2	15.3	84.0	126	70.9	107
	10	15.6	23.4	14.1	21.2	11.2	16.9	8.24	12.4	75.9	114	64.7	97.2
	11	12.9	19.3	11.6	17.5	9.29	14.0	6.81	10.2	67.9	102	58.5	87.9
	12	10.8	16.2	9.78	14.7	7.80	11.7	5.72	8.60	60.1	90.4	52.3	78.7
	13			8.34	12.5	6.65	10.0	4.88	7.33	52.7	79.2	46.4	69.8
	14							4.20	6.32	45.7	68.7	40.8	61.2
	15									39.8	59.8	35.6	53.5
	16									35.0	52.6	31.3	47.0
	17									31.0	46.6	27.7	41.6
	18									27.7	41.6	24.7	37.1
	19									24.8	37.3	22.2	33.3
	20									22.4	33.7	20.0	30.1
	21									20.3	30.5	18.2	27.3
	22									18.5	27.8	16.5	24.9
	23									16.9	25.5	15.1	22.7
	24											13.9	20.9
	25											12.8	19.2
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	HSS6×2×0.312	HSS6×2×0.250	HSS6×2×0.180	HSS6×2×0.120	HSS5×4×0.500	HSS5×4×0.375
A_g, in.^{2}	4.28	3.59	2.66	1.83	7.18	5.83
I_x, in.^{4}	15.4	13.8	10.7	7.68	20.9	18.7
I_y, in.^{4}	2.55	2.31	1.84	1.35	14.7	13.2
r_y, in.	0.772	0.802	0.832	0.859	1.43	1.50
r_x/r_y	2.46	2.44	2.42	2.39	1.20	1.19

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)


HSS5

Shape		HSS5×4×								HSS5×3×			
		0.312		0.250		0.180		0.120 ^{c1}		0.500		0.375	
t_{design}, in.		0.312		0.250		0.180		0.120		0.500		0.375	
lb/ft		17.0		14.2		10.5		7.18		21.4		17.6	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	88.2	133	73.5	110	54.3	81.5	37.1	55.8	111	167	91.3	137
	1	87.8	132	73.1	110	54.0	81.2	37.0	55.6	110	165	90.5	136
	2	86.6	130	72.2	108	53.3	80.2	36.6	55.0	107	161	88.2	133
	3	84.6	127	70.6	106	52.2	78.5	35.8	53.9	102	153	84.5	127
	4	81.8	123	68.4	103	50.7	76.1	34.8	52.3	95.1	143	79.7	120
	5	78.4	118	65.7	98.8	48.7	73.3	33.5	50.4	87.2	131	73.8	111
	6	74.5	112	62.6	94.1	46.5	69.9	32.0	48.2	78.5	118	67.2	101
	7	70.1	105	59.1	88.8	44.0	66.1	30.4	45.7	69.2	104	60.2	90.5
	8	65.3	98.2	55.3	83.0	41.2	62.0	28.6	42.9	59.9	90.0	53.0	79.7
	9	60.3	90.7	51.2	77.0	38.3	57.6	26.6	40.0	50.8	76.4	45.9	69.0
	10	55.2	82.9	47.1	70.7	35.3	53.1	24.6	37.0	42.3	63.6	39.1	58.7
	11	50.0	75.2	42.9	64.4	32.3	48.5	22.6	33.9	35.0	52.6	32.7	49.2
	12	44.9	67.5	38.7	58.2	29.3	44.0	20.5	30.8	29.4	44.2	27.5	41.3
	13	39.9	60.0	34.6	52.0	26.3	39.5	18.5	27.8	25.1	37.7	23.4	35.2
	14	35.2	52.9	30.7	46.1	23.4	35.2	16.6	24.9	21.6	32.5	20.2	30.4
	15	30.8	46.2	27.0	40.6	20.7	31.1	14.7	22.1	18.8	28.3	17.6	26.4
	16	27.0	40.6	23.7	35.7	18.2	27.4	12.9	19.5	16.6	24.9	15.5	23.2
	17	24.0	36.0	21.0	31.6	16.1	24.2	11.5	17.2	14.7	22.0	13.7	20.6
	18	21.4	32.1	18.7	28.2	14.4	21.6	10.2	15.4			12.2	18.4
	19	19.2	28.8	16.8	25.3	12.9	19.4	9.18	13.8				
	20	17.3	26.0	15.2	22.8	11.6	17.5	8.29	12.5				
	21	15.7	23.6	13.8	20.7	10.6	15.9	7.52	11.3				
	22	14.3	21.5	12.5	18.9	9.63	14.5	6.85	10.3				
	23	13.1	19.7	11.5	17.3	8.81	13.2	6.27	9.42				
	24	12.0	18.1	10.5	15.8	8.09	12.2	5.76	8.65				
	25	11.1	16.6	9.72	14.6	7.45	11.2	5.30	7.97				
	26					6.89	10.4	4.90	7.37				
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	4.91	4.09	3.02	2.07	6.18	5.08
I_x, in.^{4}	16.2	14.1	10.8	7.67	15.8	14.7
I_y, in.^{4}	11.4	9.98	7.68	5.45	6.95	6.48
r_y, in.	1.52	1.56	1.59	1.62	1.06	1.13
r_x/r_y	1.20	1.19	1.19	1.19	1.51	1.50

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS5

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS5×3×								HSS5×2×			
		0.312		0.250		0.180		0.120 [c1]		0.250		0.180	
t_{design}, in.		0.312		0.250		0.180		0.120		0.250		0.180	
lb/ft		14.9		12.4		9.23		6.35		10.7		7.98	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	76.9	116	64.5	96.9	47.8	71.8	32.8	49.3	55.5	83.4	41.3	62.1
	1	76.3	115	64.0	96.2	47.4	71.3	32.6	49.0	54.5	82.0	40.7	61.1
	2	74.4	112	62.5	94.0	46.4	69.8	32.0	48.1	51.8	77.8	38.7	58.2
	3	71.4	107	60.2	90.5	44.8	67.3	30.9	46.4	47.4	71.3	35.8	53.7
	4	67.4	101	57.1	85.8	42.5	63.9	29.4	44.2	42.0	63.1	31.9	48.0
	5	62.6	94.2	53.3	80.1	39.8	59.9	27.6	41.5	35.9	53.9	27.6	41.5
	6	57.2	86.0	49.0	73.6	36.8	55.3	25.6	38.5	29.6	44.5	23.2	34.8
	7	51.5	77.3	44.3	66.6	33.4	50.3	23.4	35.2	23.6	35.5	18.8	28.2
	8	45.5	68.4	39.5	59.4	30.0	45.1	21.1	31.7	18.3	27.5	14.8	22.2
	9	39.6	59.5	34.7	52.2	26.5	39.8	18.7	28.2	14.5	21.7	11.7	17.6
	10	33.9	50.9	30.0	45.1	23.1	34.7	16.4	24.7	11.7	17.6	9.46	14.2
	11	28.5	42.9	25.6	38.4	19.8	29.8	14.2	21.3	9.68	14.5	7.82	11.8
	12	24.0	36.1	21.5	32.4	16.8	25.2	12.1	18.2	8.13	12.2	6.57	9.87
	13	20.4	30.7	18.4	27.6	14.3	21.5	10.3	15.5	6.93	10.4	5.60	8.41
	14	17.6	26.5	15.8	23.8	12.3	18.5	8.90	13.4				
	15	15.4	23.1	13.8	20.7	10.7	16.1	7.75	11.7				
	16	13.5	20.3	12.1	18.2	9.44	14.2	6.82	10.2				
	17	12.0	18.0	10.7	16.1	8.36	12.6	6.04	9.07				
	18	10.7	16.0	9.57	14.4	7.46	11.2	5.39	8.09				
	19	9.6	14.4	8.59	12.9	6.69	10.1	4.83	7.26				
	20					6.04	9.08	4.36	6.56				
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	4.28	3.59	2.66	1.83	3.09	2.30
I_x, in.^{4}	12.7	11.3	8.74	6.24	8.48	6.64
I_y, in.^{4}	5.69	5.05	3.95	2.84	1.92	1.55
r_y, in.	1.15	1.19	1.22	1.25	0.788	0.821
r_x/r_y	1.50	1.49	1.48	1.48	2.11	2.07

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS5-HSS4

Shape		HSS5×2×		HSS4×3×								HSS4×2×	
		0.120 [c1]		0.250		0.180		0.120		0.080 [c1]		0.375	
t_{design}, in.		0.120		0.250		0.180		0.120		0.080		0.375	
lb/ft		5.51		10.7		7.98		5.51		3.75		12.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	28.5	42.8	55.5	83.4	41.3	62.1	28.6	42.9	17.7	26.6	64.3	96.7
	1	28.1	42.3	55.1	82.7	41.0	61.6	28.4	42.6	17.6	26.5	63.0	94.6
	2	26.9	40.4	53.7	80.7	40.1	60.2	27.7	41.7	17.3	26.1	59.1	88.8
	3	24.9	37.5	51.6	77.5	38.6	58.0	26.7	40.2	16.9	25.4	53.1	79.9
	4	22.4	33.7	48.7	73.2	36.6	54.9	25.4	38.1	16.3	24.5	45.8	68.9
	5	19.6	29.4	45.2	68.0	34.1	51.3	23.7	35.7	15.5	23.3	37.9	56.9
	6	16.6	24.9	41.3	62.1	31.4	47.1	21.9	32.9	14.6	21.9	30.0	45.1
	7	13.6	20.5	37.2	55.8	28.4	42.7	19.9	29.9	13.5	20.3	22.8	34.3
	8	10.9	16.3	32.9	49.4	25.3	38.1	17.8	26.7	12.3	18.4	17.4	26.2
	9	8.59	12.9	28.6	43.0	22.2	33.4	15.7	23.6	10.9	16.3	13.8	20.7
	10	6.96	10.5	24.5	36.8	19.2	28.9	13.6	20.5	9.48	14.2	11.2	16.8
	11	5.75	8.65	20.6	31.0	16.4	24.6	11.7	17.5	8.16	12.3	9.23	13.9
	12	4.83	7.26	17.3	26.0	13.8	20.7	9.86	14.8	6.92	10.4		
	13	4.12	6.19	14.8	22.2	11.8	17.7	8.41	12.6	5.90	8.87		
	14	3.55	5.34	12.7	19.1	10.1	15.2	7.25	10.9	5.09	7.65		
	15			11.1	16.7	8.83	13.3	6.31	9.49	4.43	6.66		
	16			9.74	14.6	7.76	11.7	5.55	8.34	3.89	5.85		
	17			8.63	13.0	6.88	10.3	4.92	7.39	3.45	5.19		
	18			7.70	11.6	6.13	9.22	4.38	6.59	3.08	4.63		
	19			6.91	10.4	5.51	8.27	3.93	5.91	2.76	4.15		
	20							3.55	5.34	2.49	3.75		
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.59	3.09	2.30	1.59	1.08	3.58
I_x, in.^{4}	4.81	6.45	5.05	3.65	2.54	5.75
I_y, in.^{4}	1.14	4.10	3.23	2.34	1.64	1.83
r_y, in.	0.847	1.15	1.19	1.21	1.23	0.715
r_x/r_y	2.05	1.25	1.24	1.26	1.24	1.78

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS4

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS4×2×										HSS4×1.5×	
		0.312		0.250		0.180		0.120		0.080 [c1]		0.250	
t_{design}, in.		0.312		0.250		0.180		0.120		0.080		0.250	
lb/ft		10.5		8.98		6.74		4.68		3.19		8.11	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	54.6	82.1	46.5	69.9	34.9	52.4	24.3	36.5	14.9	22.3	42.0	63.2
	1	53.5	80.5	45.7	68.7	34.3	51.5	23.9	35.9	14.7	22.1	40.6	61.1
	2	50.4	75.8	43.3	65.0	32.6	49.0	22.8	34.2	14.3	21.4	36.8	55.2
	3	45.6	68.6	39.5	59.3	30.0	45.0	21.0	31.6	13.5	20.3	31.1	46.7
	4	39.7	59.7	34.8	52.2	26.6	40.0	18.8	28.3	12.5	18.8	24.6	36.9
	5	33.2	49.8	29.5	44.3	22.9	34.4	16.4	24.6	11.3	16.9	18.2	27.3
	6	26.6	40.0	24.1	36.3	19.0	28.6	13.7	20.7	9.61	14.4	12.8	19.2
	7	20.5	30.9	19.0	28.6	15.3	23.0	11.2	16.8	7.89	11.9	9.40	14.1
	8	15.7	23.7	14.7	22.1	11.9	17.9	8.85	13.3	6.29	9.46	7.20	10.8
	9	12.4	18.7	11.6	17.4	9.42	14.2	6.99	10.5	4.98	7.48	5.69	8.55
	10	10.1	15.1	9.39	14.1	7.63	11.5	5.66	8.51	4.03	6.06		
	11	8.33	12.5	7.76	11.7	6.31	9.48	4.68	7.03	3.33	5.01		
	12	7.00	10.5	6.52	9.81	5.30	7.97	3.93	5.91	2.80	4.21		
	13					4.52	6.79	3.35	5.03	2.39	3.59		
	14									2.06	3.09		
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	3.04	2.59	1.94	1.35	0.921	2.34
I_x, in.^{4}	5.04	4.69	3.73	2.74	1.93	3.81
I_y, in.^{4}	1.65	1.54	1.25	0.927	0.660	0.755
r_y, in.	0.737	0.771	0.803	0.829	0.847	0.568
r_x/r_y	1.75	1.75	1.73	1.71	1.71	2.25

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS4-HSS3

Shape		HSS4×1.5×								HSS3×2×			
		0.180		0.120		0.083 [c1]		0.063 [c1]		0.250		0.180	
t_{design}, in.		0.180		0.120		0.083		0.063		0.250		0.180	
lb/ft		6.11		4.26		3.02		2.30		7.24		5.49	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	31.6	47.5	22.1	33.2	14.2	21.3	9.14	13.7	37.5	56.4	28.4	42.7
	1	30.7	46.1	21.5	32.3	13.9	21.0	9.01	13.5	36.8	55.3	27.9	41.9
	2	28.0	42.1	19.8	29.7	13.2	19.9	8.63	13.0	34.7	52.2	26.4	39.7
	3	24.1	36.2	17.2	25.9	12.1	18.1	7.99	12.0	31.5	47.3	24.1	36.3
	4	19.5	29.3	14.2	21.3	10.3	15.4	7.12	10.7	27.4	41.2	21.3	31.9
	5	14.9	22.3	11.0	16.6	8.11	12.2	6.03	9.06	23.0	34.5	18.1	27.1
	6	10.7	16.1	8.14	12.2	6.07	9.13	4.72	7.10	18.5	27.8	14.8	22.2
	7	7.86	11.8	5.98	8.99	4.47	6.72	3.48	5.24	14.3	21.5	11.7	17.6
	8	6.02	9.05	4.58	6.89	3.42	5.14	2.67	4.01	11.0	16.5	9.02	13.6
	9	4.76	7.15	3.62	5.44	2.70	4.06	2.11	3.17	8.67	13.0	7.13	10.7
	10			2.93	4.41	2.19	3.29	1.71	2.57	7.02	10.6	5.78	8.7
	11									5.80	8.72	4.77	7.17
	12									4.88	7.33	4.01	6.03
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

	HSS4×1.5×0.180	HSS4×1.5×0.120	HSS4×1.5×0.083	HSS4×1.5×0.063	HSS3×2×0.250	HSS3×2×0.180
A_g, in.^{2}	1.76	1.23	0.871	0.662	2.09	1.58
I_x, in.^{4}	3.08	2.29	1.68	1.29	2.21	1.80
I_y, in.^{4}	0.631	0.481	0.359	0.280	1.15	0.947
r_y, in.	0.599	0.625	0.642	0.650	0.742	0.774
r_x/r_y	2.20	2.18	2.17	2.15	1.39	1.38

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS3

Table 4-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS3×2×				HSS3×1.5×							
		0.120		0.080		0.250		0.180		0.120		0.083	
t_{design}, in.		0.120		0.080		0.250		0.180		0.120		0.083	
lb/ft		3.85		2.64		6.38		4.86		3.43		2.45	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	19.9	30.0	13.7	20.5	33.1	49.7	25.1	37.8	17.8	26.7	12.7	19.0
	1	19.6	29.5	13.5	20.2	31.9	47.9	24.4	36.6	17.3	26.0	12.3	18.5
	2	18.6	28.0	12.8	19.3	28.6	43.0	22.1	33.2	15.8	23.8	11.3	17.0
	3	17.1	25.8	11.8	17.8	23.9	36.0	18.8	28.3	13.7	20.5	9.87	14.8
	4	15.2	22.9	10.6	15.9	18.6	28.0	15.0	22.6	11.1	16.7	8.14	12.2
	5	13.1	19.7	9.14	13.7	13.5	20.3	11.3	16.9	8.55	12.8	6.34	9.54
	6	10.9	16.4	7.65	11.5	9.43	14.2	8.01	12.0	6.20	9.32	4.68	7.03
	7	8.75	13.2	6.21	9.33	6.93	10.4	5.89	8.85	4.56	6.85	3.44	5.17
	8	6.82	10.3	4.88	7.33	5.31	7.98	4.51	6.77	3.49	5.24	2.63	3.96
	9	5.39	8.10	3.85	5.79	4.19	6.30	3.56	5.35	2.76	4.14	2.08	3.13
	10	4.37	6.56	3.12	4.69					2.23	3.36	1.69	2.53
	11	3.61	5.43	2.58	3.88								
	12	3.03	4.56	2.17	3.26								
	13	2.58	3.88	1.85	2.78								
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.11	0.761	1.84	1.40	0.990	0.705
I_x, in.^{4}	1.35	0.957	1.73	1.44	1.10	0.814
I_y, in.^{4}	0.715	0.512	0.557	0.473	0.366	0.276
r_y, in.	0.803	0.820	0.550	0.581	0.608	0.626
r_x/r_y	1.37	1.37	1.76	1.74	1.73	1.71

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in
Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS3-HSS2.5

Shape		HSS3×1.5×		HSS3×1×								HSS2.5×1.5×	
		0.060 [c1]		0.180		0.120		0.080		0.060 [c1]		0.250	
t_{design}, in.		0.060		0.180		0.120		0.080		0.060		0.250	
lb/ft		1.79		4.24		3.02		2.08		1.58		5.51	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	8.39	12.6	21.9	32.9	15.6	23.5	10.8	16.2	7.31	11.0	28.6	42.9
	1	8.24	12.4	20.3	30.5	14.6	22.0	10.2	15.3	7.04	10.6	27.5	41.3
	2	7.79	11.7	16.2	24.3	12.0	18.0	8.46	12.7	6.24	9.38	24.6	36.9
	3	7.06	10.6	11.0	16.6	8.60	12.9	6.24	9.38	4.82	7.25	20.4	30.6
	4	6.03	9.06	6.61	9.94	5.42	8.14	4.08	6.13	3.19	4.80	15.7	23.5
	5	4.73	7.12	4.23	6.36	3.47	5.21	2.61	3.93	2.05	3.08	11.2	16.8
	6	3.52	5.30	2.94	4.42	2.41	3.62	1.81	2.73	1.42	2.14	7.77	11.7
	7	2.59	3.89					1.33	2.00	1.05	1.57	5.71	8.58
	8	1.98	2.98									4.37	6.57
	9	1.57	2.36										
	10	1.27	1.91										
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.516	1.22	0.870	0.601	0.456	1.59
I_x, in.^{4}	0.606	1.08	0.847	0.616	0.477	1.05
I_y, in.^{4}	0.208	0.173	0.142	0.107	0.084	0.458
r_y, in.	0.635	0.377	0.404	0.422	0.429	0.537
r_x/r_y	1.70	2.50	2.44	2.39	2.38	1.51

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS2.5

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS2.5×1.5×								HSS2.5×1×			
		0.180		0.120		0.083		0.063		0.120		0.083	
t_{design}, in.		0.180		0.120		0.083		0.063		0.120		0.083	
lb/ft		4.24		3.02		2.16		1.64		2.60		1.87	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	21.9	32.9	15.6	23.5	11.2	16.8	8.51	12.8	13.5	20.3	9.68	14.6
	1	21.2	31.9	15.2	22.8	10.9	16.3	8.28	12.4	12.6	18.9	9.09	13.7
	2	19.2	28.8	13.8	20.8	10.0	15.0	7.61	11.4	10.2	15.4	7.52	11.3
	3	16.2	24.3	11.9	17.9	8.62	13.0	6.61	9.94	7.26	10.9	5.48	8.24
	4	12.8	19.2	9.59	14.4	7.04	10.6	5.43	8.16	4.51	6.78	3.52	5.30
	5	9.46	14.2	7.29	11.0	5.43	8.17	4.22	6.34	2.89	4.34	2.25	3.39
	6	6.67	10.0	5.24	7.87	3.96	5.95	3.10	4.66	2.00	3.01	1.57	2.35
	7	4.90	7.37	3.85	5.78	2.91	4.37	2.28	3.42				
	8	3.75	5.64	2.95	4.43	2.23	3.35	1.74	2.62				
	9	2.97	4.46	2.33	3.50	1.76	2.65	1.38	2.07				
	10					1.43	2.14	1.12	1.68				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		1.22		0.870		0.622		0.474		0.750		0.539	
I_x, in.^{4}		0.892		0.692		0.518		0.403		0.522		0.397	
I_y, in.^{4}		0.394		0.309		0.234		0.183		0.118		0.092	
r_y, in.		0.568		0.596		0.613		0.621		0.397		0.414	
r_x/r_y		1.51		1.50		1.49		1.48		2.10		2.07	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS2.5-HSS2

Shape		HSS2.5×1×		HSS2×1.5×						HSS2×1×			
		0.063		0.120		0.080		0.060		0.180		0.120	
t_{design}, in.		0.063		0.120		0.080		0.060		0.180		0.120	
lb/ft		1.43		2.60		1.81		1.37		2.99		2.18	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	7.40	11.1	13.5	20.3	9.36	14.1	7.11	10.7	15.5	23.3	11.3	17.0
	1	6.96	10.5	13.0	19.6	9.08	13.6	6.91	10.4	14.2	21.4	10.5	15.8
	2	5.80	8.72	11.8	17.8	8.29	12.5	6.32	9.50	11.1	16.7	8.49	12.8
	3	4.28	6.43	10.1	15.2	7.12	10.7	5.45	8.19	7.30	11.0	5.92	8.90
	4	2.80	4.20	8.05	12.1	5.75	8.65	4.43	6.66	4.26	6.40	3.62	5.44
	5	1.79	2.69	6.02	9.05	4.38	6.58	3.39	5.10	2.73	4.10	2.31	3.48
	6	1.24	1.87	4.28	6.43	3.15	4.73	2.46	3.69			1.61	2.42
	7	0.914	1.37	3.14	4.72	2.31	3.48	1.81	2.71				
	8			2.41	3.62	1.77	2.66	1.38	2.08				
	9			1.90	2.86	1.40	2.10	1.09	1.64				
	10							0.884	1.33				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.412	0.750	0.521	0.396	0.862	0.630
I_x, in.^{4}	0.310	0.396	0.291	0.226	0.349	0.290
I_y, in.^{4}	0.073	0.252	0.186	0.145	0.112	0.095
r_y, in.	0.422	0.580	0.597	0.605	0.360	0.388
r_x/r_y	2.05	1.25	1.25	1.25	1.77	1.75

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS2-HSS1.5

Table 4-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS2×1×				HSS1.5×1×					
		0.080		0.060		0.120		0.080		0.060	
t_{design}, in.		0.080		0.060		0.120		0.080		0.060	
lb/ft		1.53		1.16		1.77		1.25		0.957	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	7.92	11.9	6.04	9.07	9.16	13.8	6.49	9.75	4.96	7.45
	1	7.42	11.1	5.67	8.52	8.48	12.7	6.04	9.08	4.63	6.97
	2	6.09	9.15	4.69	7.04	6.73	10.1	4.89	7.35	3.79	5.69
	3	4.38	6.59	3.42	5.14	4.58	6.88	3.44	5.17	2.70	4.06
	4	2.77	4.17	2.20	3.30	2.74	4.11	2.12	3.18	1.69	2.54
	5	1.77	2.67	1.41	2.11	1.75	2.63	1.35	2.04	1.08	1.63
	6	1.23	1.85	0.976	1.47	1.22	1.83	0.940	1.41	0.752	1.13
	7										
	8										
	9										
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										
	20										
	21										
	22										
	23										
	24										
	25										
	26										
	27										
	28										
	29										
	30										

Properties

A_g, in.^{2}	0.441	0.336	0.510	0.361	0.276
I_x, in.^{4}	0.217	0.170	0.137	0.105	0.083
I_y, in.^{4}	0.073	0.058	0.072	0.056	0.044
r_y, in.	0.406	0.414	0.375	0.392	0.401
r_x/r_y	1.73	1.72	1.38	1.38	1.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS32-HSS24

Table 4-3

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS32×16×		HSS32×8×		HSS28×8×				HSS24×16×			
		0.375 [c1]		0.375 [c1]		0.375 [c1]		0.312 [c1]		0.375 [c1]		0.312 [c1]	
t_{design}, in.		0.375		0.375		0.375		0.312		0.375		0.312	
lb/ft		121		100		90.0		75.4		100		84.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	433	650	325	488	322	485	239	360	427	641	302	454
	6	431	648	321	482	317	477	236	355	424	638	301	452
	7	430	647	319	479	316	474	235	353	423	636	301	452
	8	429	645	317	477	314	471	234	351	422	635	300	451
	9	428	644	315	474	311	468	232	349	421	633	300	450
	10	427	642	313	470	309	464	230	346	420	631	299	449
	11	426	641	310	466	306	460	228	343	419	629	298	448
	12	425	639	307	462	303	455	226	340	417	627	298	447
	13	424	637	304	458	299	450	224	337	415	624	297	446
	14	422	635	301	453	296	444	222	333	414	622	296	445
	15	421	633	298	447	292	438	219	329	412	619	295	444
	16	419	630	294	442	288	432	216	325	410	616	294	442
	17	418	628	290	436	283	426	214	321	408	613	293	441
	18	416	625	286	430	278	418	210	316	405	609	292	439
	19	414	622	281	423	273	411	207	311	403	605	291	438
	20	412	619	277	416	268	403	204	306	400	602	290	436
	21	410	616	272	409	263	395	200	301	398	598	289	434
	22	408	613	267	401	257	387	197	295	395	593	287	432
	23	405	609	262	393	251	378	193	290	392	589	286	430
	24	403	605	256	385	245	368	189	283	389	585	285	428
	25	400	602	250	376	239	359	184	277	386	580	283	426
	26	398	598	244	367	232	349	180	271	383	575	282	423
	27	395	594	238	358	225	338	176	264	379	570	280	421
	28	392	590	232	348	218	328	171	257	376	565	278	418
	29	389	585	225	338	210	316	166	250	372	559	276	416
	30	386	581	218	328	203	305	161	242	368	554	275	413
	32	380	572	204	306	187	281	151	227	361	542	271	407
	34	374	562	188	283	169	255	140	210	353	530	267	401
	36	367	551	172	258	152	228	128	192	344	517	262	394
	38	360	541	154	232	136	205	116	174	335	504	258	387
	40	352	529	139	209	123	185	104	157	326	490	252	379

Properties

	HSS32×16× 0.375	HSS32×8× 0.375	HSS28×8× 0.375	HSS28×8× 0.312	HSS24×16× 0.375	HSS24×16× 0.312
A_g, in.^{2}	35.0	29.0	26.0	21.7	29.0	24.2
I_x, in.^{4}	4790	3280	2320	1960	2390	2020
I_y, in.^{4}	1660	365	322	274	1290	1090
r_y, in.	6.89	3.55	3.52	3.55	6.67	6.71
r_x/r_y	1.70	2.99	2.68	2.68	1.36	1.36

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS24-HSS20

Shape		HSS24×8×				HSS20×16×							
		0.375 ^{c1}		0.312 ^{c1}		0.625		0.500		0.375 ^{c1}		0.312 ^{c1}	
t_{design}, in.		0.375		0.312		0.625		0.500		0.375		0.312	
lb/ft		79.6		66.7		146		118		90.0		75.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	**0**	319	479	237	357	756	1140	613	921	422	634	299	450
	6	313	471	234	351	749	1130	607	912	419	630	298	448
	7	311	468	232	349	747	1120	605	909	418	628	297	447
	8	309	464	231	347	744	1120	603	906	417	626	297	446
	9	306	460	229	344	740	1110	600	902	415	624	296	445
	10	303	456	227	341	737	1110	597	897	414	622	296	444
	11	300	451	225	338	733	1100	594	892	412	620	295	443
	12	296	445	222	334	728	1090	590	887	411	617	294	442
	13	293	440	220	331	723	1090	586	881	409	614	293	441
	14	288	433	217	326	718	1080	582	875	407	611	292	439
	15	284	427	214	322	713	1070	578	869	405	608	291	438
	16	279	420	211	317	707	1060	573	862	402	604	290	436
	17	274	412	208	312	701	1050	569	855	400	601	289	435
	18	269	404	204	307	694	1040	563	847	397	597	288	433
	19	263	396	201	302	688	1030	558	839	394	593	287	431
	20	257	387	197	296	681	1020	552	830	391	588	285	429
	21	251	377	193	290	673	1010	547	822	388	584	284	427
	22	245	368	189	283	666	1000	541	813	385	579	282	424
	23	238	358	184	277	658	989	534	803	382	574	281	422
	24	231	347	180	270	650	977	528	794	378	569	279	419
	25	224	336	175	263	641	964	521	784	375	563	277	417
	26	216	325	170	255	633	951	515	773	371	558	276	414
	27	208	313	165	248	624	938	508	763	367	552	274	411
	28	200	301	160	240	615	924	500	752	363	546	272	408
	29	192	289	154	232	606	911	493	741	359	540	270	405
	30	183	276	148	223	596	897	486	730	355	534	268	402
	32	165	248	137	206	577	868	470	707	347	521	263	395
	34	147	221	124	187	558	838	455	683	337	507	258	388
	36	131	197	111	167	537	808	438	659	328	493	253	380
	38	118	177	100	150	517	777	422	634	318	478	248	372
	40	106	160	90.2	136	496	745	405	609	307	462	242	363

Properties

A_g, in.^{2}	23.0	19.2	42.1	34.1	26.0	21.7
I_x, in.^{4}	1550	1320	2430	2010	1550	1310
I_y, in.^{4}	278	237	1730	1430	1110	936
r_y, in.	3.48	3.51	6.41	6.48	6.53	6.57
r_x/r_y	2.36	2.36	1.19	1.19	1.18	1.18

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS20

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS20×12×										HSS20×8×	
		0.625		0.500		0.375 ^{c1}		0.312 ^{c1}		0.250 ^{c1}		0.625	
t_{design}, in.		0.625		0.500		0.375		0.312		0.250		0.625	
lb/ft		129		105		79.6		66.7		53.9		111	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	666	1000	541	813	368	553	279	420	193	290	577	867
	6	656	986	532	800	364	547	277	416	192	288	556	836
	7	652	980	529	795	363	545	276	414	191	288	549	826
	8	647	973	526	790	361	542	275	413	191	287	541	814
	9	643	966	522	784	359	540	273	411	190	286	532	800
	10	637	957	517	778	357	537	272	409	190	285	522	785
	11	631	948	513	771	355	533	270	406	189	284	512	769
	12	625	939	507	763	352	530	269	404	188	283	500	752
	13	618	928	502	754	350	526	267	401	187	282	488	733
	14	610	917	496	745	347	521	265	398	187	280	475	714
	15	602	905	490	736	344	517	263	395	186	279	462	694
	16	594	892	483	726	341	512	261	392	184	277	448	673
	17	585	879	476	716	337	507	258	388	183	276	433	651
	18	576	865	469	705	333	501	256	384	182	274	419	629
	19	566	851	461	693	330	495	253	380	181	272	404	606
	20	556	836	453	681	326	489	250	376	180	270	388	584
	21	546	821	445	669	321	483	247	372	178	268	373	560
	22	536	805	437	657	317	477	244	367	177	266	357	537
	23	525	789	428	644	313	470	241	363	175	263	342	514
	24	514	772	420	631	308	463	238	358	174	261	326	490
	25	503	756	411	617	303	455	235	353	172	258	311	467
	26	491	738	401	603	298	448	231	348	170	256	295	444
	27	480	721	392	590	293	440	228	342	168	253	280	421
	28	468	703	383	575	287	432	224	337	166	250	266	399
	29	456	685	373	561	282	423	220	331	164	246	251	377
	30	444	667	364	547	276	415	216	325	161	242	237	356
	32	420	631	344	518	264	397	208	313	156	234	210	315
	34	396	595	325	488	251	378	199	300	150	226	186	279
	36	371	558	306	459	237	356	190	286	144	217	166	249
	38	347	522	286	430	222	334	181	272	138	208	149	223
	40	324	487	267	402	208	312	172	258	132	198	134	202
Properties													
A_g, in.^{2}		37.1		30.1		23.0		19.2		15.5		32.1	
I_x, in.^{4}		1960		1630		1260		1070		873		1490	
I_y, in.^{4}		892		742		579		491		401		352	
r_y, in.		4.90		4.96		5.02		5.06		5.09		3.31	
r_x/r_y		1.48		1.48		1.47		1.48		1.47		2.06	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS20

Shape		HSS20×8×								HSS20×4×			
		0.500		0.375 ^{c1}		0.312 ^{c1}		0.250 ^{c1}		0.375 ^{c1}		0.312 ^{c1}	
t_{design}, in.		0.500		0.375		0.312		0.250		0.375		0.312	
lb/ft		90.7		69.2		58.1		46.9		58.8		49.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	469	705	314	472	234	352	167	251	260	391	191	288
	6	453	681	307	462	230	346	164	247	240	361	179	269
	7	447	673	305	458	228	343	163	245	233	350	175	262
	8	441	663	302	454	227	341	162	243	225	338	169	255
	9	434	652	299	449	225	338	161	242	215	324	164	246
	10	426	641	296	444	222	334	159	239	205	308	157	236
	11	418	628	292	438	220	330	158	237	193	291	150	225
	12	409	614	288	432	217	326	156	234	179	269	142	214
	13	399	600	283	425	214	322	154	232	163	245	133	201
	14	389	585	278	418	211	317	152	229	148	222	124	187
	15	378	569	273	410	208	312	150	226	133	199	114	171
	16	367	552	268	402	204	307	148	222	118	178	103	154
	17	356	535	262	393	200	301	145	219	105	158	91.4	137
	18	344	517	256	384	196	295	143	215	93.6	141	81.5	123
	19	332	499	249	374	192	288	140	211	84.0	126	73.2	110
	20	320	481	242	364	187	282	137	207	75.8	114	66.0	99.3
	21	308	463	235	353	183	275	135	202	68.8	103	59.9	90.0
	22	295	444	228	342	178	267	131	198	62.7	94.2	54.6	82.0
	23	283	425	220	331	173	260	128	193	57.3	86.2	49.9	75.1
	24	271	407	211	317	168	252	125	188	52.7	79.2	45.9	68.9
	25	258	388	201	303	162	244	122	183	48.5	72.9	42.3	63.5
	26	246	370	192	289	156	235	118	178	44.9	67.4	39.1	58.7
	27	234	352	183	275	151	226	115	172	41.6	62.5	36.2	54.5
	28	222	334	174	261	145	217	111	167	38.7	58.2	33.7	50.6
	29	210	316	165	248	138	208	107	161			31.4	47.2
	30	199	299	156	235	132	199	103	155				
	32	176	265	139	209	119	178	94.9	143				
	34	156	235	123	186	106	159	86.3	130				
	36	140	210	110	166	94.1	141	77.4	116				
	38	125	188	98.9	149	84.5	127	69.5	104				
	40	113	170	89.2	134	76.2	115	62.7	94.3				

Properties

A_g, in.^{2}	26.1	20.0	16.7	13.5	17.0	14.3
I_x, in.^{4}	1250	976	829	678	687	587
I_y, in.^{4}	297	234	200	164	49.8	43.3
r_y, in.	3.37	3.42	3.46	3.49	1.71	1.74
r_x/r_y	2.05	2.04	2.04	2.03	3.72	3.68

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS20-HSS18

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS20×4×		HSS18×6×									
		0.250 ^{c1}		0.625		0.500		0.375 ^{c1}		0.312 ^{c1}		0.250 ^{c1}	
t_{design}, in.		0.250		0.625		0.500		0.375		0.312		0.250	
lb/ft		40.0		94.0		76.8		58.8		49.4		40.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	131	197	487	732	397	597	283	426	212	318	148	222
	6	124	186	456	686	373	561	272	410	205	308	144	216
	7	121	183	446	670	365	549	269	404	202	304	142	214
	8	119	178	434	652	356	535	264	397	199	299	140	211
	9	115	173	421	632	346	520	259	389	196	294	138	208
	10	112	168	406	611	335	503	253	380	192	288	136	205
	11	108	162	391	588	323	485	247	371	188	282	134	201
	12	103	155	375	564	311	467	240	361	183	275	131	197
	13	98.4	148	359	539	298	447	231	348	178	268	128	193
	14	93.2	140	342	514	284	427	221	333	173	260	125	188
	15	87.6	132	324	487	270	406	211	317	168	252	122	183
	16	81.5	123	307	461	257	386	201	302	162	243	118	178
	17	74.9	113	289	434	242	364	190	286	155	233	114	172
	18	67.8	102	271	408	228	343	179	270	149	223	111	166
	19	60.9	91.5	254	381	214	322	169	254	142	213	106	160
	20	55.0	82.6	236	355	201	302	158	238	134	202	102	153
	21	49.9	74.9	220	330	187	281	148	223	126	189	97.5	147
	22	45.4	68.3	203	305	174	261	138	207	118	177	92.8	139
	23	41.6	62.5	187	282	161	242	128	193	109	164	87.9	132
	24	38.2	57.4	172	259	149	223	119	178	101	152	82.7	124
	25	35.2	52.9	159	239	137	206	110	165	93.7	141	77.3	116
	26	32.5	48.9	147	221	127	190	101	152	86.6	130	71.8	108
	27	30.2	45.3	136	205	117	177	94.0	141	80.3	121	66.6	100
	28	28.0	42.1	127	190	109	164	87.4	131	74.7	112	61.9	93.1
	29	26.1	39.3	118	177	102	153	81.5	122	69.6	105	57.7	86.7
	30			110	166	95.2	143	76.1	114	65.0	97.8	53.9	81.1
	32			96.9	146	83.6	126	66.9	101	57.2	85.9	47.4	71.2
	34			85.9	129	74.1	111	59.3	89.1	50.6	76.1	42.0	63.1
	36			76.6	115	66.1	99.3	52.9	79.5	45.2	67.9	37.5	56.3
	38			68.7	103	59.3	89.1	47.4	71.3	40.5	60.9	33.6	50.5
	40			62.0	93.2	53.5	80.4	42.8	64.4	36.6	55.0	30.3	45.6

Properties

A_g, in.^{2}	11.5	27.1	22.1	17.0	14.3	11.5
I_x, in.^{4}	483	949	800	632	539	442
I_y, in.^{4}	36.2	163	140	112	96.1	79.5
r_y, in.	1.77	2.45	2.52	2.57	2.59	2.63
r_x/r_y	3.66	2.42	2.39	2.37	2.37	2.36

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS16

Shape		HSS16×12×										HSS16×4×	
		0.625		0.500		0.375 [c1]		0.312 [c1]		0.250 [c1]		0.375 [c1]	
t_{design}, in.		0.625		0.500		0.375		0.312		0.250		0.375	
lb/ft		111		90.7		69.2		58.1		46.9		48.4	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	577	867	469	705	359	540	275	413	191	287	251	378
	6	567	852	461	693	353	531	272	408	189	285	219	330
	7	563	847	458	689	351	528	271	407	189	284	209	314
	8	559	841	455	684	349	525	269	405	188	283	197	297
	9	555	834	452	679	346	520	268	402	188	282	185	278
	10	550	826	448	673	343	516	266	400	187	281	172	259
	11	544	818	443	666	340	511	264	397	186	280	159	239
	12	538	809	439	659	336	506	262	394	185	278	146	219
	13	532	800	433	651	333	500	260	391	184	277	132	199
	14	525	789	428	643	329	494	258	388	183	275	120	180
	15	518	779	422	635	324	487	255	384	182	273	107	161
	16	510	767	416	626	320	481	253	380	181	272	95.2	143
	17	503	755	410	616	315	473	250	376	179	269	84.4	127
	18	494	743	403	606	310	466	247	371	178	267	75.3	113
	19	486	730	396	596	305	458	244	367	176	265	67.6	102
	20	477	716	389	585	299	450	241	362	175	263	61.0	91.7
	21	467	703	382	574	294	442	237	357	173	260	55.3	83.2
	22	458	688	374	563	288	433	234	351	171	257	50.4	75.8
	23	448	674	367	551	282	424	230	346	169	255	46.1	69.3
	24	438	659	359	539	276	416	226	340	167	252	42.4	63.7
	25	428	644	351	527	270	406	222	334	165	249	39.0	58.7
	26	418	628	343	515	264	397	218	328	163	245	36.1	54.2
	27	408	612	334	502	258	388	214	322	160	241	33.5	50.3
	28	397	597	326	490	251	378	210	315	158	237	31.1	46.8
	29	386	581	317	477	245	368	205	309	155	232		
	30	376	565	309	464	239	359	201	302	152	228		
	32	354	532	291	438	225	339	190	286	145	219		
	34	333	500	274	412	212	319	179	269	139	209		
	36	311	468	257	386	199	299	168	253	132	199		
	38	290	436	240	360	186	280	158	237	125	188		
	40	269	405	223	335	173	261	147	221	118	177		

Properties

A_g, in.^{2}	32.1	26.1	20.0	16.7	13.5	14.0
I_x, in.^{4}	1140	948	741	629	514	374
I_y, in.^{4}	730	610	477	406	332	39.9
r_y, in.	4.77	4.83	4.88	4.93	4.96	1.69
r_x/r_y	1.25	1.25	1.25	1.25	1.24	3.06

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS16-HSS14

Table 4-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS16×4×						HSS14×10×					
		0.312 [c1]		0.250 [c1]		0.180 [c1]		0.625		0.500		0.375	
t_{design}, in.		0.312		0.250		0.180		0.625		0.500		0.375	
lb/ft		40.8		33.1		24.1		94.0		76.8		58.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	187	281	129	195	75.9	114	487	732	397	597	305	459
	6	172	259	121	182	71.9	108	475	714	387	582	298	448
	7	167	250	118	177	70.5	106	471	707	384	577	296	445
	8	160	241	114	172	68.9	104	466	700	380	572	293	440
	9	154	231	110	166	67.0	101	460	692	376	565	290	435
	10	146	219	106	159	65.0	97.7	454	683	371	558	286	430
	11	136	205	101	152	62.7	94.3	448	673	366	550	282	424
	12	125	188	95.6	144	60.3	90.6	440	662	360	542	278	418
	13	114	172	89.8	135	57.6	86.6	433	651	354	532	273	411
	14	103	155	83.5	125	54.8	82.3	425	639	348	523	269	404
	15	93.0	140	76.7	115	51.7	77.7	416	626	341	513	264	396
	16	83.0	125	69.3	104	48.5	72.8	408	613	334	502	258	388
	17	73.7	111	61.7	92.7	45.0	67.6	398	599	327	491	253	380
	18	65.7	98.8	55.0	82.7	41.2	62.0	389	584	319	480	247	371
	19	59.0	88.7	49.4	74.2	37.3	56.0	379	569	311	468	241	362
	20	53.3	80.0	44.6	67.0	33.6	50.6	369	554	303	456	235	353
	21	48.3	72.6	40.4	60.8	30.5	45.9	358	539	295	443	229	344
	22	44.0	66.1	36.8	55.4	27.8	41.8	348	523	287	431	223	334
	23	40.3	60.5	33.7	50.7	25.4	38.2	337	507	278	418	216	325
	24	37.0	55.6	31.0	46.5	23.4	35.1	326	490	269	405	210	315
	25	34.1	51.2	28.5	42.9	21.5	32.4	315	474	261	392	203	305
	26	31.5	47.4	26.4	39.6	19.9	29.9	304	458	252	378	196	295
	27	29.2	43.9	24.5	36.8	18.5	27.7	293	441	243	365	190	285
	28	27.2	40.8	22.7	34.2	17.2	25.8	282	424	234	352	183	275
	29			21.2	31.9	16.0	24.0	271	408	225	339	176	265
	30							261	392	216	325	170	255
	32							239	359	199	299	156	235
	34							218	328	182	274	143	215
	36							198	297	166	249	131	197
	38							179	269	150	226	119	178
	40							161	242	136	204	107	161
Properties													
A_g, in.^{2}		11.8		9.54		6.96		27.1		22.1		17.0	
I_x, in.^{4}		321		266		198		711		598		470	
I_y, in.^{4}		34.8		29.1		22.0		422		356		281	
r_y, in.		1.72		1.75		1.78		3.95		4.01		4.07	
r_x/r_y		3.03		3.02		2.99		1.30		1.30		1.29	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS14

Shape		HSS14×10×				HSS14×6×							
		0.312 ^{c1}		0.250 ^{c1}		0.625		0.500		0.375		0.312 ^{c1}	
t_{design}, in.		0.312		0.250		0.625		0.500		0.375		0.312	
lb/ft		49.4		40.0		76.6		62.9		48.4		40.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	251	377	181	272	397	597	325	489	251	378	206	310
	6	247	371	178	268	371	558	305	458	236	355	197	296
	7	245	368	177	266	362	544	298	447	231	347	194	292
	8	243	365	176	265	352	529	290	435	225	339	190	286
	9	241	362	175	263	341	512	281	422	219	329	185	278
	10	239	359	173	260	329	494	271	408	212	318	179	269
	11	236	355	172	258	316	475	261	393	204	307	173	260
	12	234	351	170	255	303	455	251	377	196	295	166	250
	13	230	346	168	252	289	434	240	360	188	283	160	240
	14	226	340	166	249	275	413	228	343	180	270	153	229
	15	222	334	164	246	260	391	217	326	171	257	145	218
	16	218	327	161	243	245	369	205	308	162	243	138	207
	17	213	320	159	239	231	346	193	290	153	230	130	196
	18	208	313	156	235	216	324	181	272	144	217	123	185
	19	204	306	154	231	201	303	169	255	135	203	116	174
	20	199	298	151	227	187	281	158	237	126	190	108	163
	21	193	291	148	222	173	260	147	220	118	177	101	152
	22	188	283	145	218	160	240	136	204	109	164	94.0	141
	23	183	275	142	213	147	221	125	188	101	152	87.2	131
	24	177	266	138	208	135	203	115	173	93.4	140	80.6	121
	25	172	258	135	203	124	187	106	159	86.1	129	74.3	112
	26	166	250	131	198	115	173	98.1	147	79.6	120	68.7	103
	27	161	241	128	192	107	160	90.9	137	73.8	111	63.7	95.8
	28	155	233	124	187	99.1	149	84.6	127	68.6	103	59.3	89.1
	29	149	225	120	181	92.4	139	78.8	118	64.0	96.2	55.2	83.0
	30	144	216	117	175	86.3	130	73.7	111	59.8	89.9	51.6	77.6
	32	133	200	108	163	75.9	114	64.7	97.3	52.6	79.0	45.4	68.2
	34	122	183	100	150	67.2	101	57.3	86.2	46.6	70.0	40.2	60.4
	36	111	167	91.0	137	59.9	90.1	51.2	76.9	41.5	62.4	35.8	53.9
	38	101	152	82.9	125	53.8	80.8	45.9	69.0	37.3	56.0	32.2	48.4
	40	91.7	138	75.2	113	48.5	73.0	41.4	62.3	33.6	50.6	29.0	43.6

Properties

A_g, in.^{2}	14.3	11.5	22.1	18.1	14.0	11.8
I_x, in.^{4}	401	328	487	415	331	284
I_y, in.^{4}	240	197	127	109	88.0	75.9
r_y, in.	4.10	4.14	2.40	2.45	2.51	2.54
r_x/r_y	1.29	1.29	1.95	1.96	1.94	1.93

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS14-HSS12

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS14×6×				HSS12×8×							
		0.250 [c1]		0.180 [c1]		0.625		0.500		0.375		0.312	
t_{design}, in.		0.250		0.180		0.625		0.500		0.375		0.312	
lb/ft		33.1		24.1		76.6		62.9		48.4		40.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	146	219	88.3	133	397	597	325	489	251	378	212	319
	6	141	211	85.6	129	382	573	313	470	242	364	204	307
	7	139	208	84.6	127	376	565	309	464	239	359	202	303
	8	136	205	83.5	126	370	556	304	457	235	354	199	299
	9	134	201	82.3	124	363	546	298	448	231	348	195	293
	10	131	197	80.9	122	355	534	292	439	227	341	192	288
	11	128	193	79.4	119	347	522	286	430	222	334	188	282
	12	125	188	77.7	117	339	509	279	419	217	326	183	275
	13	121	182	75.9	114	329	495	272	408	211	317	179	268
	14	117	176	74.0	111	320	480	264	397	205	309	174	261
	15	113	170	72.0	108	310	465	256	385	199	300	169	254
	16	109	164	69.8	105	299	450	248	372	193	290	164	246
	17	104	157	67.6	102	288	433	239	359	187	281	158	238
	18	100	150	65.2	98.0	277	417	230	346	180	271	153	229
	19	94.7	142	62.7	94.3	266	400	221	333	173	260	147	221
	20	88.9	134	60.1	90.4	255	383	212	319	166	250	141	212
	21	83.1	125	57.4	86.3	244	366	203	306	160	240	136	204
	22	77.5	116	54.6	82.1	232	349	194	292	153	229	130	195
	23	72.0	108	51.7	77.8	221	332	185	278	146	219	124	186
	24	66.6	100	48.7	73.3	210	316	176	265	139	209	118	178
	25	61.5	92.5	45.6	68.6	199	299	167	251	132	198	113	169
	26	56.9	85.5	42.4	63.8	188	283	158	238	125	188	107	161
	27	52.7	79.3	39.4	59.2	177	266	150	225	119	178	101	152
	28	49.0	73.7	36.6	55.0	167	251	141	212	112	168	95.8	144
	29	45.7	68.7	34.1	51.3	157	235	133	200	106	159	90.4	136
	30	42.7	64.2	31.9	47.9	147	221	125	187	99.3	149	85.2	128
	32	37.5	56.4	28.0	42.1	129	194	110	165	87.6	132	75.2	113
	34	33.3	50.0	24.8	37.3	114	172	97.2	146	77.6	117	66.6	100
	36	29.7	44.6	22.2	33.3	102	153	86.7	130	69.2	104	59.4	89.3
	38	26.6	40.0	19.9	29.9	91.5	138	77.8	117	62.1	93.3	53.3	80.1
	40	24.0	36.1	17.9	27.0	82.6	124	70.2	106	56.0	84.2	48.1	72.3

Properties

A_g, in.^{2}	9.54	6.96	22.1	18.1	14.0	11.8
I_x, in.^{4}	234	174	406	345	275	235
I_y, in.^{4}	62.9	47.1	216	184	147	126
r_y, in.	2.57	2.60	3.13	3.19	3.24	3.27
r_x/r_y	1.93	1.92	1.37	1.37	1.37	1.36

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS12

Shape		HSS12×8×				HSS12×4×							
		0.250 c1		0.180 c1		0.375		0.312		0.250 c1		0.180 c1	
t_{design}, in.		0.250		0.180		0.375		0.312		0.250		0.180	
lb/ft		33.1		24.1		38.0		32.1		26.1		19.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	162	243	98.9	149	198	297	166	250	126	189	74.6	112
	6	157	237	97.2	146	171	257	145	218	115	172	69.4	104
	7	156	234	96.6	145	163	244	138	207	111	167	67.6	102
	8	154	232	95.9	144	153	230	130	196	106	160	65.5	98.4
	9	152	229	95.1	143	143	215	122	183	100	151	63.1	94.9
	10	150	226	94.3	142	133	199	113	170	93.5	141	60.5	91.0
	11	148	222	93.1	140	122	183	105	157	86.5	130	57.6	86.6
	12	145	218	91.7	138	111	167	95.7	144	79.4	119	54.5	82.0
	13	142	214	90.3	136	101	152	86.9	131	72.4	109	51.2	76.9
	14	139	209	88.7	133	90.6	136	78.4	118	65.5	98.5	47.5	71.5
	15	136	205	87.0	131	80.7	121	70.1	105	58.8	88.4	43.7	65.7
	16	133	200	85.2	128	71.4	107	62.3	93.6	52.5	78.8	39.6	59.5
	17	129	193	83.4	125	63.2	95.0	55.2	82.9	46.6	70.0	35.3	53.0
	18	124	187	81.4	122	56.4	84.8	49.2	74.0	41.5	62.4	31.5	47.3
	19	120	180	79.3	119	50.6	76.1	44.2	66.4	37.3	56.0	28.2	42.5
	20	115	173	77.2	116	45.7	68.7	39.9	59.9	33.6	50.6	25.5	38.3
	21	111	166	75.0	113	41.4	62.3	36.2	54.4	30.5	45.9	23.1	34.8
	22	106	159	72.7	109	37.8	56.7	33.0	49.5	27.8	41.8	21.1	31.7
	23	101	152	70.3	106	34.5	51.9	30.1	45.3	25.4	38.2	19.3	29.0
	24	96.6	145	67.9	102	31.7	47.7	27.7	41.6	23.4	35.1	17.7	26.6
	25	92.0	138	65.4	98.2	29.2	43.9	25.5	38.4	21.5	32.4	16.3	24.5
	26	87.5	131	62.8	94.4	27.0	40.6	23.6	35.5	19.9	29.9	15.1	22.7
	27	83.0	125	60.2	90.4	25.1	37.7	21.9	32.9	18.5	27.7	14.0	21.0
	28	78.6	118	57.5	86.4			20.3	30.6	17.2	25.8	13.0	19.6
	29	74.2	112	54.7	82.3							12.1	18.2
	30	70.0	105	51.9	78.1								
	32	61.9	93.0	46.2	69.5								
	34	54.8	82.4	41.0	61.6								
	36	48.9	73.5	36.6	54.9								
	38	43.9	66.0	32.8	49.3								
	40	39.6	59.6	29.6	44.5								

Properties

	HSS12×8×0.250	HSS12×8×0.180	HSS12×4×0.375	HSS12×4×0.312	HSS12×4×0.250	HSS12×4×0.180
A_g, in.^{2}	9.54	6.96	11.0	9.26	7.54	5.52
I_x, in.^{4}	194	144	173	150	125	93.6
I_y, in.^{4}	104	77.7	30.0	26.2	22.1	16.8
r_y, in.	3.30	3.34	1.65	1.68	1.71	1.74
r_x/r_y	1.37	1.36	2.41	2.39	2.38	2.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS10

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS10×6×											
		0.625		0.500		0.375		0.312		0.250		0.180 [c1]	
t_{design}, in.		0.625		0.500		0.375		0.312		0.250		0.180	
lb/ft		59.3		49.0		38.0		32.1		26.1		19.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	307	462	253	381	198	297	166	250	135	204	86.4	130
	6	285	429	236	355	185	278	156	234	127	191	82.8	125
	7	278	418	230	346	180	271	152	229	124	187	81.6	123
	8	269	405	224	336	176	264	148	223	121	182	80.1	120
	9	260	391	217	326	170	256	144	216	117	177	78.5	118
	10	250	376	209	314	164	247	139	209	114	171	76.7	115
	11	240	360	201	301	158	237	134	201	109	164	74.7	112
	12	229	344	192	288	151	228	128	193	105	158	72.6	109
	13	217	327	183	275	145	217	123	184	101	151	70.3	106
	14	206	309	174	261	138	207	117	176	95.9	144	67.8	102
	15	194	291	164	247	130	196	111	167	91.1	137	65.2	98.0
	16	182	273	155	232	123	185	105	157	86.3	130	62.5	93.9
	17	170	255	145	218	116	174	98.7	148	81.4	122	59.6	89.6
	18	158	238	136	204	109	163	92.7	139	76.5	115	56.6	85.1
	19	147	220	126	190	101	152	86.7	130	71.7	108	53.3	80.1
	20	135	203	117	176	94.3	142	80.8	121	66.9	101	49.8	74.9
	21	124	187	108	163	87.4	131	75.0	113	62.3	93.6	46.4	69.8
	22	114	171	99.6	150	80.7	121	69.4	104	57.7	86.8	43.1	64.8
	23	104	157	91.4	137	74.3	112	64.0	96.2	53.3	80.2	39.9	60.0
	24	95.8	144	83.9	126	68.2	103	58.9	88.5	49.1	73.8	36.8	55.3
	25	88.3	133	77.3	116	62.9	94.5	54.3	81.6	45.3	68.0	34.0	51.0
	26	81.7	123	71.5	107	58.2	87.4	50.2	75.4	41.9	62.9	31.4	47.2
	27	75.7	114	66.3	99.6	53.9	81.0	46.5	69.9	38.8	58.3	29.1	43.8
	28	70.4	106	61.6	92.6	50.1	75.4	43.3	65.0	36.1	54.2	27.1	40.7
	29	65.6	98.6	57.5	86.4	46.7	70.3	40.3	60.6	33.6	50.6	25.2	37.9
	30	61.3	92.2	53.7	80.7	43.7	65.6	37.7	56.6	31.4	47.3	23.6	35.4
	32	53.9	81.0	47.2	70.9	38.4	57.7	33.1	49.8	27.6	41.5	20.7	31.1
	34	47.7	71.8	41.8	62.8	34.0	51.1	29.3	44.1	24.5	36.8	18.4	27.6
	36	42.6	64.0	37.3	56.0	30.3	45.6	26.2	39.3	21.8	32.8	16.4	24.6
	38	38.2	57.5	33.5	50.3	27.2	40.9	23.5	35.3	19.6	29.5	14.7	22.1
	40					24.6	36.9	21.2	31.9	17.7	26.6	13.3	19.9

Properties

A_g, in.^{2}	17.1	14.1	11.0	9.26	7.54	5.52
I_x, in.^{4}	202	175	142	123	102	76.2
I_y, in.^{4}	90.5	78.9	64.3	55.7	46.4	34.9
r_y, in.	2.30	2.37	2.42	2.45	2.48	2.51
r_x/r_y	1.50	1.49	1.48	1.49	1.48	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS10-HSS8

Shape		HSS10×6×		HSS8×4×									
		0.120 ^{c1}		0.375		0.312		0.250		0.180 ^{c1}		0.120 ^{c1}	
t_{design}, in.		0.120		0.375		0.312		0.250		0.180		0.120	
lb/ft		12.9		27.6		23.5		19.2		14.1		9.62	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	44.8	67.3	143	215	121	183	99.5	150	71.7	108	38.8	58.4
	6	43.7	65.7	122	184	105	157	86.2	130	63.8	95.9	35.8	53.8
	7	43.3	65.1	116	174	99.2	149	81.9	123	60.7	91.3	34.7	52.2
	8	42.9	64.4	109	163	93.2	140	77.1	116	57.3	86.2	33.5	50.4
	9	42.4	63.7	101	152	86.9	131	72.1	108	53.7	80.7	32.2	48.4
	10	41.8	62.8	93.0	140	80.4	121	66.8	100	49.9	75.0	30.7	46.1
	11	41.1	61.8	85.0	128	73.7	111	61.5	92.4	46.1	69.2	29.1	43.7
	12	40.4	60.8	77.0	116	67.0	101	56.1	84.3	42.2	63.4	27.3	41.1
	13	39.7	59.6	69.2	104	60.4	90.8	50.8	76.3	38.3	57.6	25.5	38.3
	14	38.8	58.3	61.7	92.7	54.1	81.3	45.6	68.6	34.5	51.9	23.5	35.3
	15	37.9	56.9	54.4	81.8	48.0	72.1	40.6	61.1	30.9	46.4	21.4	32.2
	16	36.9	55.4	47.9	72.0	42.3	63.6	36.0	54.0	27.4	41.2	19.3	28.9
	17	35.7	53.6	42.4	63.8	37.5	56.3	31.8	47.9	24.3	36.5	17.1	25.7
	18	34.3	51.5	37.9	56.9	33.4	50.2	28.4	42.7	21.7	32.6	15.3	22.9
	19	32.9	49.4	34.0	51.1	30.0	45.1	25.5	38.3	19.5	29.3	13.7	20.6
	20	31.4	47.2	30.7	46.1	27.1	40.7	23.0	34.6	17.6	26.4	12.4	18.6
	21	29.9	44.9	27.8	41.8	24.5	36.9	20.9	31.4	15.9	23.9	11.2	16.8
	22	28.3	42.6	25.3	38.1	22.4	33.6	19.0	28.6	14.5	21.8	10.2	15.3
	23	26.7	40.2	23.2	34.8	20.5	30.8	17.4	26.1	13.3	20.0	9.34	14.0
	24	25.1	37.7	21.3	32.0	18.8	28.2	16.0	24.0	12.2	18.3	8.58	12.9
	25	23.4	35.2	19.6	29.5	17.3	26.0	14.7	22.1	11.2	16.9	7.91	11.9
	26	21.7	32.6	18.1	27.3	16.0	24.1	13.6	20.5	10.4	15.6	7.31	11.0
	27	20.1	30.3			14.8	22.3	12.6	19.0	9.64	14.5	6.78	10.2
	28	18.7	28.2							8.96	13.5	6.30	9.48
	29	17.5	26.2										
	30	16.3	24.5										
	32	14.3	21.6										
	34	12.7	19.1										
	36	11.3	17.0										
	38	10.2	15.3										
	40	9.18	13.8										

Properties

A_g, in.^{2}	3.73	7.95	6.76	5.54	4.08	2.77
I_x, in.^{4}	52.5	59.9	52.5	44.2	33.6	23.5
I_y, in.^{4}	24.1	20.1	17.7	15.0	11.5	8.10
r_y, in.	2.54	1.59	1.62	1.65	1.68	1.71
r_x/r_y	1.480	1.72	1.72	1.71	1.71	1.70

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS7-HSS6

Table 4-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 30 ksi

Shape		HSS7×4×										HSS6×3×	
		0.375		0.312		0.250		0.180		0.120 [c1]		0.250	
t_{design}, in.		0.375		0.312		0.250		0.180		0.120		0.250	
lb/ft		25.0		21.3		17.5		12.9		8.78		14.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	129	194	110	166	90.5	136	66.8	100	38.5	57.8	72.6	109
	6	110	166	94.5	142	78.0	117	58.0	87.2	35.1	52.8	55.6	83.6
	7	104	156	89.4	134	74.0	111	55.1	82.8	34.0	51.0	50.5	75.9
	8	97.3	146	83.8	126	69.5	104	52.0	78.1	32.6	49.0	45.2	67.9
	9	90.2	136	77.9	117	64.8	97.4	48.6	73.0	31.1	46.8	39.9	59.9
	10	82.9	125	71.9	108	59.9	90.1	45.1	67.8	29.5	44.3	34.6	52.0
	11	75.5	113	65.7	98.7	54.9	82.6	41.5	62.4	27.7	41.7	29.6	44.5
	12	68.1	102	59.5	89.4	50.0	75.1	37.9	57.0	25.8	38.8	25.1	37.7
	13	60.9	91.6	53.5	80.3	45.1	67.7	34.4	51.7	23.8	35.8	21.4	32.1
	14	54.0	81.2	47.6	71.6	40.3	60.6	30.9	46.5	21.6	32.5	18.4	27.7
	15	47.5	71.4	42.0	63.2	35.8	53.7	27.6	41.5	19.4	29.1	16.0	24.1
	16	41.8	62.8	37.0	55.6	31.5	47.4	24.4	36.7	17.2	25.9	14.1	21.2
	17	37.0	55.6	32.8	49.3	27.9	42.0	21.6	32.5	15.3	22.9	12.5	18.8
	18	33.0	49.6	29.2	43.9	24.9	37.4	19.3	29.0	13.6	20.5	11.1	16.7
	19	29.6	44.5	26.2	39.4	22.4	33.6	17.3	26.0	12.2	18.4	10.0	15.0
	20	26.7	40.2	23.7	35.6	20.2	30.3	15.6	23.5	11.0	16.6	9.02	13.6
	21	24.2	36.4	21.5	32.3	18.3	27.5	14.2	21.3	10.0	15.0		
	22	22.1	33.2	19.6	29.4	16.7	25.1	12.9	19.4	9.11	13.7		
	23	20.2	30.4	17.9	26.9	15.3	22.9	11.8	17.8	8.34	12.5		
	24	18.6	27.9	16.4	24.7	14.0	21.1	10.9	16.3	7.65	11.5		
	25	17.1	25.7	15.2	22.8	12.9	19.4	10.0	15.0	7.05	10.6		
	26	15.8	23.8	14.0	21.1	11.9	17.9	9.25	13.9	6.52	9.80		
	27					11.1	16.6	8.58	12.9	6.05	9.09		
	28									5.62	8.45		
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	7.20	6.14	5.04	3.72	2.53	4.04
I_x, in.^{4}	42.5	37.4	31.7	24.2	16.9	17.4
I_y, in.^{4}	17.6	15.6	13.3	10.2	7.19	5.88
r_y, in.	1.56	1.59	1.62	1.66	1.69	1.21
r_x/r_y	1.56	1.55	1.55	1.54	1.53	1.72

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS6

Shape		HSS6×3×				HSS6×2×					
		0.180		0.120 [c1]		0.250		0.180		0.120 [c1]	
t_{design}, in.		0.180		0.120		0.250		0.180		0.120	
lb/ft		10.4		7.12		12.3		9.15		6.29	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	53.9	81.0	33.7	50.6	63.6	95.6	47.4	71.3	29.4	44.2
	6	41.8	62.9	28.3	42.5	34.4	51.7	26.9	40.5	19.2	28.8
	7	38.2	57.3	26.4	39.7	27.6	41.4	21.9	33.0	15.9	23.8
	8	34.3	51.6	24.0	36.0	21.4	32.2	17.3	26.1	12.7	19.1
	9	30.5	45.8	21.4	32.1	16.9	25.5	13.7	20.6	10.1	15.2
	10	26.6	40.0	18.8	28.3	13.7	20.6	11.1	16.7	8.17	12.3
	11	23.0	34.5	16.3	24.6	11.3	17.0	9.17	13.8	6.75	10.1
	12	19.5	29.4	14.0	21.0	9.53	14.3	7.71	11.6	5.67	8.53
	13	16.7	25.0	11.9	17.9	8.12	12.2	6.57	9.87	4.83	7.26
	14	14.4	21.6	10.3	15.5					4.17	6.26
	15	12.5	18.8	8.97	13.5						
	16	11.0	16.5	7.88	11.8						
	17	9.74	14.6	6.98	10.5						
	18	8.69	13.1	6.23	9.36						
	19	7.80	11.7	5.59	8.40						
	20	7.04	10.6	5.04	7.58						
	21			4.58	6.88						
	22										
	23										
	24										
	25										
	26										
	27										
	28										
	29										
	30										
	32										
	34										
	36										
	38										
	40										

Properties

	HSS6×3× 0.180	HSS6×3× 0.120	HSS6×2× 0.250	HSS6×2× 0.180	HSS6×2× 0.120
A_g, in.^{2}	3.00	2.05	3.54	2.64	1.81
I_x, in.^{4}	13.5	9.61	13.3	10.5	7.53
I_y, in.^{4}	4.61	3.30	2.25	1.82	1.34
r_y, in.	1.24	1.27	0.797	0.830	0.860
r_x/r_y	1.71	1.71	2.43	2.40	2.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS10

Table 4-4
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS12×12×								HSS10×10×			
		0.500		0.375		0.312		0.250 ^{c1}		0.500		0.375	
t_{design}, in.		0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft		76.9		59.2		49.5		40.2		63.1		48.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	399	599	307	462	257	386	185	278	327	491	253	381
	6	392	589	302	454	252	379	183	276	318	479	247	371
	7	389	585	300	451	251	377	183	275	315	474	245	368
	8	386	580	298	447	249	374	182	274	312	469	242	364
	9	383	576	295	444	247	371	181	272	308	463	239	359
	10	379	570	293	440	245	368	180	271	304	456	236	355
	11	375	564	290	435	242	364	179	270	299	449	232	349
	12	371	558	286	430	240	360	178	268	294	442	229	344
	13	366	551	283	425	237	356	177	266	289	434	225	338
	14	361	543	279	420	234	351	176	264	283	425	220	331
	15	356	535	275	414	230	346	174	262	277	416	216	324
	16	351	527	271	407	227	341	173	260	271	407	211	317
	17	345	519	267	401	223	336	171	257	264	397	206	310
	18	339	510	262	394	220	330	170	255	257	387	201	302
	19	333	500	258	387	216	324	168	252	250	376	196	294
	20	326	491	253	380	212	318	166	249	243	366	190	286
	21	320	481	248	372	208	312	164	246	236	355	185	278
	22	313	470	243	364	203	306	162	243	229	344	179	270
	23	306	460	237	357	199	299	159	240	221	332	174	261
	24	299	449	232	348	195	292	157	236	214	321	168	253
	25	292	438	226	340	190	286	155	232	206	310	162	244
	26	284	427	221	332	185	279	151	227	198	298	156	235
	27	277	416	215	323	181	272	147	222	191	287	151	226
	28	269	405	209	315	176	265	144	216	183	275	145	218
	29	262	393	204	306	171	257	140	210	176	264	139	209
	30	254	382	198	297	166	250	136	204	168	253	133	201
	32	239	359	186	280	157	236	128	193	153	231	122	184
	34	223	336	175	263	147	221	120	181	139	209	111	167
	36	208	313	163	245	137	207	113	169	126	189	101	151
	38	193	291	152	228	128	192	105	158	113	170	90.6	136
	40	179	269	141	211	119	178	97.6	147	102	153	81.8	123

Properties

A_g, in.^{2}	22.2	17.1	14.3	11.6	18.2	14.1
$I_x = I_y$, in.^{4}	479	380	321	265	267	214
$r_x = r_y$, in.	4.65	4.71	4.74	4.78	3.83	3.90

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS10-HSS9

Shape		HSS10×10×				HSS9×9×							
		0.312		0.250		0.500		0.375		0.312		0.250	
t_{design}, in.		0.312		0.250		0.500		0.375		0.312		0.250	
lb/ft		40.8		33.3		56.1		43.6		36.5		29.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	212	319	172	259	291	437	226	340	189	284	154	232
	6	207	311	168	253	281	423	219	330	183	275	150	225
	7	205	308	167	250	278	418	217	326	181	272	148	222
	8	203	305	165	248	274	412	214	321	178	268	146	220
	9	200	301	163	245	270	406	211	317	176	264	144	216
	10	198	297	161	242	265	399	207	311	173	260	142	213
	11	195	293	159	238	260	391	203	306	170	255	139	209
	12	192	288	156	235	255	383	199	300	166	250	136	205
	13	188	283	153	231	249	374	195	293	163	245	134	201
	14	185	278	151	226	243	365	190	286	159	239	131	196
	15	181	272	148	222	236	355	185	279	155	233	127	191
	16	177	266	144	217	230	345	180	271	151	227	124	186
	17	173	260	141	212	223	335	175	263	146	220	121	181
	18	169	254	138	207	216	324	170	255	142	214	117	176
	19	165	247	134	202	208	313	164	247	138	207	113	170
	20	160	241	131	197	201	302	159	239	133	200	110	165
	21	156	234	127	191	193	291	153	230	128	193	106	159
	22	151	227	124	186	186	279	148	222	124	186	102	153
	23	146	220	120	180	178	268	142	213	119	179	98.2	148
	24	142	213	116	174	171	257	136	204	114	171	94.3	142
	25	137	206	112	168	163	245	130	196	109	164	90.4	136
	26	132	198	108	163	156	234	124	187	104	157	86.6	130
	27	127	191	104	157	148	223	119	179	100	150	82.7	124
	28	122	184	100	151	141	212	113	170	95.0	143	78.9	119
	29	118	177	96.6	145	134	201	108	162	90.4	136	75.2	113
	30	113	169	92.8	139	126	190	102	153	85.9	129	71.5	107
	32	103	155	85.2	128	113	169	91.5	138	77.0	116	64.3	96.6
	34	94.2	142	77.8	117	100	150	81.5	122	68.7	103	57.4	86.3
	36	85.4	128	70.7	106	89.2	134	72.7	109	61.3	92.1	51.3	77.0
	38	77.0	116	63.8	95.9	80.1	120	65.2	98.0	55.0	82.6	46.0	69.1
	40	69.5	104	57.6	86.6	72.3	109	58.9	88.5	49.6	74.6	41.5	62.4

Properties

A_g, in.^{2}	11.8	9.59	16.2	12.6	10.5	8.59
$I_x = I_y$, in.^{4}	182	151	189	154	130	109
$r_x = r_y$, in.	3.93	3.97	3.42	3.50	3.52	3.56

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS8-HSS7

Table 4-4 (continued)

Available Strength in Axial Compression, kips

Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS8×8×										HSS7×7×	
		0.500		0.375		0.312		0.250		0.180 [c1]		0.500	
t_{design}, in.		0.500		0.375		0.312		0.250		0.180		0.500	
lb/ft		49.2		38.4		32.2		26.3		19.2		42.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	255	383	199	300	167	251	136	205	94.8	142	219	329
	6	244	367	191	288	160	241	131	197	92.7	139	207	311
	7	241	362	189	283	158	237	129	194	91.9	138	203	305
	8	236	355	185	279	155	233	127	191	91.0	137	198	297
	9	232	348	182	273	152	229	125	188	90.0	135	192	289
	10	226	340	178	268	149	224	122	184	88.8	133	187	281
	11	221	332	174	261	146	219	119	180	87.4	131	181	271
	12	215	323	169	255	142	213	117	175	85.3	128	174	262
	13	208	313	165	247	138	207	113	170	83.0	125	167	251
	14	202	303	160	240	134	201	110	165	80.7	121	160	241
	15	195	293	154	232	130	195	107	160	78.2	118	153	230
	16	188	282	149	224	125	188	103	155	75.6	114	145	219
	17	181	271	144	216	121	181	99.4	149	73.0	110	138	207
	18	173	260	138	207	116	174	95.7	144	70.3	106	130	196
	19	166	249	132	199	111	167	91.9	138	67.6	102	123	185
	20	158	238	127	190	106	160	88.1	132	64.8	97.4	115	173
	21	151	226	121	182	102	153	84.2	127	62.0	93.3	108	162
	22	143	215	115	173	96.9	146	80.4	121	59.2	89.1	101	152
	23	135	204	109	164	92.2	139	76.5	115	56.5	84.9	93.9	141
	24	128	193	104	156	87.4	131	72.7	109	53.7	80.7	87.1	131
	25	121	182	98.1	147	82.8	124	68.9	104	50.9	76.6	80.5	121
	26	114	171	92.6	139	78.2	117	65.2	98.0	48.2	72.5	74.4	112
	27	107	160	87.2	131	73.7	111	61.5	92.4	45.6	68.5	69.0	104
	28	99.9	150	81.9	123	69.3	104	57.9	87.1	43.0	64.6	64.2	96.5
	29	93.3	140	76.8	115	65.0	97.7	54.4	81.8	40.4	60.7	59.8	89.9
	30	87.2	131	71.9	108	60.9	91.5	51.0	76.7	37.9	57.0	55.9	84.0
	32	76.7	115	63.2	94.9	53.5	80.4	44.9	67.5	33.4	50.2	49.1	73.9
	34	67.9	102	55.9	84.1	47.4	71.2	39.8	59.7	29.6	44.4	43.5	65.4
	36	60.6	91.0	49.9	75.0	42.3	63.5	35.5	53.3	26.4	39.6	38.8	58.4
	38	54.4	81.7	44.8	67.3	37.9	57.0	31.8	47.8	23.7	35.6	34.9	52.4
	40	49.1	73.7	40.4	60.8	34.2	51.4	28.7	43.2	21.4	32.1	31.5	47.3

Properties

A_g, in.^{2}	14.2	11.1	9.28	7.59	5.54	12.2
$I_x = I_y$, in.^{4}	129	106	89.7	75.1	56.0	82.5
$r_x = r_y$, in.	3.01	3.09	3.11	3.15	3.18	2.60

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS7-HSS6

Shape		HSS7×7×						HSS6×6×					
		0.375		0.312		0.250		0.500		0.375		0.312	
t_{design}, in.		0.375		0.312		0.250		0.500		0.375		0.312	
lb/ft		33.2		27.8		22.9		35.3		28.0		23.5	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	172	259	144	217	118	178	183	275	145	218	122	183
	6	163	245	137	206	112	169	169	254	135	202	113	170
	7	160	240	134	202	110	166	164	247	131	197	110	165
	8	156	235	131	197	108	162	159	238	127	191	107	160
	9	152	229	128	192	105	158	153	229	122	184	103	155
	10	148	222	124	187	102	154	146	220	118	177	99.1	149
	11	143	216	121	181	99.4	149	139	210	113	169	94.9	143
	12	138	208	116	175	96.2	145	132	199	107	161	90.5	136
	13	133	200	112	169	92.8	139	125	188	102	153	85.9	129
	14	128	192	108	162	89.2	134	118	177	96.1	144	81.2	122
	15	123	184	103	155	85.6	129	110	166	90.4	136	76.5	115
	16	117	176	98.6	148	81.8	123	103	154	84.7	127	71.8	108
	17	111	167	93.9	141	78.0	117	95.4	143	79.0	119	67.0	101
	18	106	159	89.1	134	74.2	111	88.1	132	73.4	110	62.4	93.7
	19	99.8	150	84.4	127	70.3	106	81.1	122	67.9	102	57.8	86.8
	20	94.1	141	79.6	120	66.5	99.9	74.2	112	62.6	94.1	53.3	80.1
	21	88.5	133	74.9	113	62.6	94.2	67.7	102	57.4	86.3	49.0	73.6
	22	82.9	125	70.3	106	58.9	88.5	61.7	92.7	52.5	78.9	44.8	67.4
	23	77.5	116	65.7	98.8	55.2	82.9	56.4	84.8	48.0	72.2	41.0	61.6
	24	72.2	108	61.3	92.1	51.6	77.5	51.8	77.9	44.1	66.3	37.7	56.6
	25	67.0	101	57.0	85.6	48.0	72.2	47.8	71.8	40.6	61.1	34.7	52.2
	26	62.1	93.4	52.8	79.4	44.6	67.1	44.2	66.4	37.6	56.5	32.1	48.2
	27	57.6	86.6	49.0	73.6	41.4	62.2	40.9	61.5	34.9	52.4	29.8	44.7
	28	53.6	80.5	45.6	68.5	38.5	57.9	38.1	57.2	32.4	48.7	27.7	41.6
	29	49.9	75.0	42.5	63.8	35.9	54.0	35.5	53.3	30.2	45.4	25.8	38.8
	30	46.7	70.1	39.7	59.7	33.5	50.4	33.2	49.9	28.2	42.4	24.1	36.2
	32	41.0	61.6	34.9	52.4	29.5	44.3	29.2	43.8	24.8	37.3	21.2	31.8
	34	36.3	54.6	30.9	46.4	26.1	39.3	25.8	38.8	22.0	33.0	18.8	28.2
	36	32.4	48.7	27.6	41.4	23.3	35.0	23.0	34.6	19.6	29.5	16.7	25.2
	38	29.1	43.7	24.7	37.2	20.9	31.4					15.0	22.6
	40	26.2	39.4	22.3	33.6	18.9	28.4						

Properties

	HSS7×7×0.375	HSS7×7×0.312	HSS7×7×0.250	HSS6×6×0.500	HSS6×6×0.375	HSS6×6×0.312
A_g, in.^{2}	9.58	8.03	6.59	10.2	8.08	6.78
$I_x = I_y$, in.^{4}	68.7	58.6	49.4	48.9	41.6	35.6
$r_x = r_y$, in.	2.68	2.70	2.74	2.19	2.27	2.29

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS6-HSS5

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS6×6×						HSS5×5×					
		0.250		0.180		0.120 c1		0.500		0.375		0.312	
t_{design}, in.		0.250		0.180		0.120		0.500		0.375		0.312	
lb/ft		19.4		14.2		9.67		28.4		22.8		19.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	100	151	73.7	111	42.6	64.1	147	221	118	178	99.3	149
	6	93.5	140	68.7	103	41.1	61.8	130	195	106	159	89.0	134
	7	91.1	137	67.0	101	40.6	61.0	124	187	101	152	85.5	128
	8	88.4	133	65.0	97.7	40.0	60.1	118	177	96.7	145	81.6	123
	9	85.4	128	62.9	94.6	39.3	59.0	111	167	91.7	138	77.5	116
	10	82.2	124	60.6	91.1	38.4	57.8	104	157	86.4	130	73.1	110
	11	78.9	119	58.2	87.5	37.5	56.4	97.2	146	80.9	122	68.6	103
	12	75.3	113	55.7	83.7	36.5	54.9	89.8	135	75.3	113	63.9	96.0
	13	71.7	108	53.0	79.7	35.4	53.2	82.4	124	69.6	105	59.2	88.9
	14	67.9	102	50.3	75.6	34.2	51.4	75.2	113	64.0	96.2	54.5	81.9
	15	64.1	96.3	47.5	71.5	32.7	49.2	68.1	102	58.4	87.8	49.8	74.9
	16	60.2	90.5	44.8	67.3	30.8	46.4	61.2	92.0	53.0	79.7	45.3	68.1
	17	56.4	84.8	42.0	63.1	29.0	43.5	54.7	82.2	47.8	71.9	41.0	61.6
	18	52.6	79.1	39.2	58.9	27.1	40.7	48.8	73.4	42.9	64.4	36.8	55.3
	19	48.9	73.4	36.5	54.8	25.3	38.0	43.8	65.8	38.5	57.8	33.0	49.7
	20	45.2	67.9	33.8	50.8	23.5	35.3	39.5	59.4	34.7	52.2	29.8	44.8
	21	41.6	62.6	31.2	46.9	21.7	32.6	35.9	53.9	31.5	47.3	27.0	40.6
	22	38.2	57.4	28.7	43.2	20.0	30.1	32.7	49.1	28.7	43.1	24.6	37.0
	23	35.0	52.6	26.3	39.6	18.4	27.6	29.9	44.9	26.3	39.5	22.5	33.9
	24	32.1	48.3	24.2	36.4	16.9	25.4	27.5	41.3	24.1	36.2	20.7	31.1
	25	29.6	44.5	22.3	33.5	15.6	23.4	25.3	38.0	22.2	33.4	19.1	28.7
	26	27.4	41.2	20.6	31.0	14.4	21.6	23.4	35.2	20.5	30.9	17.6	26.5
	27	25.4	38.2	19.1	28.7	13.3	20.0	21.7	32.6	19.1	28.6	16.4	24.6
	28	23.6	35.5	17.8	26.7	12.4	18.6	20.2	30.3	17.7	26.6	15.2	22.9
	29	22.0	33.1	16.6	24.9	11.6	17.4	18.8	28.3	16.5	24.8	14.2	21.3
	30	20.6	30.9	15.5	23.3	10.8	16.2			15.4	23.2	13.3	19.9
	32	18.1	27.2	13.6	20.5	9.50	14.3						
	34	16.0	24.1	12.1	18.1	8.41	12.6						
	36	14.3	21.5	10.8	16.2	7.50	11.3						
	38	12.8	19.3	9.65	14.5	6.73	10.1						
	40												
Properties													
A_g, in.^{2}		5.59		4.10		2.79		8.18		6.58		5.53	
I_x = I_y, in.^{4}		30.3		22.9		16.0		26.0		22.8		19.6	
r_x = r_y, in.		2.33		2.36		2.39		1.78		1.86		1.88	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS5-HSS4

Shape		HSS5×5×						HSS4×4×					
		0.250		0.180		0.120 ^{c1}		0.500		0.375		0.312	
t_{design}, in.		0.250		0.180		0.120		0.500		0.375		0.312	
lb/ft		15.9		11.7		8.01		21.4		17.6		14.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	82.5	124	60.7	91.3	41.3	62.1	111	167	91.3	137	76.9	116
	6	74.2	111	54.8	82.4	37.6	56.5	90.2	136	75.8	114	64.2	96.5
	7	71.4	107	52.8	79.4	36.2	54.5	83.7	126	70.9	107	60.1	90.4
	8	68.3	103	50.6	76.0	34.8	52.3	76.7	115	65.6	98.6	55.8	83.8
	9	65.0	97.7	48.2	72.4	33.2	49.9	69.6	105	60.1	90.4	51.2	77.0
	10	61.5	92.4	45.7	68.6	31.5	47.3	62.3	93.7	54.5	81.9	46.6	70.0
	11	57.8	86.8	43.0	64.6	29.7	44.6	55.2	83.0	48.9	73.5	41.9	63.0
	12	54.0	81.2	40.3	60.5	27.9	41.9	48.3	72.7	43.4	65.3	37.3	56.1
	13	50.2	75.4	37.5	56.4	26.0	39.1	41.8	62.9	38.2	57.4	32.9	49.5
	14	46.3	69.7	34.7	52.2	24.1	36.3	36.1	54.3	33.3	50.0	28.8	43.2
	15	42.6	64.0	32.0	48.1	22.3	33.5	31.5	47.3	29.0	43.5	25.1	37.7
	16	38.9	58.4	29.3	44.0	20.5	30.7	27.6	41.6	25.5	38.3	22.0	33.1
	17	35.3	53.0	26.6	40.1	18.7	28.1	24.5	36.8	22.6	33.9	19.5	29.4
	18	31.8	47.8	24.1	36.3	16.9	25.5	21.8	32.8	20.1	30.2	17.4	26.2
	19	28.6	43.0	21.7	32.7	15.3	23.0	19.6	29.5	18.1	27.1	15.6	23.5
	20	25.8	38.8	19.6	29.5	13.8	20.8	17.7	26.6	16.3	24.5	14.1	21.2
	21	23.4	35.2	17.8	26.7	12.5	18.8	16.0	24.1	14.8	22.2	12.8	19.2
	22	21.3	32.1	16.2	24.4	11.4	17.2	14.6	22.0	13.5	20.2	11.7	17.5
	23	19.5	29.3	14.8	22.3	10.4	15.7			12.3	18.5	10.7	16.0
	24	17.9	26.9	13.6	20.5	9.59	14.4			11.3	17.0	9.80	14.7
	25	16.5	24.8	12.5	18.9	8.84	13.3						
	26	15.3	23.0	11.6	17.4	8.17	12.3						
	27	14.2	21.3	10.8	16.2	7.58	11.4						
	28	13.2	19.8	10.0	15.0	7.05	10.6						
	29	12.3	18.5	9.33	14.0	6.57	9.88						
	30	11.5	17.2	8.71	13.1	6.14	9.23						
	32			7.66	11.5	5.40	8.11						
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	4.59	3.38	2.31	6.18	5.08	4.28
$I_x = I_y$, in.^{4}	16.9	12.9	9.10	11.6	10.7	9.29
$r_x = r_y$, in.	1.92	1.95	1.98	1.37	1.45	1.47

ASD	LRFD
$\Omega_c = 1.67$	$\varphi_c = 0.90$

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

Table 4-4 (continued)

Available Strength in Axial Compression, kips

Square HSS (Roll Formed)

HSS4-HSS3.5

F_y = 30 ksi

Shape		HSS4×4×								HSS3.5×3.5×			
		0.250		0.180		0.120		0.083 [c1]		0.250		0.180	
t_{design}, in.		0.250		0.180		0.120		0.083		0.250		0.180	
lb/ft		12.4		9.23		6.35		4.46		10.7		7.98	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	64.5	96.9	47.8	71.8	32.9	49.4	20.3	30.4	55.5	83.4	41.3	62.1
	6	54.4	81.7	40.6	61.1	28.1	42.3	18.6	28.0	44.2	66.5	33.2	50.0
	7	51.1	76.8	38.3	57.6	26.6	39.9	18.0	27.0	40.7	61.2	30.7	46.2
	8	47.6	71.5	35.8	53.8	24.9	37.4	17.3	25.9	37.1	55.7	28.1	42.2
	9	43.9	66.0	33.2	49.8	23.1	34.8	16.4	24.6	33.3	50.0	25.3	38.1
	10	40.1	60.3	30.4	45.7	21.3	32.0	15.1	22.7	29.5	44.4	22.6	34.0
	11	36.3	54.5	27.7	41.6	19.4	29.2	13.8	20.7	25.9	38.9	19.9	29.9
	12	32.5	48.9	25.0	37.5	17.6	26.4	12.5	18.8	22.4	33.6	17.3	26.0
	13	28.9	43.4	22.3	33.5	15.8	23.7	11.2	16.9	19.1	28.8	14.9	22.4
	14	25.4	38.2	19.7	29.7	14.0	21.1	10.0	15.0	16.5	24.8	12.9	19.3
	15	22.2	33.4	17.3	26.0	12.4	18.6	8.83	13.3	14.4	21.6	11.2	16.8
	16	19.5	29.3	15.2	22.9	10.9	16.4	7.77	11.7	12.6	19.0	9.84	14.8
	17	17.3	26.0	13.5	20.3	9.65	14.5	6.89	10.3	11.2	16.8	8.72	13.1
	18	15.4	23.2	12.0	18.1	8.60	12.9	6.14	9.23	10.0	15.0	7.78	11.7
	19	13.8	20.8	10.8	16.2	7.72	11.6	5.51	8.29	8.96	13.5	6.98	10.5
	20	12.5	18.8	9.75	14.7	6.97	10.5	4.98	7.48	8.09	12.2	6.30	9.47
	21	11.3	17.0	8.84	13.3	6.32	9.50	4.51	6.78	7.34	11.0	5.71	8.59
	22	10.3	15.5	8.06	12.1	5.76	8.66	4.11	6.18			5.21	7.83
	23	9.44	14.2	7.37	11.1	5.27	7.92	3.76	5.65				
	24	8.67	13.0	6.77	10.2	4.84	7.27	3.45	5.19				
	25	7.99	12.0	6.24	9.38	4.46	6.70	3.18	4.79				
	26					4.12	6.20	2.94	4.42				
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	3.59	2.66	1.83	1.29	3.09	2.30
$I_x = I_y$, in.^{4}	8.22	6.36	4.55	3.27	5.29	4.14
$r_x = r_y$, in.	1.51	1.55	1.58	1.59	1.31	1.34

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS3.5-HSS3

Shape		HSS3.5×3.5×				HSS3×3×							
		0.120		0.083 ^{c1}		0.375		0.250		0.180		0.120	
t_{design}, in.		0.120		0.083		0.375		0.250		0.180		0.120	
lb/ft		5.51		3.89		12.4		8.98		6.74		4.68	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	28.6	42.9	19.7	29.7	64.3	96.7	46.5	69.9	34.9	52.4	24.3	36.5
	6	23.2	34.9	16.4	24.7	44.8	67.4	33.7	50.7	25.8	38.8	18.2	27.4
	7	21.5	32.4	15.3	23.0	39.4	59.2	30.0	45.1	23.2	34.8	16.5	24.7
	8	19.7	29.7	14.1	21.1	33.9	50.9	26.2	39.4	20.4	30.7	14.6	22.0
	9	17.9	26.9	12.8	19.2	28.6	42.9	22.5	33.9	17.7	26.7	12.8	19.2
	10	16.0	24.1	11.5	17.3	23.6	35.5	19.0	28.6	15.1	22.8	11.0	16.5
	11	14.2	21.3	10.2	15.3	19.5	29.3	15.8	23.8	12.7	19.1	9.31	14.0
	12	12.4	18.7	8.97	13.5	16.4	24.7	13.3	20.0	10.7	16.1	7.83	11.8
	13	10.8	16.2	7.80	11.7	14.0	21.0	11.3	17.0	9.10	13.7	6.67	10.0
	14	9.29	14.0	6.74	10.1	12.1	18.1	9.76	14.7	7.85	11.8	5.75	8.65
	15	8.09	12.2	5.87	8.82	10.5	15.8	8.50	12.8	6.84	10.3	5.01	7.53
	16	7.11	10.7	5.16	7.75	9.23	13.9	7.47	11.2	6.01	9.03	4.40	6.62
	17	6.30	9.47	4.57	6.87	8.18	12.3	6.62	10.0	5.32	8.00	3.90	5.86
	18	5.62	8.45	4.08	6.13			5.90	8.87	4.75	7.14	3.48	5.23
	19	5.04	7.58	3.66	5.50							3.12	4.69
	20	4.55	6.84	3.30	4.96								
	21	4.13	6.21	2.99	4.50								
	22	3.76	5.65	2.73	4.10								
	23			2.50	3.75								
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.59	1.12	3.58	2.59	1.94	1.35
$I_x = I_y$, in.^{4}	3.00	2.17	3.88	3.16	2.51	1.84
$r_x = r_y$, in.	1.37	1.39	1.04	1.10	1.14	1.17

ASD	LRFD
$\Omega_c = 1.67$	$\varphi_c = 0.90$

^{c1} Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS3-HSS2.5

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS3×3×		HSS2.5×2.5×									
		0.080		0.250		0.180		0.120		0.080		0.060	
t_{design}, in.		0.080		0.250		0.180		0.120		0.080		0.060	
lb/ft		3.19		7.24		5.49		3.85		2.64		2.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	16.5	24.9	37.5	56.4	28.4	42.7	19.9	30.0	13.7	20.5	10.3	15.6
	1	16.4	24.7	37.0	55.7	28.0	42.1	19.7	29.6	13.5	20.3	10.2	15.4
	2	16.0	24.1	35.6	53.5	27.0	40.6	19.0	28.6	13.1	19.6	9.90	14.9
	3	15.4	23.2	33.3	50.0	25.4	38.2	17.9	27.0	12.4	18.6	9.37	14.1
	4	14.6	22.0	30.3	45.5	23.3	35.0	16.5	24.9	11.4	17.2	8.67	13.0
	5	13.7	20.5	26.9	40.4	20.8	31.3	14.9	22.4	10.3	15.5	7.85	11.8
	6	12.6	18.9	23.2	34.8	18.2	27.3	13.1	19.7	9.13	13.7	6.96	10.5
	7	11.4	17.1	19.5	29.3	15.5	23.2	11.2	16.9	7.89	11.9	6.03	9.06
	8	10.1	15.2	15.9	23.9	12.8	19.3	9.44	14.2	6.67	10.0	5.11	7.68
	9	8.90	13.4	12.7	19.1	10.4	15.6	7.74	11.6	5.51	8.28	4.23	6.36
	10	7.70	11.6	10.3	15.5	8.43	12.7	6.28	9.44	4.49	6.74	3.45	5.19
	11	6.55	9.85	8.52	12.8	6.97	10.5	5.19	7.80	3.71	5.57	2.85	4.29
	12	5.53	8.31	7.16	10.8	5.85	8.80	4.36	6.56	3.12	4.68	2.40	3.60
	13	4.71	7.08	6.10	9.17	4.99	7.50	3.72	5.59	2.66	3.99	2.04	3.07
	14	4.06	6.10	5.26	7.90	4.30	6.46	3.20	4.82	2.29	3.44	1.76	2.65
	15	3.54	5.32			3.75	5.63	2.79	4.20	1.99	3.00	1.53	2.31
	16	3.11	4.67					2.45	3.69	1.75	2.63	1.35	2.03
	17	2.75	4.14										
	18	2.46	3.69										
	19	2.20	3.31										
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.921	2.09	1.58	1.11	0.761	0.576
$I_x = I_y$, in.^{4}	1.30	1.69	1.38	1.03	0.736	0.566
$r_x = r_y$, in.	1.19	0.899	0.935	0.963	0.983	0.991

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS2-HSS1.75

Shape		HSS2×2×										HSS1.75×1.75×	
		0.250		0.180		0.120		0.080		0.060		0.180	
t_{design}, in.		0.250		0.180		0.120		0.080		0.060		0.180	
lb/ft		5.51		4.24		3.02		2.08		1.58		3.61	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	28.6	42.9	21.9	32.9	15.6	23.5	10.8	16.2	8.19	12.3	18.7	28.1
	1	27.9	42.0	21.5	32.3	15.3	23.1	10.6	15.9	8.05	12.1	18.2	27.3
	2	26.1	39.2	20.2	30.4	14.5	21.8	10.1	15.1	7.64	11.5	16.7	25.1
	3	23.3	35.1	18.2	27.4	13.2	19.8	9.19	13.8	7.00	10.5	14.6	21.9
	4	19.9	30.0	15.8	23.8	11.6	17.4	8.11	12.2	6.20	9.31	12.0	18.0
	5	16.3	24.5	13.2	19.8	9.78	14.7	6.91	10.4	5.30	7.96	9.36	14.1
	6	12.7	19.1	10.5	15.8	7.95	12.0	5.68	8.53	4.37	6.57	6.90	10.4
	7	9.54	14.3	8.07	12.1	6.23	9.37	4.50	6.76	3.48	5.24	5.08	7.63
	8	7.30	11.0	6.18	9.29	4.79	7.20	3.48	5.23	2.70	4.06	3.89	5.84
	9	5.77	8.67	4.88	7.34	3.79	5.69	2.75	4.13	2.13	3.21	3.07	4.61
	10	4.67	7.02	3.96	5.95	3.07	4.61	2.23	3.34	1.73	2.60	2.49	3.74
	11	3.86	5.80	3.27	4.91	2.53	3.81	1.84	2.76	1.43	2.15		
	12			2.75	4.13	2.13	3.20	1.55	2.32	1.20	1.80		
	13									1.02	1.54		
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.59	1.22	0.870	0.601	0.456	1.04
$I_x = I_y$, in.^{4}	0.766	0.648	0.503	0.365	0.283	0.408
$r_x = r_y$, in.	0.694	0.729	0.760	0.779	0.788	0.626

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS1.75-HSS1.5

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS1.75×1.75×						HSS1.5×1.5×					
		0.120		0.083		0.063		0.250		0.180		0.120	
t_{design}, in.		0.120		0.083		0.063		0.250		0.180		0.120	
lb/ft		2.60		1.87		1.43		3.78		2.99		2.18	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	13.5	20.3	9.68	14.6	7.40	11.1	19.6	29.4	15.5	23.3	11.3	17.0
	1	13.1	19.7	9.46	14.2	7.23	10.9	18.7	28.1	14.9	22.4	10.9	16.4
	2	12.2	18.3	8.81	13.2	6.75	10.1	16.3	24.5	13.2	19.9	9.84	14.8
	3	10.8	16.2	7.83	11.8	6.01	9.03	13.0	19.5	10.8	16.3	8.26	12.4
	4	9.03	13.6	6.63	10.0	5.11	7.68	9.46	14.2	8.22	12.3	6.46	9.71
	5	7.21	10.8	5.36	8.06	4.15	6.23	6.34	9.52	5.75	8.65	4.71	7.08
	6	5.47	8.23	4.13	6.21	3.22	4.83	4.40	6.61	4.00	6.01	3.30	4.96
	7	4.04	6.08	3.08	4.62	2.40	3.61	3.23	4.86	2.94	4.41	2.43	3.65
	8	3.10	4.65	2.36	3.54	1.84	2.76	2.47	3.72	2.25	3.38	1.86	2.79
	9	2.45	3.68	1.86	2.80	1.45	2.18					1.47	2.21
	10	1.98	2.98	1.51	2.27	1.18	1.77						
	11			1.25	1.87	0.972	1.46						
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.750		0.539		0.412		1.09		0.862		0.630	
$I_x = I_y$, in.^{4}		0.325		0.247		0.193		0.260		0.236		0.195	
$r_x = r_y$, in.		0.658		0.677		0.684		0.488		0.523		0.556	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS1.5-HSS1.25

Shape		HSS1.5×1.5×				HSS1.25×1.25×							
		0.080		0.060		0.180		0.120		0.080		0.060	
t_{design}, in.		0.080		0.060		0.180		0.120		0.080		0.060	
lb/ft		1.53		1.16		2.37		1.77		1.25		0.957	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	7.92	11.9	6.04	9.07	12.3	18.4	9.16	13.8	6.49	9.75	4.96	7.45
	1	7.67	11.5	5.85	8.79	11.5	17.3	8.69	13.1	6.18	9.29	4.73	7.11
	2	6.95	10.4	5.31	7.98	9.59	14.4	7.42	11.2	5.34	8.03	4.11	6.18
	3	5.90	8.87	4.53	6.80	7.07	10.6	5.71	8.58	4.19	6.30	3.25	4.89
	4	4.69	7.05	3.62	5.44	4.61	6.92	3.95	5.94	2.99	4.49	2.34	3.52
	5	3.49	5.25	2.71	4.08	2.95	4.43	2.57	3.86	1.97	2.96	1.56	2.34
	6	2.47	3.71	1.93	2.90	2.05	3.08	1.78	2.68	1.37	2.06	1.08	1.63
	7	1.82	2.73	1.42	2.13	1.51	2.26	1.31	1.97	1.01	1.51	0.795	1.20
	8	1.39	2.09	1.09	1.63							0.609	0.915
	9	1.10	1.65	0.857	1.29								
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.441	0.336	0.682	0.510	0.361	0.276
$I_x = I_y$, in.^{4}	0.146	0.114	0.121	0.105	0.081	0.064
$r_x = r_y$, in.	0.575	0.582	0.421	0.454	0.473	0.481

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS1

Table 4-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 30 ksi

Shape		HSS1×1×							
		0.180		0.120		0.080		0.060	
t_{design}, in.		0.180		0.120		0.080		0.060	
lb/ft		1.74		1.35		0.973		0.748	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	9.02	13.6	7.01	10.5	5.05	7.59	3.88	5.83
	1	8.10	12.2	6.42	9.65	4.67	7.01	3.60	5.41
	2	5.86	8.81	4.94	7.42	3.68	5.54	2.87	4.31
	3	3.42	5.14	3.19	4.79	2.49	3.74	1.97	2.96
	4	1.92	2.89	1.84	2.77	1.48	2.22	1.18	1.78
	5	1.23	1.85	1.18	1.77	0.944	1.42	0.757	1.14
	6					0.656	0.985	0.526	0.790
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								
	25								
	26								
	27								
	28								
	29								
	30								

Properties

A_g, in.^{2}	0.502	0.390	0.281	0.216
$I_x = I_y$, in.^{4}	0.050	0.048	0.039	0.031
$r_x = r_y$, in.	0.317	0.352	0.371	0.379

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS20-HSS16

Table 4-5

Available Strength in Axial Compression, kips

Square HSS (Press Braked)

F_y = 30 ksi

Shape		HSS20×20×						HSS16×16×					
		0.625		0.500		0.375 [c1]		0.625		0.500		0.375	
t_{design}, in.		0.625		0.500		0.375		0.625		0.500		0.375	
lb/ft		163		132		100		129		105		79.6	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	**0**	846	1270	684	1030	430	647	666	1000	541	813	413	621
	6	841	1260	680	1020	429	645	660	992	535	805	409	615
	7	839	1260	679	1020	428	644	657	988	534	802	408	613
	8	837	1260	677	1020	428	643	655	984	531	799	406	610
	9	834	1250	675	1010	427	642	651	979	529	795	404	608
	10	831	1250	673	1010	427	641	648	974	526	791	402	604
	11	828	1240	670	1010	426	640	644	968	523	786	400	601
	12	825	1240	668	1000	425	639	640	962	520	781	397	597
	13	821	1230	665	999	424	637	636	955	516	776	395	593
	14	817	1230	662	994	423	636	631	948	512	770	392	589
	15	813	1220	658	989	422	634	626	940	508	764	389	584
	16	809	1220	655	984	421	632	620	932	504	758	386	580
	17	804	1210	651	979	420	631	614	924	500	751	382	574
	18	799	1200	647	973	418	629	608	915	495	744	379	569
	19	794	1190	643	967	417	627	602	905	490	736	375	563
	20	789	1190	639	960	415	624	596	895	485	728	371	558
	21	783	1180	634	953	414	622	589	885	479	720	367	551
	22	777	1170	630	946	412	620	582	874	474	712	363	545
	23	771	1160	625	939	411	617	574	863	468	703	358	538
	24	765	1150	620	931	409	615	567	852	462	694	354	532
	25	758	1140	614	923	407	612	559	840	456	685	349	525
	26	751	1130	609	915	405	609	551	828	449	675	344	518
	27	744	1120	603	907	403	606	543	816	443	666	339	510
	28	737	1110	598	898	401	603	535	804	436	656	334	503
	29	730	1100	592	890	399	600	526	791	429	646	329	495
	30	722	1090	586	881	397	596	518	778	423	635	324	487
	32	707	1060	573	862	392	589	500	751	408	614	314	471
	34	690	1040	561	842	387	582	482	724	394	592	303	455
	36	674	1010	547	822	382	574	463	696	379	570	291	438
	38	656	987	533	802	376	565	444	668	364	547	280	421
	40	639	960	519	780	370	556	425	639	349	524	268	403
Properties													
A_g, in.^{2}		47.1		38.1		29.0		37.1		30.1		23.0	
$I_x = I_y$, in.^{4}		2900		2390		1840		1430		1190		924	
$r_x = r_y$, in.		7.85		7.92		7.97		6.21		6.29		6.34	

ASD	LRFD
$\Omega_c = 1.67$	$\varphi_c = 0.90$

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

HSS16-HSS12

Shape		HSS16×16×		HSS14×14×								HSS12×12×	
		0.312 [c1]		0.625		0.500		0.375		0.312 [c1]		0.625	
t_{design}, in.		0.312		0.625		0.500		0.375		0.312		0.625	
lb/ft		66.7		111		90.7		69.2		58.1		94.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	295	443	577	867	469	705	359	540	288	433	487	732
	6	293	441	569	855	463	696	355	533	286	430	478	718
	7	293	440	566	851	461	692	353	531	285	429	475	713
	8	292	439	563	846	458	689	351	528	284	427	471	708
	9	291	438	560	841	455	684	349	525	283	426	467	702
	10	291	437	556	835	452	680	347	521	282	424	462	695
	11	290	436	551	829	449	674	344	517	281	422	457	687
	12	289	434	547	822	445	669	341	513	280	420	452	679
	13	288	433	542	814	441	663	338	509	278	418	446	671
	14	287	431	536	806	437	656	335	504	276	415	440	661
	15	286	429	530	797	432	650	332	498	275	413	433	651
	16	284	427	524	788	427	642	328	493	273	410	427	641
	17	283	425	518	778	422	635	324	487	271	407	419	630
	18	281	423	511	768	417	627	320	481	268	403	412	619
	19	280	421	504	758	411	618	316	475	264	397	404	607
	20	278	418	497	747	406	610	312	468	261	392	396	595
	21	277	416	489	736	400	601	307	462	257	387	388	583
	22	275	413	482	724	393	591	302	455	253	381	379	570
	23	273	410	474	712	387	582	298	447	249	375	370	557
	24	271	407	466	700	381	572	293	440	245	369	362	543
	25	269	404	457	687	374	562	288	432	241	362	353	530
	26	267	401	449	674	367	552	283	425	237	356	343	516
	27	265	398	440	661	360	541	277	417	233	350	334	502
	28	262	394	431	648	353	531	272	409	228	343	325	488
	29	260	391	422	634	346	520	266	400	224	336	315	474
	30	257	387	413	620	338	509	261	392	219	329	306	460
	32	252	379	394	592	324	486	250	375	210	315	287	431
	34	246	370	375	564	308	464	238	358	200	301	268	403
	36	240	361	356	535	293	441	227	341	191	287	249	375
	38	234	351	337	507	278	418	215	323	181	272	231	347
	40	225	339	318	478	263	395	203	306	172	258	213	320

Properties

A_g, in.^{2}	19.2	32.1	26.1	20.0	16.7	27.1
$I_x = I_y$, in.^{4}	782	935	780	609	518	568
$r_x = r_y$, in.	6.38	5.40	5.47	5.52	5.57	4.58

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS10

Table 4-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

F_y = 30 ksi

Shape		HSS12×12×								HSS10×10×			
		0.500		0.375		0.312		0.250 ^{c1}		0.625		0.500	
t_{design}, in.		0.500		0.375		0.312		0.250		0.625		0.500	
lb/ft		76.8		58.8		49.4		40.0		76.6		62.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	397	597	305	459	257	386	187	281	397	597	325	489
	6	390	586	300	451	252	379	185	279	386	580	317	476
	7	387	582	298	448	251	377	185	278	382	575	314	471
	8	384	578	296	445	249	374	184	277	378	568	310	466
	9	381	573	293	441	247	371	183	275	373	561	306	460
	10	378	568	291	437	245	368	182	274	368	553	302	454
	11	374	562	288	433	242	364	181	272	362	544	297	447
	12	369	555	285	428	240	360	180	271	356	534	292	439
	13	365	548	281	422	237	356	179	269	349	524	287	431
	14	360	541	277	417	234	351	177	267	342	513	281	423
	15	355	533	273	411	230	346	176	264	334	502	275	414
	16	349	525	269	405	227	341	174	262	326	490	269	404
	17	343	516	265	398	223	336	173	260	318	478	263	395
	18	338	507	261	392	220	330	171	257	310	465	256	385
	19	331	498	256	385	216	324	169	254	301	452	249	374
	20	325	488	251	377	212	318	167	251	292	439	242	364
	21	318	478	246	370	207	312	165	248	283	426	235	353
	22	312	468	241	362	203	305	163	245	274	412	227	342
	23	305	458	236	354	199	299	160	241	265	398	220	331
	24	297	447	230	346	194	292	157	236	255	384	212	319
	25	290	436	225	338	190	285	154	231	246	370	205	308
	26	283	425	219	329	185	278	150	225	236	355	197	297
	27	276	414	214	321	180	271	146	220	227	341	190	285
	28	268	403	208	312	176	264	142	214	218	327	182	274
	29	260	391	202	304	171	257	139	208	208	313	175	263
	30	253	380	196	295	166	250	135	203	199	299	167	251
	32	238	357	185	278	156	235	127	191	181	272	153	229
	34	222	334	173	260	147	221	119	179	164	246	138	208
	36	207	312	162	243	137	206	112	168	147	221	125	188
	38	193	289	150	226	128	192	104	157	132	198	112	169
	40	178	268	139	209	118	178	96.7	145	119	179	101	152

Properties

A_g, in.^{2}	22.1	17.0	14.3	11.5	22.1	18.1
$I_x = I_y$, in.^{4}	478	376	320	263	312	266
$r_x = r_y$, in.	4.65	4.70	4.73	4.78	3.76	3.83

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 30 ksi

Table 4-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

HSS10-HSS8

Shape		HSS10×10×						HSS8×8×					
		0.375		0.312		0.250		0.625		0.500		0.375	
t_{design}, in.		0.375		0.312		0.250		0.625		0.500		0.375	
lb/ft		48.4		40.8		33.1		59.3		49.0		38.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	251	378	212	319	171	258	307	462	253	381	198	297
	6	245	368	207	311	167	251	294	441	243	365	190	285
	7	243	365	205	308	166	249	289	434	239	359	187	281
	8	240	361	203	305	164	246	284	426	235	353	184	276
	9	237	357	200	301	162	243	278	417	230	346	180	271
	10	234	352	198	297	160	240	271	407	225	338	176	265
	11	231	346	195	293	158	237	264	397	219	329	172	258
	12	227	341	192	288	155	233	256	385	213	320	167	252
	13	223	335	188	283	152	229	249	374	207	311	163	245
	14	218	328	185	277	150	225	240	361	200	301	158	237
	15	214	321	181	272	147	220	232	348	194	291	153	229
	16	209	314	177	266	143	216	223	335	186	280	147	221
	17	204	307	173	260	140	211	214	321	179	269	142	213
	18	199	299	169	254	137	206	205	308	172	258	136	205
	19	194	292	164	247	133	200	195	294	164	247	130	196
	20	189	283	160	240	130	195	186	280	157	236	125	188
	21	183	275	155	233	126	190	177	266	149	225	119	179
	22	178	267	151	226	122	184	167	252	142	213	113	170
	23	172	258	146	219	119	178	158	238	135	202	108	162
	24	166	250	141	212	115	173	149	224	127	191	102	153
	25	160	241	136	205	111	167	140	211	120	180	96.3	145
	26	155	232	132	198	107	161	132	198	113	170	90.8	137
	27	149	224	127	191	103	155	123	185	106	159	85.5	128
	28	143	215	122	183	99.4	149	115	173	99.2	149	80.2	121
	29	137	206	117	176	95.6	144	107	161	92.7	139	75.1	113
	30	132	198	112	169	91.7	138	100	151	86.6	130	70.3	106
	32	120	181	103	155	84.2	126	88.1	132	76.1	114	61.8	92.9
	34	109	164	93.8	141	76.8	115	78.0	117	67.4	101	54.7	82.3
	36	99.0	149	85.0	128	69.7	105	69.6	105	60.1	90.4	48.8	73.4
	38	89.1	134	76.6	115	62.9	94.5	62.5	93.9	54.0	81.1	43.8	65.8
	40	80.4	121	69.2	104	56.8	85.3	56.4	84.7	48.7	73.2	39.5	59.4

Properties

A_g, in.^{2}	14.0	11.8	9.54	17.1	14.1	11.0
$I_x = I_y$, in.^{4}	211	181	149	148	128	104
$r_x = r_y$, in.	3.88	3.92	3.95	2.94	3.01	3.07

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS8-HSS7

Table 4-5 (continued)

Available Strength in Axial Compression, kips

Square HSS (Press Braked)

F_y = 30 ksi

Shape		HSS8×8×						HSS7×7×					
		0.312		0.250		0.180 [c1]		0.500		0.375		0.312	
t_{design}, in.		0.312		0.250		0.180		0.500		0.375		0.312	
lb/ft		32.1		26.1		19.1		42.1		32.8		27.8	
Design		P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	166	250	135	204	96.1	144	217	327	170	255	144	216
	6	160	240	130	196	93.8	141	205	308	161	242	136	205
	7	157	237	128	193	93.0	140	201	302	158	237	134	201
	8	155	233	126	190	92.1	138	196	295	154	231	131	197
	9	152	228	124	186	90.9	137	191	287	150	226	128	192
	10	149	224	121	182	89.1	134	185	278	146	219	124	186
	11	145	218	119	178	87.1	131	179	269	141	212	120	181
	12	142	213	116	174	85.0	128	173	259	136	205	116	175
	13	138	207	112	169	82.7	124	166	249	131	197	112	168
	14	134	201	109	164	80.4	121	159	239	126	189	108	162
	15	129	194	106	159	77.9	117	152	228	121	181	103	155
	16	125	188	102	154	75.4	113	144	217	115	173	98.4	148
	17	120	181	98.6	148	72.8	109	137	206	109	164	93.6	141
	18	116	174	94.9	143	70.1	105	129	194	104	156	88.9	134
	19	111	167	91.1	137	67.4	101	122	183	98.1	147	84.1	126
	20	106	160	87.3	131	64.6	97.1	114	172	92.4	139	79.4	119
	21	101	153	83.4	125	61.8	92.9	107	161	86.8	131	74.7	112
	22	96.7	145	79.6	120	59.0	88.7	100	150	81.3	122	70.1	105
	23	92.0	138	75.7	114	56.3	84.6	93.1	140	76.0	114	65.5	98.5
	24	87.3	131	71.9	108	53.5	80.4	86.3	130	70.7	106	61.1	91.9
	25	82.6	124	68.2	102	50.8	76.3	79.9	120	65.7	98.7	56.8	85.4
	26	78.0	117	64.4	96.8	48.1	72.2	73.8	111	60.8	91.4	52.7	79.2
	27	73.5	110	60.8	91.4	45.4	68.2	68.5	103	56.4	84.8	48.9	73.5
	28	69.1	104	57.2	86.0	42.8	64.3	63.7	95.7	52.4	78.8	45.4	68.3
	29	64.8	97.5	53.8	80.8	40.3	60.5	59.3	89.2	48.9	73.5	42.4	63.7
	30	60.7	91.3	50.4	75.7	37.8	56.8	55.5	83.4	45.7	68.7	39.6	59.5
	32	53.4	80.2	44.3	66.6	33.3	50.0	48.7	73.3	40.1	60.3	34.8	52.3
	34	47.3	71.1	39.2	59.0	29.5	44.3	43.2	64.9	35.6	53.4	30.8	46.3
	36	42.2	63.4	35.0	52.6	26.3	39.5	38.5	57.9	31.7	47.7	27.5	41.3
	38	37.8	56.9	31.4	47.2	23.6	35.5	34.6	52.0	28.5	42.8	24.7	37.1
	40	34.2	51.3	28.4	42.6	21.3	32.0	31.2	46.9	25.7	38.6	22.3	33.5

Properties

	0.312	0.250	0.180	0.500	0.375	0.312
A_g, in.^{2}	9.26	7.54	5.52	12.1	9.45	8.01
$I_x = I_y$, in.^{4}	89.4	74.3	55.7	82.0	67.2	58.4
$r_x = r_y$, in.	3.11	3.14	3.18	2.60	2.67	2.70

ASD	LRFD
Ω_c = 1.67	ϕ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-5 (continued)

Available Strength in Axial Compression, kips

Square HSS (Press Braked)

HSS7-HSS6

Shape		HSS7×7×				HSS6×6×							
		0.250		0.180		0.500		0.375		0.312		0.250	
t_{design}, in.		0.250		0.180		0.500		0.375		0.312		0.250	
lb/ft		22.7		16.6		35.2		27.6		23.5		19.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	117	177	86.2	130	181	273	143	215	121	183	100	150
	6	111	168	82.0	123	167	251	132	199	113	169	92.6	139
	7	109	164	80.5	121	162	244	129	193	110	165	90.2	136
	8	107	161	78.8	118	157	236	125	187	106	160	87.5	131
	9	104	157	76.9	116	151	227	120	181	103	154	84.5	127
	10	102	153	74.9	113	145	218	116	174	98.8	148	81.4	122
	11	98.5	148	72.7	109	138	207	110	166	94.6	142	78.0	117
	12	95.3	143	70.4	106	131	197	105	158	90.2	136	74.5	112
	13	91.9	138	67.9	102	124	186	100	150	85.6	129	70.8	106
	14	88.4	133	65.4	98.3	117	175	94.2	142	81.0	122	67.1	101
	15	84.7	127	62.8	94.3	109	164	88.6	133	76.3	115	63.3	95.1
	16	81.0	122	60.1	90.3	102	153	83.0	125	71.6	108	59.4	89.3
	17	77.2	116	57.3	86.2	94.4	142	77.4	116	66.8	100	55.6	83.6
	18	73.4	110	54.6	82.0	87.3	131	71.8	108	62.2	93.4	51.8	77.9
	19	69.5	104	51.8	77.8	80.3	121	66.4	100	57.6	86.6	48.1	72.3
	20	65.7	98.7	49.0	73.7	73.5	110	61.1	91.9	53.1	79.9	44.5	66.9
	21	61.9	93.0	46.3	69.5	67.0	101	56.0	84.2	48.8	73.4	41.0	61.6
	22	58.1	87.4	43.5	65.4	61.1	91.8	51.2	76.9	44.7	67.2	37.6	56.5
	23	54.4	81.8	40.9	61.4	55.9	84.0	46.8	70.4	40.9	61.5	34.4	51.7
	24	50.9	76.4	38.2	57.5	51.3	77.1	43.0	64.7	37.6	56.4	31.6	47.5
	25	47.4	71.2	35.7	53.6	47.3	71.1	39.6	59.6	34.6	52.0	29.1	43.8
	26	44.0	66.1	33.2	49.9	43.7	65.7	36.7	55.1	32.0	48.1	26.9	40.5
	27	40.8	61.3	30.8	46.3	40.5	60.9	34.0	51.1	29.7	44.6	25.0	37.5
	28	37.9	57.0	28.7	43.1	37.7	56.7	31.6	47.5	27.6	41.5	23.2	34.9
	29	35.4	53.2	26.7	40.2	35.1	52.8	29.5	44.3	25.7	38.7	21.6	32.5
	30	33.0	49.7	25.0	37.5	32.8	49.4	27.5	41.4	24.0	36.1	20.2	30.4
	32	29.0	43.7	21.9	33.0	28.9	43.4	24.2	36.4	21.1	31.8	17.8	26.7
	34	25.7	38.7	19.4	29.2	25.6	38.4	21.4	32.2	18.7	28.1	15.7	23.7
	36	22.9	34.5	17.3	26.1	22.8	34.3	19.1	28.7	16.7	25.1	14.0	21.1
	38	20.6	31.0	15.6	23.4					15.0	22.5	12.6	18.9
	40	18.6	27.9	14.0	21.1								
Properties													
A_g, in.^{2}		6.54		4.80		10.1		7.95		6.76		5.54	
$I_x = I_y$, in.^{4}		48.7		36.7		48.6		40.5		35.5		29.9	
$r_x = r_y$, in.		2.73		2.77		2.19		2.26		2.29		2.32	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS6-HSS5

Table 4-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

F_y = 30 ksi

Shape		HSS6×6×				HSS5×5×					
		0.180		0.120 c1		0.250		0.180		0.120	
t_{design}, in.		0.180		0.120		0.250		0.180		0.120	
lb/ft		14.1		9.62		15.7		11.6		7.95	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	73.3	110	43.5	65.4	81.6	123	60.4	90.7	41.1	61.8
	6	68.3	103	41.9	63.0	73.3	110	54.5	81.9	37.2	56.0
	7	66.6	100	41.3	62.1	70.5	106	52.5	78.9	35.9	54.0
	8	64.7	97.3	40.7	61.1	67.4	101	50.3	75.6	34.5	51.8
	9	62.6	94.1	39.9	60.0	64.1	96.4	47.9	72.0	32.9	49.4
	10	60.3	90.7	39.0	58.7	60.6	91.1	45.4	68.2	31.2	46.9
	11	57.9	87.1	38.1	57.2	56.9	85.6	42.8	64.3	29.4	44.3
	12	55.4	83.2	37.0	55.6	53.2	79.9	40.0	60.2	27.6	41.5
	13	52.8	79.3	35.8	53.8	49.4	74.2	37.3	56.0	25.8	38.8
	14	50.1	75.2	34.3	51.6	45.6	68.5	34.5	51.9	23.9	36.0
	15	47.3	71.1	32.5	48.8	41.8	62.8	31.8	47.8	22.1	33.2
	16	44.5	66.9	30.6	46.0	38.1	57.3	29.1	43.7	20.3	30.5
	17	41.8	62.8	28.8	43.2	34.6	52.0	26.5	39.8	18.5	27.8
	18	39.0	58.7	26.9	40.5	31.2	46.8	24.0	36.0	16.8	25.3
	19	36.3	54.6	25.1	37.7	28.0	42.1	21.6	32.5	15.2	22.8
	20	33.7	50.6	23.3	35.0	25.3	38.0	19.5	29.3	13.7	20.6
	21	31.1	46.7	21.6	32.4	22.9	34.4	17.7	26.6	12.4	18.7
	22	28.6	43.0	19.9	29.9	20.9	31.4	16.1	24.2	11.3	17.0
	23	26.2	39.4	18.3	27.4	19.1	28.7	14.7	22.2	10.4	15.6
	24	24.1	36.2	16.8	25.2	17.5	26.4	13.5	20.3	9.51	14.3
	25	22.2	33.3	15.4	23.2	16.2	24.3	12.5	18.7	8.77	13.2
	26	20.5	30.8	14.3	21.5	15.0	22.5	11.5	17.3	8.10	12.2
	27	19.0	28.6	13.2	19.9	13.9	20.8	10.7	16.1	7.51	11.3
	28	17.7	26.6	12.3	18.5	12.9	19.4	9.94	14.9	6.99	10.5
	29	16.5	24.8	11.5	17.3	12.0	18.1	9.27	13.9	6.51	9.79
	30	15.4	23.2	10.7	16.1	11.2	16.9	8.66	13.0	6.09	9.15
	32	13.5	20.4	9.43	14.2			7.61	11.4	5.35	8.04
	34	12.0	18.0	8.35	12.6						
	36	10.7	16.1	7.45	11.2						
	38	9.60	14.4	6.69	10.0						
	40										

Properties

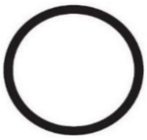
	HSS6×6×0.180	HSS6×6×0.120	HSS5×5×0.250	HSS5×5×0.180	HSS5×5×0.120
A_g, in.^{2}	4.08	2.77	4.54	3.36	2.29
$I_x = I_y$, in.^{4}	22.7	15.8	16.6	12.8	9.00
$r_x = r_y$, in.	2.36	2.39	1.91	1.95	1.98

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS7.5-HSS6.25

Table 4-6

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS7.5×								HSS6.25×			
		0.375		0.250		0.180		0.120		0.375		0.250	
t_{design}, in.		0.375		0.250		0.180		0.120		0.375		0.250	
lb/ft		29.1		19.7		14.4		9.65		24.0		16.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	143	214	97.0	145	70.6	106	47.4	70.9	118	176	80.3	120
	6	134	201	91.4	137	66.6	99.6	44.7	66.9	108	161	73.6	110
	7	132	197	89.5	134	65.2	97.5	43.8	65.6	104	156	71.3	107
	8	128	192	87.3	131	63.6	95.2	42.8	64.0	100	150	68.8	103
	9	125	186	84.9	127	61.9	92.6	41.7	62.3	96.3	144	66.0	98.8
	10	121	180	82.3	123	60.0	89.8	40.4	60.5	91.8	137	63.1	94.4
	11	116	174	79.5	119	58.0	86.8	39.1	58.5	87.1	130	60.0	89.7
	12	112	167	76.6	115	55.9	83.7	37.7	56.4	82.2	123	56.7	84.9
	13	107	160	73.5	110	53.7	80.3	36.2	54.2	77.2	116	53.4	79.9
	14	102	153	70.3	105	51.4	76.9	34.7	51.9	72.2	108	50.1	74.9
	15	97.4	146	67.1	100	49.1	73.4	33.1	49.6	67.1	100	46.7	69.8
	16	92.4	138	63.7	95.3	46.7	69.8	31.5	47.2	62.1	92.9	43.3	64.8
	17	87.3	131	60.4	90.3	44.2	66.2	29.9	44.8	57.2	85.6	40.0	59.8
	18	82.3	123	57.0	85.3	41.8	62.6	28.3	42.3	52.4	78.4	36.8	55.0
	19	77.2	116	53.6	80.3	39.4	58.9	26.7	39.9	47.8	71.4	33.6	50.3
	20	72.3	108	50.3	75.3	37.0	55.3	25.1	37.5	43.3	64.8	30.6	45.8
	21	67.4	101	47.0	70.4	34.6	51.8	23.5	35.2	39.3	58.8	27.8	41.6
	22	62.6	93.7	43.8	65.6	32.3	48.3	21.9	32.8	35.8	53.6	25.3	37.9
	23	58.0	86.8	40.7	60.9	30.0	44.9	20.4	30.6	32.8	49.0	23.2	34.7
	24	53.5	80.1	37.7	56.4	27.8	41.6	19.0	28.4	30.1	45.0	21.3	31.8
	25	49.4	73.8	34.8	52.1	25.7	38.5	17.5	26.2	27.7	41.5	19.6	29.3
	26	45.6	68.3	32.2	48.2	23.8	35.6	16.2	24.3	25.6	38.4	18.1	27.1
	27	42.3	63.3	29.8	44.7	22.1	33.0	15.0	22.5	23.8	35.6	16.8	25.2
	28	39.3	58.9	27.8	41.5	20.5	30.7	14.0	20.9	22.1	33.1	15.6	23.4
	29	36.7	54.9	25.9	38.7	19.1	28.6	13.0	19.5	20.6	30.8	14.6	21.8
	30	34.3	51.3	24.2	36.2	17.9	26.7	12.2	18.2	19.3	28.8	13.6	20.4
	32	30.1	45.1	21.2	31.8	15.7	23.5	10.7	16.0	16.9	25.3	12.0	17.9
	34	26.7	39.9	18.8	28.2	13.9	20.8	9.49	14.2	15.0	22.4	10.6	15.9
	36	23.8	35.6	16.8	25.1	12.4	18.6	8.46	12.7				
	38	21.4	32.0	15.1	22.5	11.1	16.7	7.59	11.4				
	40	19.3	28.8	13.6	20.3	10.0	15.0	6.85	10.3				

Properties

A_g, in.^{2}	8.39	5.69	4.14	2.78	6.92	4.71
I, in.^{4}	53.4	37.5	27.7	18.9	30.0	21.2
r, in.	2.52	2.57	2.59	2.61	2.08	2.12

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

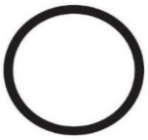
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS6.25-HSS5

Shape		HSS6.25×				HSS5×							
		0.180		0.120		0.250		0.180		0.120		0.109	
t_{design}, in.		0.180		0.120		0.250		0.180		0.120		0.109	
lb/ft		11.9		8.01		12.9		9.45		6.38		5.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	58.5	87.5	39.4	58.9	63.6	95.1	46.5	69.6	31.4	46.9	28.5	42.6
	6	53.7	80.4	36.2	54.2	55.5	83.0	40.7	60.8	27.5	41.2	25.0	37.4
	7	52.1	78.0	35.2	52.6	52.8	79.0	38.7	57.9	26.3	39.3	23.8	35.7
	8	50.3	75.3	34.0	50.8	49.9	74.6	36.6	54.8	24.9	37.2	22.6	33.8
	9	48.4	72.3	32.7	48.9	46.8	70.0	34.3	51.4	23.4	35.0	21.2	31.8
	10	46.2	69.2	31.3	46.8	43.5	65.1	32.0	47.8	21.8	32.7	19.8	29.6
	11	44.0	65.9	29.8	44.6	40.2	60.1	29.6	44.2	20.2	30.3	18.4	27.5
	12	41.7	62.4	28.3	42.3	36.8	55.1	27.1	40.6	18.6	27.9	16.9	25.3
	13	39.3	58.9	26.7	39.9	33.5	50.1	24.7	36.9	17.0	25.4	15.4	23.1
	14	36.9	55.2	25.1	37.5	30.2	45.2	22.3	33.4	15.4	23.1	14.0	20.9
	15	34.5	51.6	23.5	35.1	27.1	40.5	20.0	29.9	13.9	20.8	12.6	18.9
	16	32.1	48.0	21.8	32.7	24.1	36.0	17.8	26.7	12.4	18.6	11.3	16.9
	17	29.7	44.4	20.2	30.3	21.3	31.9	15.8	23.6	11.0	16.5	10.0	15.0
	18	27.4	40.9	18.7	27.9	19.0	28.5	14.1	21.1	9.84	14.7	8.93	13.4
	19	25.1	37.5	17.2	25.7	17.1	25.6	12.7	18.9	8.83	13.2	8.02	12.0
	20	22.9	34.2	15.7	23.5	15.4	23.1	11.4	17.1	7.97	11.9	7.23	10.8
	21	20.8	31.1	14.3	21.4	14.0	20.9	10.4	15.5	7.23	10.8	6.56	9.82
	22	19.0	28.4	13.0	19.5	12.7	19.1	9.44	14.1	6.59	9.86	5.98	8.94
	23	17.4	26.0	11.9	17.8	11.7	17.4	8.64	12.9	6.03	9.02	5.47	8.18
	24	15.9	23.8	10.9	16.4	10.7	16.0	7.93	11.9	5.54	8.28	5.02	7.52
	25	14.7	22.0	10.1	15.1	9.87	14.8	7.31	10.9	5.10	7.63	4.63	6.93
	26	13.6	20.3	9.32	13.9	9.12	13.7	6.76	10.1	4.72	7.06	4.28	6.40
	27	12.6	18.8	8.64	12.9	8.46	12.7	6.27	9.37	4.37	6.54	3.97	5.94
	28	11.7	17.5	8.03	12.0	7.87	11.8	5.83	8.72	4.07	6.08	3.69	5.52
	29	10.9	16.3	7.49	11.2								
	30	10.2	15.3	7.00	10.5								
	32	8.96	13.4	6.15	9.20								
	34	7.94	11.9	5.45	8.15								
	36			4.86	7.27								
	38												
	40												

Properties

A_g, in.^{2}	3.43	2.31	3.73	2.73	1.84	1.67
I, in.^{4}	15.8	10.9	10.6	7.93	5.48	5.01
r, in.	2.15	2.17	1.69	1.70	1.73	1.73

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS5-HSS4.5

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 30 ksi

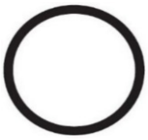
Shape		HSS5×		HSS4.5×									
		0.083		0.250		0.180		0.148		0.120		0.109	
t_{design}, in.		0.083		0.250		0.180		0.148		0.120		0.109	
lb/ft		4.45		11.6		8.47		7.02		5.73		5.21	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	21.8	32.6	56.9	85.2	41.6	62.2	34.4	51.5	28.1	42.1	25.6	38.3
	6	19.2	28.7	47.9	71.6	35.2	52.7	29.2	43.7	23.9	35.8	21.8	32.6
	7	18.3	27.4	45.0	67.3	33.2	49.6	27.5	41.2	22.5	33.7	20.6	30.8
	8	17.4	26.0	41.8	62.6	30.9	46.3	25.7	38.5	21.1	31.5	19.2	28.8
	9	16.3	24.4	38.5	57.7	28.6	42.8	23.8	35.6	19.5	29.2	17.8	26.7
	10	15.3	22.8	35.2	52.6	26.2	39.2	21.8	32.6	17.9	26.8	16.4	24.5
	11	14.1	21.2	31.8	47.6	23.8	35.5	19.8	29.6	16.3	24.4	14.9	22.3
	12	13.0	19.5	28.5	42.6	21.4	31.9	17.8	26.7	14.7	22.0	13.5	20.1
	13	11.9	17.8	25.2	37.7	19.0	28.5	15.9	23.8	13.1	19.6	12.0	18.0
	14	10.8	16.2	22.2	33.1	16.8	25.1	14.1	21.0	11.6	17.4	10.7	16.0
	15	9.75	14.6	19.3	28.9	14.7	22.0	12.3	18.4	10.2	15.3	9.39	14.1
	16	8.73	13.1	17.0	25.4	12.9	19.3	10.8	16.2	8.97	13.4	8.26	12.4
	17	7.76	11.6	15.1	22.5	11.4	17.1	9.60	14.4	7.94	11.9	7.31	10.9
	18	6.93	10.4	13.4	20.1	10.2	15.3	8.56	12.8	7.08	10.6	6.52	9.76
	19	6.22	9.30	12.1	18.0	9.16	13.7	7.68	11.5	6.36	9.51	5.85	8.76
	20	5.61	8.39	10.9	16.3	8.27	12.4	6.93	10.4	5.74	8.58	5.28	7.90
	21	5.09	7.61	9.87	14.8	7.50	11.2	6.29	9.41	5.20	7.79	4.79	7.17
	22	4.64	6.94	8.99	13.4	6.83	10.2	5.73	8.57	4.74	7.09	4.37	6.53
	23	4.24	6.35	8.23	12.3	6.25	9.35	5.24	7.84	4.34	6.49	4.00	5.98
	24	3.90	5.83	7.55	11.3	5.74	8.59	4.82	7.20	3.98	5.96	3.67	5.49
	25	3.59	5.37	6.96	10.4	5.29	7.92	4.44	6.64	3.67	5.49	3.38	5.06
	26	3.32	4.97									3.13	4.68
	27	3.08	4.60										
	28	2.86	4.28										
	29	2.67	3.99										
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.28		3.34		2.44		2.02		1.65		1.50	
I, in.^{4}		3.88		7.56		5.71		4.80		3.96		3.63	
r, in.		1.74		1.50		1.53		1.54		1.55		1.56	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



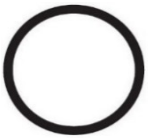
HSS4.5-HSS3.75

Shape		HSS4.5×		HSS4×						HSS3.75×			
		0.083		0.120		0.109		0.083		0.250		0.180	
t_{design}, in.		0.083		0.120		0.109		0.083		0.250		0.180	
lb/ft		3.99		5.07		4.62		3.54		9.53		7.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	19.6	29.3	24.9	37.2	22.7	33.9	17.4	26.0	46.9	70.1	34.4	51.5
	6	16.7	25.0	20.2	30.2	18.5	27.6	14.2	21.3	36.4	54.4	26.9	40.3
	7	15.8	23.6	18.8	28.1	17.2	25.7	13.2	19.8	33.2	49.6	24.6	36.9
	8	14.7	22.1	17.2	25.7	15.8	23.6	12.1	18.2	29.9	44.7	22.2	33.3
	9	13.7	20.4	15.6	23.3	14.3	21.4	11.0	16.5	26.5	39.6	19.8	29.6
	10	12.6	18.8	14.0	20.9	12.8	19.2	9.92	14.8	23.2	34.7	17.4	26.0
	11	11.4	17.1	12.4	18.5	11.4	17.0	8.82	13.2	20.0	29.9	15.1	22.6
	12	10.3	15.4	10.8	16.2	10.0	14.9	7.75	11.6	17.0	25.4	12.9	19.3
	13	9.24	13.8	9.38	14.0	8.67	13.0	6.74	10.1	14.5	21.7	11.0	16.4
	14	8.19	12.3	8.09	12.1	7.48	11.2	5.82	8.71	12.5	18.7	9.47	14.2
	15	7.20	10.8	7.05	10.5	6.52	9.75	5.07	7.59	10.9	16.3	8.25	12.3
	16	6.33	9.47	6.20	9.27	5.73	8.57	4.46	6.67	9.56	14.3	7.25	10.9
	17	5.61	8.39	5.49	8.21	5.07	7.59	3.95	5.91	8.47	12.7	6.42	9.61
	18	5.00	7.48	4.90	7.33	4.53	6.77	3.52	5.27	7.56	11.3	5.73	8.57
	19	4.49	6.72	4.40	6.57	4.06	6.08	3.16	4.73	6.78	10.1	5.14	7.69
	20	4.05	6.06	3.97	5.93	3.67	5.48	2.85	4.27	6.12	9.16	4.64	6.94
	21	3.67	5.50	3.60	5.38	3.33	4.97	2.59	3.87			4.21	6.30
	22	3.35	5.01	3.28	4.90	3.03	4.53	2.36	3.53				
	23	3.06	4.58			2.77	4.15	2.16	3.23				
	24	2.81	4.21										
	25	2.59	3.88										
	26	2.40	3.59										
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.15		1.46		1.33		1.02		2.75		2.02	
I, in.^{4}		2.81		2.76		2.52		1.96		4.23		3.22	
r, in.		1.56		1.37		1.38		1.39		1.24		1.26	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS3.75-HSS3.5

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS3.75×								HSS3.5×			
		0.148		0.120		0.109		0.083		0.180		0.148	
t_{design}, in.		0.148		0.120		0.109		0.083		0.180		0.148	
lb/ft		5.81		4.75		4.32		3.32		6.51		5.40	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	28.5	42.6	23.4	34.9	21.3	31.9	16.3	24.4	32.0	47.9	26.6	39.8
	6	22.4	33.6	18.4	27.5	16.9	25.2	12.9	19.4	24.1	36.1	20.1	30.1
	7	20.6	30.8	16.9	25.3	15.5	23.2	11.9	17.8	21.7	32.5	18.2	27.2
	8	18.6	27.9	15.3	22.9	14.0	21.0	10.8	16.2	19.3	28.9	16.2	24.2
	9	16.7	24.9	13.7	20.4	12.6	18.8	9.69	14.5	16.9	25.2	14.2	21.2
	10	14.7	22.0	12.1	18.0	11.1	16.6	8.58	12.8	14.5	21.7	12.2	18.3
	11	12.8	19.1	10.5	15.7	9.69	14.5	7.50	11.2	12.3	18.4	10.4	15.5
	12	11.0	16.4	9.01	13.5	8.34	12.5	6.47	9.68	10.3	15.5	8.73	13.1
	13	9.37	14.0	7.69	11.5	7.13	10.7	5.54	8.28	8.82	13.2	7.44	11.1
	14	8.08	12.1	6.63	9.92	6.14	9.19	4.77	7.14	7.60	11.4	6.42	9.60
	15	7.04	10.5	5.78	8.64	5.35	8.01	4.16	6.22	6.62	9.91	5.59	8.36
	16	6.19	9.26	5.08	7.59	4.70	7.04	3.65	5.47	5.82	8.71	4.91	7.35
	17	5.48	8.20	4.50	6.73	4.17	6.23	3.24	4.84	5.16	7.71	4.35	6.51
	18	4.89	7.31	4.01	6.00	3.72	5.56	2.89	4.32	4.60	6.88	3.88	5.81
	19	4.39	6.57	3.60	5.39	3.34	4.99	2.59	3.88	4.13	6.17	3.48	5.21
	20	3.96	5.92	3.25	4.86	3.01	4.50	2.34	3.50				
	21	3.59	5.37	2.95	4.41	2.73	4.09	2.12	3.17				
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.67	1.37	1.25	0.956	1.88	1.56
I, in.^{4}	2.72	2.26	2.07	1.61	2.59	2.19
r, in.	1.28	1.28	1.29	1.30	1.17	1.18

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

HSS3.5-HSS3.125

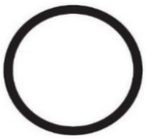
Shape		HSS3.5×										HSS3.125×	
		0.120		0.109		0.083		0.063		0.049		0.250	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.250	
lb/ft		4.42		4.03		3.09		2.34		1.84		7.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	21.6	32.4	19.8	29.6	15.2	22.7	11.5	17.2	9.05	13.5	38.5	57.6
	6	16.5	24.7	15.1	22.6	11.6	17.4	8.85	13.2	6.96	10.4	26.5	39.6
	7	15.0	22.4	13.7	20.5	10.6	15.8	8.05	12.0	6.34	9.48	23.1	34.6
	8	13.4	20.0	12.2	18.3	9.46	14.1	7.22	10.8	5.68	8.50	19.8	29.6
	9	11.8	17.6	10.7	16.1	8.34	12.5	6.38	9.54	5.02	7.51	16.6	24.8
	10	10.2	15.3	9.32	13.9	7.25	10.8	5.56	8.31	4.37	6.54	13.6	20.4
	11	8.71	13.0	7.96	11.9	6.20	9.28	4.77	7.13	3.75	5.61	11.3	16.8
	12	7.35	11.0	6.72	10.0	5.25	7.85	4.04	6.04	3.18	4.75	9.45	14.1
	13	6.27	9.37	5.72	8.56	4.47	6.69	3.44	5.15	2.71	4.05	8.06	12.1
	14	5.40	8.08	4.93	7.38	3.85	5.77	2.97	4.44	2.33	3.49	6.95	10.4
	15	4.71	7.04	4.30	6.43	3.36	5.02	2.59	3.87	2.03	3.04	6.05	9.05
	16	4.14	6.19	3.78	5.65	2.95	4.41	2.27	3.40	1.79	2.67	5.32	7.96
	17	3.66	5.48	3.35	5.01	2.61	3.91	2.01	3.01	1.58	2.37	4.71	7.05
	18	3.27	4.89	2.99	4.47	2.33	3.49	1.80	2.69	1.41	2.11		
	19	2.93	4.39	2.68	4.01	2.09	3.13	1.61	2.41	1.27	1.90		
	20	2.65	3.96	2.42	3.62	1.89	2.82	1.45	2.18	1.14	1.71		
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.27	1.16	0.891	0.675	0.531	2.26
I, in.^{4}	1.82	1.67	1.30	0.997	0.791	2.35
r, in.	1.20	1.20	1.21	1.22	1.22	1.02

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



HS3.125-HSS3

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

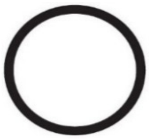
F_y = 30 ksi

Shape		HSS3.125×										HSS3×	
		0.180		0.120		0.109		0.083		0.063		0.250	
t_{design}, in.		0.180		0.120		0.109		0.083		0.063		0.250	
lb/ft		5.78		3.93		3.58		2.75		2.09		7.49	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	28.5	42.6	19.3	28.8	17.6	26.3	13.5	20.2	10.2	15.3	36.8	55.1
	6	19.8	29.7	13.6	20.4	12.5	18.7	9.67	14.5	7.33	11.0	24.5	36.6
	7	17.4	26.1	12.0	18.0	11.0	16.5	8.57	12.8	6.50	9.72	21.1	31.6
	8	15.0	22.4	10.4	15.5	9.58	14.3	7.46	11.2	5.65	8.46	17.8	26.6
	9	12.6	18.9	8.82	13.2	8.16	12.2	6.37	9.53	4.83	7.22	14.7	22.0
	10	10.5	15.6	7.34	11.0	6.81	10.2	5.34	7.99	4.05	6.05	11.9	17.9
	11	8.64	12.9	6.08	9.09	5.64	8.44	4.43	6.62	3.35	5.02	9.87	14.8
	12	7.26	10.9	5.11	7.64	4.74	7.09	3.72	5.56	2.82	4.22	8.29	12.4
	13	6.19	9.26	4.35	6.51	4.04	6.04	3.17	4.74	2.40	3.59	7.06	10.6
	14	5.34	7.98	3.75	5.61	3.48	5.21	2.73	4.09	2.07	3.10	6.09	9.11
	15	4.65	6.95	3.27	4.89	3.03	4.54	2.38	3.56	1.80	2.70	5.31	7.94
	16	4.09	6.11	2.87	4.30	2.67	3.99	2.09	3.13	1.59	2.37	4.66	6.98
	17	3.62	5.41	2.54	3.81	2.36	3.53	1.85	2.77	1.40	2.10		
	18							1.65	2.47	1.25	1.87		
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
A_g, in.^{2}		1.67		1.13		1.03		0.793		0.601		2.16	
I, in.^{4}		1.81		1.28		1.18		0.918		0.705		2.06	
r, in.		1.04		1.06		1.07		1.08		1.08		0.977	

ASD	LRFD	Note: Heavy line indicates KL/r equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	

F_y = 30 ksi

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

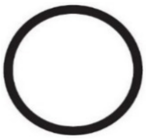

HSS3

Shape		HSS3×											
		0.180		0.148		0.120		0.109		0.083		0.063	
t_{design}, in.		0.180		0.148		0.120		0.109		0.083		0.063	
lb/ft		5.53		4.60		3.77		3.43		2.64		2.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	27.1	40.5	22.7	33.9	18.6	27.8	16.9	25.2	13.0	19.4	9.84	14.7
	1	26.8	40.1	22.4	33.6	18.4	27.5	16.7	25.0	12.8	19.2	9.74	14.6
	2	26.0	38.8	21.7	32.5	17.8	26.7	16.2	24.2	12.5	18.6	9.45	14.1
	3	24.6	36.8	20.6	30.8	16.9	25.3	15.4	23.0	11.8	17.7	8.99	13.4
	4	22.8	34.1	19.1	28.6	15.7	23.5	14.3	21.4	11.0	16.5	8.38	12.5
	5	20.7	30.9	17.4	26.0	14.3	21.4	13.0	19.5	10.0	15.0	7.66	11.5
	6	18.3	27.4	15.5	23.1	12.8	19.1	11.6	17.4	8.98	13.4	6.86	10.3
	7	15.9	23.8	13.5	20.2	11.2	16.7	10.1	15.2	7.86	11.8	6.02	9.01
	8	13.5	20.3	11.5	17.2	9.54	14.3	8.66	13.0	6.75	10.1	5.18	7.75
	9	11.3	16.9	9.59	14.3	7.99	12.0	7.26	10.9	5.67	8.48	4.37	6.54
	10	9.21	13.8	7.86	11.8	6.57	9.82	5.96	8.92	4.67	6.99	3.61	5.41
	11	7.61	11.4	6.49	9.71	5.43	8.12	4.93	7.37	3.86	5.78	2.99	4.47
	12	6.39	9.56	5.46	8.16	4.56	6.82	4.14	6.20	3.25	4.86	2.51	3.75
	13	5.45	8.15	4.65	6.95	3.89	5.81	3.53	5.28	2.77	4.14	2.14	3.20
	14	4.70	7.03	4.01	6.00	3.35	5.01	3.04	4.55	2.38	3.57	1.84	2.76
	15	4.09	6.12	3.49	5.22	2.92	4.37	2.65	3.97	2.08	3.11	1.61	2.40
	16	3.60	5.38	3.07	4.59	2.56	3.84	2.33	3.49	1.83	2.73	1.41	2.11
	17									1.62	2.42	1.25	1.87
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties						
A_g, in.^{2}	1.59	1.33	1.09	0.990	0.761	0.577
I, in.^{4}	1.59	1.35	1.13	1.04	0.810	0.622
r, in.	1.00	1.01	1.02	1.02	1.03	1.04

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



HSS3-HSS2.75

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS3×		HSS2.875×								HSS2.75×	
		0.049		0.180		0.120		0.109		0.083		0.250	
t_{design}, in.		0.049		0.180		0.120		0.109		0.083		0.250	
lb/ft		1.58		5.29		3.60		3.28		2.52		6.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	7.74	11.6	25.9	38.8	17.7	26.5	16.1	24.1	12.4	18.6	33.4	50.0
	1	7.66	11.5	25.6	38.3	17.5	26.2	16.0	23.9	12.3	18.4	33.0	49.3
	2	7.43	11.1	24.7	37.0	16.9	25.3	15.4	23.1	11.9	17.8	31.6	47.3
	3	7.07	10.6	23.3	34.8	16.0	23.9	14.6	21.8	11.2	16.8	29.5	44.2
	4	6.59	9.86	21.4	32.1	14.8	22.1	13.5	20.2	10.4	15.5	26.8	40.1
	5	6.02	9.01	19.3	28.8	13.3	19.9	12.2	18.2	9.40	14.1	23.7	35.5
	6	5.40	8.07	16.9	25.3	11.8	17.6	10.7	16.1	8.32	12.4	20.4	30.5
	7	4.74	7.09	14.5	21.7	10.1	15.2	9.28	13.9	7.20	10.8	17.1	25.5
	8	4.08	6.10	12.1	18.1	8.53	12.8	7.83	11.7	6.10	9.12	13.9	20.8
	9	3.44	5.14	9.92	14.8	7.03	10.5	6.46	9.66	5.05	7.55	11.1	16.6
	10	2.84	4.25	8.04	12.0	5.71	8.55	5.26	7.86	4.11	6.16	8.97	13.4
	11	2.35	3.52	6.65	9.94	4.72	7.06	4.34	6.50	3.40	5.09	7.41	11.1
	12	1.97	2.95	5.59	8.36	3.97	5.93	3.65	5.46	2.86	4.27	6.23	9.32
	13	1.68	2.52	4.76	7.12	3.38	5.06	3.11	4.65	2.43	3.64	5.31	7.94
	14	1.45	2.17	4.10	6.14	2.91	4.36	2.68	4.01	2.10	3.14	4.58	6.85
	15	1.26	1.89	3.57	5.35	2.54	3.80	2.34	3.49	1.83	2.74		
	16	1.11	1.66			2.23	3.34	2.05	3.07	1.61	2.40		
	17	0.984	1.47										
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

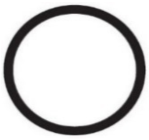
A_g, in.^{2}	0.454	1.52	1.04	0.947	0.728	1.96
I, in.^{4}	0.495	1.39	0.987	0.907	0.710	1.55
r, in.	1.04	0.956	0.974	0.979	0.988	0.889

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

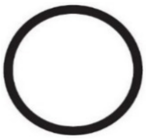
Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS2.75

Shape	HSS2.75×											
	0.180		0.148		0.120		0.109		0.083		0.065	
t_{design}, in.	0.180		0.148		0.120		0.109		0.083		0.065	
lb/ft	5.04		4.20		3.44		3.14		2.41		1.90	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r												
0	24.7	37.0	20.6	30.9	16.9	25.3	15.4	23.1	11.8	17.7	9.34	14.0
1	24.4	36.5	20.4	30.5	16.7	25.0	15.2	22.8	11.7	17.5	9.23	13.8
2	23.5	35.1	19.6	29.3	16.1	24.0	14.7	21.9	11.3	16.9	8.90	13.3
3	22.0	32.9	18.4	27.5	15.1	22.6	13.8	20.6	10.6	15.9	8.38	12.5
4	20.1	30.0	16.8	25.2	13.8	20.7	12.6	18.9	9.75	14.6	7.71	11.5
5	17.9	26.7	15.0	22.5	12.4	18.5	11.3	16.9	8.74	13.1	6.91	10.3
6	15.5	23.2	13.0	19.5	10.8	16.1	9.86	14.8	7.65	11.4	6.06	9.06
7	13.1	19.6	11.1	16.5	9.15	13.7	8.39	12.6	6.53	9.77	5.18	7.75
8	10.8	16.1	9.14	13.7	7.59	11.4	6.97	10.4	5.44	8.14	4.32	6.47
9	8.66	13.0	7.37	11.0	6.14	9.19	5.65	8.45	4.42	6.62	3.52	5.27
10	7.01	10.5	5.97	8.93	4.97	7.44	4.58	6.85	3.59	5.36	2.86	4.27
11	5.80	8.67	4.93	7.38	4.11	6.15	3.78	5.66	2.96	4.43	2.36	3.53
12	4.87	7.29	4.14	6.20	3.45	5.17	3.18	4.75	2.49	3.73	1.98	2.97
13	4.15	6.21	3.53	5.28	2.94	4.40	2.71	4.05	2.12	3.17	1.69	2.53
14	3.58	5.35	3.05	4.56	2.54	3.80	2.33	3.49	1.83	2.74	1.46	2.18
15	3.12	4.66	2.65	3.97	2.21	3.31	2.03	3.04	1.59	2.38	1.27	1.90
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
Properties												
A_g, in.^{2}	1.45		1.21		0.991		0.904		0.695		0.548	
I, in.^{4}	1.21		1.03		0.859		0.790		0.619		0.494	
r, in.	0.914		0.923		0.931		0.935		0.944		0.949	

ASD	LRFD	Note: Heavy line indicates KL/r equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	



HSS2.5

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS2.5×											
		0.250		0.180		0.148		0.120		0.109		0.083	
t_{design}, in.		0.250		0.180		0.148		0.120		0.109		0.083	
lb/ft		6.13		4.55		3.79		3.11		2.84		2.19	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	30.2	45.1	22.3	33.4	18.6	27.8	15.3	22.9	14.0	20.9	10.7	16.1
	1	29.7	44.4	22.0	32.9	18.3	27.4	15.1	22.5	13.8	20.6	10.6	15.8
	2	28.2	42.2	20.9	31.3	17.5	26.1	14.4	21.5	13.1	19.7	10.1	15.1
	3	25.9	38.7	19.3	28.9	16.1	24.2	13.3	19.9	12.2	18.2	9.40	14.1
	4	23.0	34.4	17.3	25.9	14.5	21.7	12.0	17.9	11.0	16.4	8.47	12.7
	5	19.7	29.5	15.0	22.4	12.6	18.8	10.4	15.6	9.56	14.3	7.41	11.1
	6	16.4	24.5	12.6	18.8	10.6	15.9	8.83	13.2	8.09	12.1	6.30	9.42
	7	13.1	19.6	10.2	15.3	8.66	13.0	7.24	10.8	6.65	9.95	5.19	7.77
	8	10.2	15.3	8.03	12.0	6.86	10.3	5.76	8.62	5.30	7.93	4.16	6.22
	9	8.08	12.1	6.34	9.49	5.42	8.11	4.56	6.82	4.19	6.27	3.29	4.92
	10	6.54	9.79	5.14	7.69	4.39	6.57	3.69	5.52	3.39	5.08	2.67	3.99
	11	5.41	8.09	4.25	6.35	3.63	5.43	3.05	4.56	2.80	4.20	2.20	3.30
	12	4.54	6.80	3.57	5.34	3.05	4.56	2.56	3.83	2.36	3.53	1.85	2.77
	13	3.87	5.79	3.04	4.55	2.60	3.89	2.18	3.27	2.01	3.00	1.58	2.36
	14							1.88	2.82	1.73	2.59	1.36	2.04
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

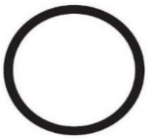
	0.250	0.180	0.148	0.120	0.109	0.083
A_g, in.^{2}	1.77	1.31	1.09	0.897	0.819	0.630
I, in.^{4}	1.13	0.888	0.759	0.637	0.586	0.461
r, in.	0.799	0.823	0.834	0.843	0.846	0.855

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS2.5-HSS2.375

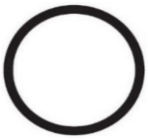
Shape		HSS2.5×				HSS2.375×							
		0.063		0.049		0.180		0.148		0.120		0.109	
t_{design}, in.		0.063		0.049		0.180		0.148		0.120		0.109	
lb/ft		1.66		1.31		4.30		3.59		2.95		2.69	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	8.16	12.2	6.43	9.61	21.1	31.6	17.7	26.5	14.5	21.7	13.2	19.8
	1	8.05	12.0	6.33	9.48	20.8	31.1	17.4	26.1	14.2	21.3	13.0	19.5
	2	7.70	11.5	6.07	9.07	19.7	29.4	16.5	24.7	13.5	20.3	12.4	18.5
	3	7.16	10.7	5.64	8.44	18.0	26.9	15.2	22.7	12.4	18.6	11.4	17.0
	4	6.47	9.67	5.10	7.63	15.9	23.8	13.4	20.1	11.0	16.5	10.1	15.1
	5	5.67	8.48	4.48	6.70	13.5	20.2	11.5	17.1	9.48	14.2	8.68	13.0
	6	4.83	7.23	3.82	5.72	11.1	16.6	9.46	14.1	7.86	11.8	7.21	10.8
	7	4.00	5.98	3.17	4.74	8.81	13.2	7.54	11.3	6.31	9.44	5.79	8.67
	8	3.21	4.80	2.55	3.82	6.81	10.2	5.84	8.74	4.91	7.34	4.52	6.76
	9	2.54	3.81	2.03	3.03	5.38	8.05	4.62	6.91	3.88	5.80	3.57	5.34
	10	2.06	3.08	1.64	2.45	4.36	6.52	3.74	5.59	3.14	4.70	2.89	4.32
	11	1.70	2.55	1.36	2.03	3.60	5.39	3.09	4.62	2.60	3.88	2.39	3.57
	12	1.43	2.14	1.14	1.70	3.03	4.53	2.60	3.88	2.18	3.26	2.01	3.00
	13	1.22	1.82	0.971	1.45			2.21	3.31	1.86	2.78	1.71	2.56
	14	1.05	1.57	0.837	1.25								
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

	0.063	0.049	0.180	0.148	0.120	0.109
A_g, in.^{2}	0.479	0.377	1.24	1.04	0.850	0.776
I, in.^{4}	0.356	0.283	0.753	0.645	0.542	0.499
r, in.	0.862	0.867	0.779	0.788	0.799	0.802

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS2.375-HSS2.25

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS2.375×						HSS2.25×					
		0.083		0.063		0.049		0.180		0.148		0.120	
t_{design}, in.		0.083		0.063		0.049		0.180		0.148		0.120	
lb/ft		2.07		1.57		1.24		4.06		3.39		2.78	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	10.2	15.2	7.74	11.6	6.10	9.13	19.9	29.8	16.7	24.9	13.7	20.5
	1	10.0	15.0	7.61	11.4	6.01	8.98	19.5	29.2	16.3	24.4	13.4	20.1
	2	9.54	14.3	7.25	10.9	5.72	8.56	18.4	27.5	15.4	23.0	12.7	19.0
	3	8.79	13.1	6.69	10.0	5.28	7.90	16.6	24.9	14.0	20.9	11.5	17.2
	4	7.83	11.7	5.97	8.93	4.72	7.06	14.5	21.6	12.2	18.2	10.1	15.1
	5	6.75	10.1	5.16	7.72	4.09	6.11	12.1	18.1	10.2	15.3	8.50	12.7
	6	5.63	8.43	4.32	6.46	3.43	5.13	9.69	14.5	8.25	12.3	6.89	10.3
	7	4.55	6.80	3.50	5.24	2.78	4.16	7.46	11.2	6.40	9.57	5.38	8.05
	8	3.56	5.32	2.75	4.11	2.19	3.27	5.72	8.55	4.91	7.34	4.13	6.18
	9	2.81	4.21	2.17	3.25	1.73	2.59	4.52	6.76	3.88	5.80	3.26	4.88
	10	2.28	3.41	1.76	2.63	1.40	2.10	3.66	5.47	3.14	4.70	2.64	3.95
	11	1.88	2.82	1.45	2.17	1.16	1.73	3.02	4.52	2.59	3.88	2.18	3.27
	12	1.58	2.37	1.22	1.83	0.973	1.46	2.54	3.80	2.18	3.26	1.84	2.75
	13	1.35	2.02	1.04	1.56	0.829	1.24						
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.598	0.454	0.358	1.17	0.977	0.803
I, in.^{4}	0.393	0.304	0.242	0.632	0.542	0.457
r, in.	0.811	0.818	0.822	0.735	0.745	0.754

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

HSS2.25-HSS2

Shape		HSS2.25×						HSS2×					
		0.109		0.083		0.063		0.180		0.148		0.120	
t_{design}, in.		0.109		0.083		0.063		0.180		0.148		0.120	
lb/ft		2.54		1.96		1.49		3.57		2.99		2.46	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	12.5	18.7	9.63	14.4	7.33	11.0	17.6	26.3	14.7	22.0	12.1	18.1
	1	12.3	18.3	9.45	14.1	7.20	10.8	17.1	25.6	14.3	21.4	11.8	17.6
	2	11.6	17.3	8.95	13.4	6.82	10.2	15.8	23.7	13.3	19.9	11.0	16.4
	3	10.5	15.8	8.16	12.2	6.23	9.31	13.9	20.8	11.7	17.5	9.69	14.5
	4	9.24	13.8	7.17	10.7	5.48	8.20	11.6	17.3	9.82	14.7	8.2	12.2
	5	7.80	11.7	6.08	9.09	4.66	6.97	9.17	13.7	7.84	11.7	6.55	9.80
	6	6.34	9.48	4.96	7.42	3.82	5.71	6.89	10.3	5.94	8.89	5.00	7.48
	7	4.96	7.42	3.91	5.84	3.01	4.51	5.08	7.60	4.39	6.57	3.70	5.54
	8	3.81	5.70	3.01	4.50	2.32	3.48	3.89	5.82	3.36	5.03	2.84	4.24
	9	3.01	4.50	2.38	3.55	1.84	2.75	3.07	4.60	2.66	3.97	2.24	3.35
	10	2.44	3.65	1.92	2.88	1.49	2.23	2.49	3.72	2.15	3.22	1.82	2.72
	11	2.02	3.01	1.59	2.38	1.23	1.84					1.50	2.24
	12	1.69	2.53	1.34	2.00	1.03	1.55						
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

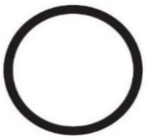
Properties

A_g, in.^{2}	0.733	0.565	0.430	1.03	0.861	0.709
I, in.^{4}	0.421	0.332	0.257	0.430	0.372	0.314
r, in.	0.758	0.767	0.773	0.646	0.657	0.665

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS2-HSS1.9

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS2×										HSS1.9×	
		0.109		0.083		0.063		0.049		0.035		0.148	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.148	
lb/ft		2.25		1.73		1.32		1.04		0.749		2.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	11.0	16.5	8.52	12.8	6.48	9.69	5.11	7.65	3.68	5.51	13.9	20.8
	1	10.8	16.1	8.32	12.5	6.33	9.47	5.00	7.48	3.60	5.39	13.5	20.2
	2	10.0	15.0	7.76	11.6	5.91	8.84	4.67	6.98	3.36	5.03	12.4	18.6
	3	8.88	13.3	6.89	10.3	5.26	7.88	4.17	6.23	3.01	4.50	10.8	16.2
	4	7.50	11.2	5.85	8.74	4.48	6.70	3.55	5.32	2.57	3.84	8.87	13.3
	5	6.03	9.02	4.73	7.07	3.64	5.45	2.89	4.33	2.10	3.14	6.90	10.3
	6	4.62	6.91	3.65	5.46	2.83	4.23	2.25	3.37	1.64	2.45	5.07	7.59
	7	3.43	5.13	2.72	4.06	2.11	3.16	1.69	2.52	1.23	1.84	3.73	5.57
	8	2.62	3.93	2.08	3.11	1.62	2.42	1.29	1.93	0.941	1.41	2.85	4.27
	9	2.07	3.10	1.64	2.46	1.28	1.91	1.02	1.53	0.744	1.11	2.25	3.37
	10	1.68	2.51	1.33	1.99	1.04	1.55	0.827	1.24	0.602	0.901	1.83	2.73
	11	1.39	2.08	1.10	1.65	0.856	1.28	0.683	1.02	0.498	0.745		
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.648	0.500	0.380	0.300	0.216	0.815
I, in.^{4}	0.290	0.230	0.179	0.143	0.104	0.315
r, in.	0.669	0.678	0.686	0.690	0.694	0.622

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

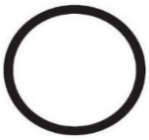
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS1.9

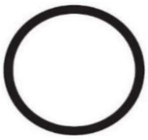
Shape		HSS1.9×											
		0.120		0.109		0.083		0.063		0.049		0.035	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.33		2.13		1.64		1.25		0.988		0.711	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	11.4	17.1	10.4	15.6	8.08	12.1	6.15	9.21	4.86	7.27	3.49	5.23
	1	11.1	16.7	10.2	15.2	7.87	11.8	6.00	8.97	4.74	7.09	3.41	5.10
	2	10.3	15.3	9.38	14.0	7.28	10.9	5.55	8.31	4.39	6.57	3.16	4.73
	3	8.95	13.4	8.20	12.3	6.38	9.55	4.88	7.30	3.87	5.79	2.79	4.18
	4	7.40	11.1	6.80	10.2	5.31	7.95	4.08	6.10	3.24	4.85	2.35	3.51
	5	5.79	8.67	5.34	7.98	4.20	6.28	3.23	4.84	2.58	3.86	1.88	2.81
	6	4.29	6.42	3.97	5.94	3.15	4.71	2.44	3.65	1.95	2.92	1.43	2.13
	7	3.16	4.72	2.92	4.37	2.32	3.46	1.80	2.69	1.44	2.15	1.06	1.58
	8	2.42	3.62	2.24	3.35	1.77	2.65	1.38	2.06	1.10	1.65	0.808	1.21
	9	1.91	2.86	1.77	2.64	1.40	2.10	1.09	1.63	0.871	1.30	0.638	0.955
	10	1.55	2.31	1.43	2.14	1.13	1.70	0.880	1.32	0.706	1.06	0.517	0.773
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.671	0.613	0.474	0.361	0.285	0.205
I, in.^{4}	0.267	0.247	0.196	0.152	0.122	0.089
r, in.	0.631	0.635	0.643	0.649	0.654	0.660

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS1.75

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 30 ksi

Shape		HSS1.75×											
		0.120		0.109		0.083		0.063		0.049		0.035	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.13		1.95		1.51		1.15		0.908		0.654	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	10.5	15.7	9.58	14.3	7.41	11.1	5.64	8.44	4.47	6.68	3.22	4.82
	1	10.1	15.2	9.28	13.9	7.19	10.8	5.47	8.19	4.33	6.48	3.13	4.68
	2	9.19	13.8	8.43	12.6	6.54	9.79	5.00	7.47	3.96	5.93	2.86	4.28
	3	7.82	11.7	7.18	10.7	5.60	8.37	4.29	6.42	3.41	5.10	2.47	3.70
	4	6.23	9.32	5.73	8.57	4.50	6.73	3.47	5.19	2.77	4.14	2.01	3.01
	5	4.65	6.96	4.29	6.42	3.40	5.08	2.64	3.95	2.11	3.16	1.54	2.30
	6	3.30	4.94	3.05	4.56	2.43	3.63	1.90	2.84	1.53	2.28	1.12	1.67
	7	2.42	3.63	2.24	3.35	1.78	2.67	1.39	2.09	1.12	1.68	0.820	1.23
	8	1.86	2.78	1.72	2.57	1.37	2.04	1.07	1.60	0.859	1.29	0.628	0.939
	9	1.47	2.19	1.36	2.03	1.08	1.61	0.843	1.26	0.679	1.02	0.496	0.742
	10									0.550	0.822	0.402	0.601
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.614		0.562		0.435		0.331		0.262		0.189	
I, in.^{4}		0.205		0.190		0.151		0.118		0.095		0.069	
r, in.		0.578		0.581		0.589		0.597		0.602		0.606	

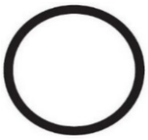
ASD	LRFD	Note: Heavy line indicates KL/r equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS1.66-HSS1.5

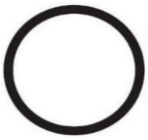
Shape		HSS1.66×										HSS1.5×	
		0.148		0.120		0.109		0.083		0.063		0.120	
t_{design}, in.		0.148		0.120		0.109		0.083		0.063		0.120	
lb/ft		2.44		2.01		1.84		1.43		1.09		1.80	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	12.0	17.9	9.90	14.8	9.05	13.5	7.01	10.5	5.35	8.01	8.86	13.3
	1	11.5	17.3	9.55	14.3	8.73	13.1	6.77	10.1	5.17	7.74	8.47	12.7
	2	10.3	15.4	8.56	12.8	7.84	11.7	6.10	9.12	4.67	6.99	7.40	11.1
	3	8.54	12.8	7.14	10.7	6.55	9.80	5.12	7.66	3.94	5.89	5.90	8.83
	4	6.57	9.83	5.54	8.28	5.09	7.62	4.01	6.01	3.10	4.64	4.31	6.44
	5	4.68	7.01	3.99	5.97	3.68	5.51	2.94	4.39	2.28	3.42	2.89	4.33
	6	3.26	4.88	2.79	4.17	2.57	3.85	2.06	3.08	1.61	2.40	2.01	3.00
	7	2.40	3.58	2.05	3.06	1.89	2.83	1.51	2.26	1.18	1.77	1.48	2.21
	8	1.83	2.74	1.57	2.34	1.45	2.17	1.16	1.73	0.904	1.35	1.13	1.69
	9			1.24	1.85	1.14	1.71	0.915	1.37	0.714	1.07		
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.703	0.581	0.531	0.411	0.314	0.520
I, in.^{4}	0.203	0.173	0.160	0.128	0.100	0.125
r, in.	0.537	0.546	0.549	0.558	0.564	0.490

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS1.5-HSS1.25

Table 4-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 30 ksi

	Shape	HSS1.5×										HSS1.25×	
		0.109		0.083		0.063		0.049		0.035		0.120	
	t_{design}, in.	0.109		0.083		0.063		0.049		0.035		0.120	
	lb/ft	1.65		1.28		0.979		0.775		0.559		1.48	
	Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	8.11	12.1	6.29	9.41	4.81	7.19	3.80	5.69	2.74	4.11	7.26	10.9
	1	7.76	11.6	6.03	9.01	4.61	6.90	3.65	5.46	2.64	3.94	6.79	10.2
	2	6.79	10.2	5.30	7.92	4.07	6.08	3.23	4.83	2.33	3.49	5.55	8.31
	3	5.44	8.14	4.27	6.39	3.30	4.94	2.63	3.93	1.91	2.85	3.97	5.94
	4	3.99	5.97	3.16	4.73	2.46	3.68	1.97	2.95	1.44	2.15	2.49	3.73
	5	2.69	4.02	2.15	3.22	1.69	2.53	1.36	2.04	1.00	1.50	1.59	2.39
	6	1.87	2.79	1.50	2.24	1.18	1.76	0.948	1.42	0.695	1.04	1.11	1.66
	7	1.37	2.05	1.10	1.64	0.863	1.29	0.696	1.04	0.510	0.764		
	8	1.05	1.57	0.841	1.26	0.661	0.989	0.533	0.797	0.391	0.585		
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.476	0.369	0.282	0.223	0.161	0.426
I, in.^{4}	0.116	0.093	0.073	0.059	0.043	0.069
r, in.	0.494	0.502	0.509	0.514	0.518	0.402

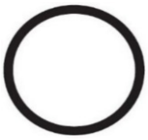
ASD	LRFD	Note: Heavy line indicates *KL*/*r* equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



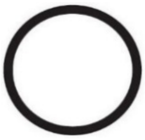
HSS1.25-HSS1

Shape		HSS1.25×										HSS1×	
		0.109		0.083		0.063		0.049		0.035		0.120	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.120	
lb/ft		1.36		1.06		0.809		0.641		0.463		1.15	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	6.66	9.97	5.18	7.75	3.97	5.94	3.15	4.72	2.28	3.42	5.66	8.47
	1	6.24	9.33	4.86	7.28	3.74	5.59	2.97	4.44	2.15	3.22	5.07	7.58
	2	5.12	7.66	4.02	6.02	3.11	4.65	2.48	3.71	1.80	2.70	3.65	5.45
	3	3.68	5.50	2.93	4.39	2.29	3.43	1.84	2.75	1.34	2.01	2.10	3.15
	4	2.32	3.47	1.89	2.82	1.49	2.23	1.21	1.81	0.890	1.33	1.18	1.77
	5	1.49	2.22	1.21	1.81	0.956	1.43	0.774	1.16	0.571	0.854	0.758	1.13
	6	1.03	1.54	0.838	1.25	0.664	0.994	0.537	0.804	0.397	0.593		
	7					0.488	0.730	0.395	0.591	0.291	0.436		
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.391	0.304	0.233	0.185	0.134	0.332
I, in.^{4}	0.064	0.052	0.041	0.033	0.025	0.033
r, in.	0.405	0.414	0.421	0.425	0.429	0.314

ASD	LRFD	Note: Heavy line indicates KL/r equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	



HSS1

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 30 ksi

Shape		HSS1×											
		0.109		0.083		0.065		0.063		0.049		0.042	
t_{design}, in.		0.109		0.083		0.065		0.063		0.049		0.042	
lb/ft		1.06		0.829		0.662		0.638		0.508		0.438	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	5.20	7.78	4.07	6.09	3.26	4.87	3.14	4.69	2.49	3.72	2.15	3.21
	1	4.67	6.98	3.68	5.50	2.95	4.41	2.84	4.25	2.26	3.38	1.95	2.92
	2	3.38	5.05	2.70	4.04	2.20	3.29	2.12	3.17	1.70	2.54	1.47	2.20
	3	1.97	2.95	1.62	2.42	1.34	2.01	1.29	1.94	1.05	1.58	0.919	1.38
	4	1.11	1.66	0.914	1.37	0.762	1.14	0.734	1.10	0.600	0.898	0.524	0.784
	5	0.710	1.06	0.585	0.875	0.488	0.729	0.470	0.703	0.384	0.574	0.335	0.502
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties						
A_g, in.^{2}	0.305	0.239	0.191	0.184	0.146	0.126
I, in.^{4}	0.031	0.025	0.021	0.020	0.017	0.015
r, in.	0.317	0.325	0.332	0.332	0.337	0.339

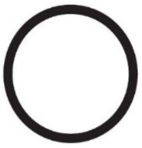
ASD	LRFD	Note: Heavy line indicates *KL*/*r* equal to or greater than 200.
Ω_c = 1.76	φ_c = 0.85	

F_y = 30 ksi

Table 4-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS1

Shape		HSS1×			
		0.035		0.032	
t_{design}, in.		0.035		0.032	
lb/ft		0.368		0.337	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	1.81	2.70	1.66	2.48
	1	1.65	2.46	1.51	2.26
	2	1.25	1.87	1.14	1.71
	3	0.785	1.17	0.720	1.08
	4	0.449	0.671	0.412	0.616
	5	0.287	0.430	0.264	0.394
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

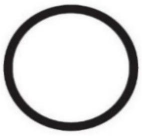
Properties

A_g, in.^{2}	0.106	0.097
I, in.^{4}	0.012	0.011
r, in.	0.342	0.342

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



PIPE 12-PIPE 8

Table 4-7
Available Strength in Axial Compression, kips
Pipe

F_y = 30 ksi

Shape		Pipe 12				Pipe 10				Pipe 8			
		Std. 40S		Std. 10S		Std. 40S		Std. 10S		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.180		0.365		0.165		0.500		0.322	
lb/ft		50.6		24.7		41.3		19.0		44.3		29.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	249	372	122	182	205	306	93.9	141	218	326	143	214
	6	244	365	119	179	199	297	91.4	137	208	311	137	205
	7	242	362	118	177	197	294	90.5	135	205	306	135	201
	8	240	359	118	176	194	291	89.4	134	201	300	132	198
	9	238	356	116	174	192	287	88.3	132	196	294	129	194
	10	235	352	115	172	189	283	87.0	130	191	286	126	189
	11	233	348	114	170	186	278	85.6	128	186	279	123	184
	12	230	343	113	168	182	273	84.1	126	181	270	120	179
	13	226	339	111	166	179	267	82.5	123	175	262	116	173
	14	223	334	109	164	175	262	80.8	121	169	253	112	168
	15	219	328	108	161	171	256	79.0	118	163	243	108	162
	16	216	323	106	158	167	250	77.2	115	156	234	104	155
	17	212	317	104	156	163	243	75.3	113	150	224	99.7	149
	18	208	311	102	153	158	236	73.3	110	143	214	95.4	143
	19	203	304	100	150	153	230	71.2	107	136	204	91.1	136
	20	199	298	97.9	146	149	223	69.1	103	129	194	86.7	130
	21	194	291	95.7	143	144	215	67.0	100	123	183	82.4	123
	22	190	284	93.5	140	139	208	64.8	97.0	116	173	78.1	117
	23	185	277	91.2	136	134	201	62.6	93.7	109	164	73.8	110
	24	180	270	88.9	133	129	193	60.4	90.4	103	154	69.5	104
	25	175	262	86.6	130	124	186	58.2	87.0	96.4	144	65.4	97.8
	26	170	255	84.2	126	119	179	55.9	83.7	90.2	135	61.4	91.8
	27	165	248	81.8	122	115	171	53.7	80.4	84.2	126	57.4	85.9
	28	160	240	79.4	119	110	164	51.5	77.0	78.4	117	53.6	80.2
	29	155	233	77.0	115	105	157	49.3	73.7	73.1	109	50.0	74.8
	30	150	225	74.5	112	99.9	150	47.1	70.5	68.3	102	46.7	69.9
	32	140	210	69.7	104	90.5	135	42.8	64.1	60.0	89.8	41.1	61.4
	34	130	195	64.8	97.0	81.5	122	38.7	57.9	53.2	79.6	36.4	54.4
	36	120	180	60.1	89.9	73.0	109	34.8	52.0	47.4	71.0	32.4	48.5
	38	111	166	55.4	82.9	65.5	98.0	31.2	46.7	42.6	63.7	29.1	43.6
	40	102	152	50.9	76.2	59.1	88.5	28.2	42.2	38.4	57.5	26.3	39.3
Properties													
A_g, in.^{2}		14.6		7.14		12.0		5.51		12.8		8.40	
I, in.^{4}		283		142		163		78.0		106		72.6	
r, in.		4.40		4.46		3.69		3.76		2.88		2.94	

ASD	LRFD	
Ω_c = 1.76	φ_c = 0.85	Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-7 (continued)
Available Strength in Axial Compression, kips
Pipe

PIPE 8-PIPE 6

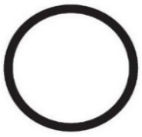
Shape		Pipe 8				Pipe 6							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.148		0.109		0.432		0.280		0.134		0.109	
lb/ft		13.7		10.1		29.1		19.4		9.48		7.74	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	67.2	100	49.8	74.5	143	214	95.3	143	46.5	69.6	38.0	56.9
	6	64.3	96.2	47.7	71.3	132	198	88.2	132	43.2	64.7	35.3	52.9
	7	63.3	94.7	46.9	70.2	128	192	85.8	128	42.1	63.0	34.4	51.5
	8	62.2	93.0	46.1	69.0	124	186	83.1	124	40.8	61.1	33.4	49.9
	9	60.9	91.1	45.2	67.6	120	179	80.1	120	39.4	59.0	32.2	48.2
	10	59.5	89.1	44.2	66.1	115	171	76.9	115	37.9	56.7	31.0	46.4
	11	58.1	86.8	43.1	64.4	109	164	73.5	110	36.3	54.3	29.7	44.5
	12	56.5	84.5	41.9	62.7	104	155	70.0	105	34.6	51.8	28.4	42.4
	13	54.8	82.0	40.7	60.8	98.2	147	66.4	99.3	32.9	49.2	27.0	40.3
	14	53.0	79.4	39.4	58.9	92.4	138	62.6	93.7	31.1	46.6	25.5	38.2
	15	51.2	76.6	38.0	56.9	86.6	130	58.9	88.1	29.4	43.9	24.1	36.0
	16	49.3	73.8	36.6	54.8	80.8	121	55.1	82.4	27.5	41.2	22.6	33.8
	17	47.4	70.9	35.2	52.7	75.1	112	51.3	76.8	25.7	38.5	21.1	31.6
	18	45.5	68.0	33.8	50.5	69.4	104	47.6	71.2	24.0	35.8	19.7	29.5
	19	43.5	65.1	32.3	48.4	63.9	95.6	44.0	65.8	22.2	33.2	18.3	27.3
	20	41.5	62.1	30.8	46.1	58.5	87.6	40.5	60.6	20.5	30.7	16.9	25.2
	21	39.5	59.1	29.4	43.9	53.4	79.9	37.1	55.5	18.9	28.2	15.5	23.2
	22	37.5	56.1	27.9	41.7	48.7	72.8	33.9	50.6	17.3	25.8	14.2	21.3
	23	35.5	53.1	26.4	39.6	44.6	66.6	31.0	46.3	15.8	23.6	13.0	19.5
	24	33.6	50.2	25.0	37.4	40.9	61.2	28.4	42.6	14.5	21.7	12.0	17.9
	25	31.6	47.3	23.6	35.3	37.7	56.4	26.2	39.2	13.4	20.0	11.0	16.5
	26	29.8	44.5	22.2	33.2	34.9	52.2	24.2	36.3	12.4	18.5	10.2	15.2
	27	27.9	41.8	20.8	31.1	32.3	48.4	22.5	33.6	11.5	17.2	9.45	14.1
	28	26.1	39.1	19.5	29.2	30.1	45.0	20.9	31.3	10.7	16.0	8.79	13.1
	29	24.4	36.5	18.2	27.2	28.0	41.9	19.5	29.1	9.94	14.9	8.19	12.3
	30	22.8	34.1	17.0	25.5	26.2	39.2	18.2	27.2	9.29	13.9	7.66	11.5
	32	20.1	30.0	15.0	22.4	23.0	34.4	16.0	23.9	8.17	12.2	6.73	10.1
	34	17.8	26.6	13.3	19.8	20.4	30.5	14.2	21.2	7.23	10.8	5.96	8.92
	36	15.8	23.7	11.8	17.7	18.2	27.2	12.6	18.9	6.45	9.65	5.32	7.95
	38	14.2	21.3	10.6	15.9					5.79	8.66	4.77	7.14
	40	12.8	19.2	9.57	14.3								

Properties

	Pipe 8 Std. 10S	Pipe 8 Std. 5S	Pipe 6 Std. 80S	Pipe 6 Std. 40S	Pipe 6 Std. 10S	Pipe 6 Std. 5S
A_g, in.^{2}	3.94	2.92	8.41	5.59	2.73	2.23
I, in.^{4}	35.5	26.5	40.6	28.2	14.4	11.9
r, in.	3.00	3.01	2.20	2.25	2.30	2.31

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



PIPE 5-PIPE 4

Table 4-7 (continued)

Available Strength in Axial Compression, kips

Pipe

F_y = 30 ksi

Shape		Pipe 5								Pipe 4			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.258		0.134		0.109		0.337		0.237	
lb/ft		21.2		14.9		7.93		6.48		15.3		11.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	104	156	73.3	110	38.9	58.1	31.9	47.7	75.2	112	54.0	80.8
	6	92.8	139	65.6	98.1	35.0	52.3	28.7	42.9	62.9	94.1	45.5	68.1
	7	89.0	133	63.0	94.2	33.7	50.3	27.6	41.4	59.0	88.2	42.8	64.0
	8	84.9	127	60.1	89.9	32.2	48.2	26.5	39.6	54.8	81.9	39.9	59.6
	9	80.4	120	57.0	85.3	30.6	45.8	25.2	37.7	50.4	75.3	36.8	55.0
	10	75.6	113	53.8	80.4	29.0	43.3	23.8	35.6	45.8	68.6	33.6	50.3
	11	70.7	106	50.4	75.4	27.2	40.7	22.4	33.5	41.3	61.8	30.4	45.5
	12	65.7	98.3	46.9	70.2	25.5	38.1	21.0	31.4	36.9	55.2	27.3	40.8
	13	60.6	90.7	43.4	65.0	23.6	35.4	19.5	29.2	32.6	48.7	24.2	36.2
	14	55.6	83.2	39.9	59.7	21.8	32.7	18.0	27.0	28.5	42.6	21.3	31.8
	15	50.7	75.8	36.5	54.6	20.1	30.0	16.6	24.8	24.9	37.2	18.6	27.8
	16	45.9	68.7	33.2	49.6	18.3	27.4	15.1	22.6	21.8	32.7	16.3	24.5
	17	41.3	61.8	29.9	44.8	16.6	24.9	13.8	20.6	19.4	29.0	14.5	21.7
	18	37.0	55.3	26.9	40.2	15.0	22.4	12.4	18.6	17.3	25.8	12.9	19.3
	19	33.2	49.6	24.1	36.1	13.5	20.2	11.2	16.7	15.5	23.2	11.6	17.3
	20	29.9	44.8	21.8	32.6	12.2	18.2	10.1	15.1	14.0	20.9	10.5	15.7
	21	27.2	40.6	19.7	29.5	11.0	16.5	9.15	13.7	12.7	19.0	9.49	14.2
	22	24.7	37.0	18.0	26.9	10.1	15.0	8.33	12.5	11.6	17.3	8.65	12.9
	23	22.6	33.9	16.5	24.6	9.20	13.8	7.62	11.4	10.6	15.8	7.91	11.8
	24	20.8	31.1	15.1	22.6	8.45	12.6	7.00	10.5	9.71	14.5	7.27	10.9
	25	19.2	28.7	13.9	20.8	7.79	11.6	6.45	9.65			6.70	10.0
	26	17.7	26.5	12.9	19.3	7.20	10.8	5.97	8.93				
	27	16.4	24.6	11.9	17.9	6.68	10.0	5.53	8.28				
	28	15.3	22.9	11.1	16.6	6.21	9.29	5.14	7.70				
	29	14.2	21.3	10.4	15.5	5.79	8.66	4.80	7.17				
	30	13.3	19.9	9.67	14.5	5.41	8.09	4.48	6.70				
	32					4.75	7.11	3.94	5.89				
	34												
	36												
	38												
	40												

Properties

	Pipe 5 Std. 80S	Pipe 5 Std. 40S	Pipe 5 Std. 10S	Pipe 5 Std. 5S	Pipe 4 Std. 80S	Pipe 4 Std. 40S
A_g, in.^{2}	6.11	4.30	2.28	1.87	4.41	3.17
I, in.^{4}	20.6	15.1	8.41	6.94	9.61	7.23
r, in.	1.84	1.87	1.92	1.93	1.48	1.51

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 30 ksi

Table 4-7 (continued)
Available Strength in Axial Compression, kips
Pipe

PIPE 4-PIPE 3½

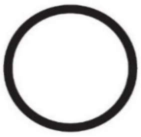
Shape		Pipe 4				Pipe 3½							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.120		0.083		0.318		0.226		0.120		0.083	
lb/ft		5.73		3.99		12.8		9.29		5.07		3.54	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	28.1	42.1	19.6	29.3	62.7	93.8	45.7	68.3	24.9	37.2	17.4	26.0
	6	23.9	35.8	16.7	25.0	50.0	74.8	36.8	55.0	20.2	30.2	14.2	21.3
	7	22.5	33.7	15.8	23.6	46.0	68.9	34.0	50.8	18.8	28.1	13.2	19.8
	8	21.1	31.5	14.7	22.1	41.9	62.6	31.0	46.4	17.2	25.7	12.1	18.2
	9	19.5	29.2	13.7	20.4	37.6	56.3	28.0	41.9	15.6	23.3	11.0	16.5
	10	17.9	26.8	12.6	18.8	33.4	49.9	25.0	37.4	14.0	20.9	9.92	14.8
	11	16.3	24.4	11.4	17.1	29.2	43.7	22.0	32.9	12.4	18.5	8.82	13.2
	12	14.7	22.0	10.3	15.4	25.3	37.8	19.2	28.7	10.8	16.2	7.75	11.6
	13	13.1	19.6	9.24	13.8	21.6	32.4	16.5	24.7	9.38	14.0	6.74	10.1
	14	11.6	17.4	8.19	12.3	18.7	27.9	14.2	21.3	8.09	12.1	5.82	8.71
	15	10.2	15.3	7.20	10.8	16.3	24.3	12.4	18.5	7.05	10.5	5.07	7.59
	16	8.97	13.4	6.33	9.47	14.3	21.4	10.9	16.3	6.20	9.27	4.46	6.67
	17	7.94	11.9	5.61	8.39	12.7	18.9	9.64	14.4	5.49	8.21	3.95	5.91
	18	7.08	10.6	5.00	7.48	11.3	16.9	8.60	12.9	4.90	7.33	3.52	5.27
	19	6.36	9.51	4.49	6.72	10.1	15.2	7.72	11.5	4.40	6.57	3.16	4.73
	20	5.74	8.58	4.05	6.06	9.14	13.7	6.97	10.4	3.97	5.93	2.85	4.27
	21	5.20	7.79	3.67	5.50	8.29	12.4	6.32	9.45	3.60	5.38	2.59	3.87
	22	4.74	7.09	3.35	5.01			5.76	8.61	3.28	4.90	2.36	3.53
	23	4.34	6.49	3.06	4.58							2.16	3.23
	24	3.98	5.96	2.81	4.21								
	25	3.67	5.49	2.59	3.88								
	26			2.40	3.59								
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	Pipe 4 Std. 10S	Pipe 4 Std. 5S	Pipe 3½ Std. 80S	Pipe 3½ Std. 40S	Pipe 3½ Std. 10S	Pipe 3½ Std. 5S
A_g, in.^{2}	1.65	1.15	3.68	2.68	1.46	1.02
I, in.^{4}	3.96	2.81	6.28	4.79	2.76	1.96
r, in.	1.55	1.56	1.31	1.34	1.37	1.39

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 3-PIPE 2½

Table 4-7 (continued)
Available Strength in Axial Compression, kips
Pipe

F_y = 30 ksi

Shape		Pipe 3								Pipe 2½			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.300		0.216		0.120		0.083		0.276		0.203	
lb/ft		10.5		7.73		4.42		3.09		7.82		5.91	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	51.5	77.0	38.0	56.9	21.6	32.4	15.2	22.7	38.5	57.6	29.1	43.6
	6	37.9	56.7	28.4	42.6	16.5	24.7	11.6	17.4	24.5	36.6	18.9	28.3
	7	34.0	50.8	25.6	38.3	15.0	22.4	10.6	15.8	20.8	31.1	16.2	24.2
	8	29.9	44.7	22.7	34.0	13.4	20.0	9.46	14.1	17.2	25.7	13.5	20.2
	9	25.9	38.7	19.8	29.6	11.8	17.6	8.34	12.5	13.9	20.8	11.0	16.5
	10	22.0	33.0	17.0	25.4	10.2	15.3	7.25	10.8	11.2	16.8	8.92	13.3
	11	18.5	27.6	14.3	21.5	8.71	13.0	6.20	9.28	9.29	13.9	7.37	11.0
	12	15.5	23.2	12.1	18.0	7.35	11.0	5.25	7.85	7.81	11.7	6.19	9.26
	13	13.2	19.8	10.3	15.4	6.27	9.37	4.47	6.69	6.65	10.0	5.28	7.89
	14	11.4	17.0	8.86	13.3	5.40	8.08	3.85	5.77	5.74	8.58	4.55	6.81
	15	9.92	14.8	7.72	11.6	4.71	7.04	3.36	5.02	5.00	7.48	3.96	5.93
	16	8.72	13.0	6.79	10.2	4.14	6.19	2.95	4.41				
	17	7.73	11.6	6.01	8.99	3.66	5.48	2.61	3.91				
	18	6.89	10.3	5.36	8.02	3.27	4.89	2.33	3.49				
	19			4.81	7.20	2.93	4.39	2.09	3.13				
	20					2.65	3.96	1.89	2.82				
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	Std. 80S	Std. 40S	Std. 10S	Std. 5S	Std. 80S	Std. 40S
A_g, in.^{2}	3.02	2.23	1.27	0.891	2.26	1.71
I, in.^{4}	3.89	3.02	1.82	1.30	1.94	1.54
r, in.	1.13	1.16	1.20	1.21	0.927	0.949

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

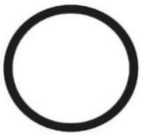
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-7 (continued)

Available Strength in Axial Compression, kips

Pipe



PIPE 2½-PIPE 2

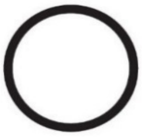
Shape		Pipe 2½				Pipe 2							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.120		0.083		0.218		0.154		0.109		0.065	
lb/ft		3.60		2.52		5.12		3.73		2.69		1.64	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	17.7	26.5	12.4	18.6	25.2	37.7	18.4	27.5	13.3	19.8	8.06	12.1
	1	17.5	26.2	12.3	18.4	24.8	37.1	18.1	27.1	13.0	19.5	7.93	11.9
	2	16.9	25.3	11.9	17.8	23.4	35.1	17.2	25.7	12.4	18.6	7.56	11.3
	3	16.0	23.9	11.2	16.8	21.4	32.0	15.7	23.5	11.4	17.1	6.97	10.4
	4	14.8	22.1	10.4	15.6	18.8	28.1	13.9	20.8	10.1	15.2	6.23	9.3
	5	13.3	20.0	9.43	14.1	15.9	23.8	11.9	17.8	8.72	13.0	5.38	8.05
	6	11.8	17.6	8.35	12.5	13.0	19.5	9.82	14.7	7.25	10.9	4.51	6.74
	7	10.2	15.2	7.23	10.8	10.3	15.3	7.83	11.7	5.83	8.73	3.65	5.47
	8	8.57	12.8	6.12	9.16	7.90	11.8	6.07	9.08	4.55	6.81	2.87	4.29
	9	7.07	10.6	5.07	7.59	6.24	9.33	4.79	7.17	3.59	5.38	2.27	3.39
	10	5.75	8.60	4.14	6.19	5.05	7.56	3.88	5.81	2.91	4.36	1.84	2.75
	11	4.75	7.11	3.42	5.11	4.18	6.25	3.21	4.80	2.41	3.60	1.52	2.27
	12	3.99	5.97	2.87	4.30	3.51	5.25	2.70	4.03	2.02	3.03	1.28	1.91
	13	3.40	5.09	2.45	3.66			2.30	3.44	1.72	2.58	1.09	1.63
	14	2.93	4.39	2.11	3.16								
	15	2.55	3.82	1.84	2.75								
	16	2.25	3.36	1.62	2.42								
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.04	0.729	1.48	1.08	0.778	0.473
I, in.^{4}	0.993	0.714	0.874	0.670	0.503	0.317
r, in.	0.977	0.990	0.768	0.788	0.804	0.819

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 1½-PIPE 1¼

Table 4-7 (continued)

Available Strength in Axial Compression, kips

Pipe

F_y = 30 ksi

Shape		Pipe 1½								Pipe 1¼			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.200		0.145		0.109		0.065		0.191		0.140	
lb/ft		3.70		2.77		2.13		1.30		3.06		2.32	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	18.2	27.3	13.6	20.4	10.4	15.6	6.39	9.56	15.0	22.5	11.4	17.1
	1	17.7	26.5	13.2	19.8	10.2	15.2	6.23	9.32	14.4	21.6	11.0	16.4
	2	16.2	24.2	12.2	18.2	9.38	14.0	5.77	8.63	12.8	19.2	9.83	14.7
	3	14.0	20.9	10.6	15.8	8.20	12.3	5.07	7.59	10.5	15.7	8.16	12.2
	4	11.4	17.0	8.71	13.0	6.80	10.2	4.24	6.34	7.99	11.9	6.29	9.41
	5	8.70	13.00	6.78	10.1	5.34	7.98	3.36	5.03	5.60	8.38	4.50	6.74
	6	6.30	9.42	4.99	7.46	3.97	5.94	2.53	3.79	3.89	5.82	3.14	4.69
	7	4.63	6.92	3.66	5.48	2.92	4.37	1.87	2.79	2.86	4.28	2.31	3.45
	8	3.54	5.30	2.81	4.20	2.24	3.35	1.43	2.14	2.19	3.27	1.76	2.64
	9	2.80	4.19	2.22	3.32	1.77	2.64	1.13	1.69				
	10	2.27	3.39	1.80	2.69	1.43	2.14	0.915	1.37				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

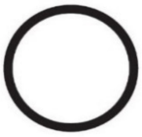
A_g, in.^{2}	1.07	0.799	0.613	0.375	0.881	0.669
I, in.^{4}	0.391	0.310	0.247	0.158	0.242	0.195
r, in.	0.605	0.623	0.635	0.649	0.524	0.540

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 30 ksi

Table 4-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 1¼-PIPE 1

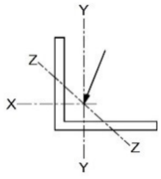
Shape		Pipe 1¼				Pipe 1							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.109		0.065		0.179		0.133		0.109		0.065	
lb/ft		1.84		1.13		2.22		1.71		1.43		0.885	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	9.05	13.5	5.56	8.31	10.9	16.4	8.45	12.6	7.07	10.6	4.36	6.53
	1	8.73	13.1	5.37	8.04	10.3	15.3	7.96	11.9	6.67	10.0	4.13	6.18
	2	7.84	11.7	4.85	7.26	8.43	12.6	6.63	9.92	5.60	8.37	3.51	5.24
	3	6.55	9.80	4.09	6.12	6.09	9.11	4.89	7.31	4.17	6.25	2.67	3.99
	4	5.09	7.62	3.23	4.83	3.87	5.79	3.19	4.78	2.77	4.14	1.82	2.72
	5	3.68	5.51	2.38	3.56	2.48	3.70	2.05	3.06	1.78	2.66	1.17	1.76
	6	2.57	3.85	1.67	2.50	1.72	2.57	1.42	2.13	1.23	1.85	0.815	1.22
	7	1.89	2.83	1.23	1.84			1.04	1.56	0.907	1.36	0.599	0.896
	8	1.45	2.17	0.941	1.41								
	9	1.14	1.71	0.744	1.11								
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.531	0.326	0.642	0.496	0.415	0.256
I, in.^{4}	0.160	0.104	0.107	0.088	0.077	0.051
r, in.	0.549	0.565	0.408	0.422	0.430	0.445

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

Note: Heavy line indicates KL/r equal to or greater than 200.



L8-L6

Table 4-8
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 30 ksi

Shape		L8×8×										L6×6×	
		¾		⅝ ^{c1}		½ ^{c1}		⅜ ^{c1}		¼ ^{c1}		¾	
lb/ft		39.7		33.3		26.9		20.3		13.7		29.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	205	308	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	152	228
	1	204	306	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	150	226
	2	201	303	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	147	221
	3	197	296	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	141	212
	4	191	287	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	134	201
	5	184	276	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	125	188
	6	175	263	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	115	172
	7	166	249	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	104	156
	8	155	233	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	92.1	138
	9	144	217	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	80.7	121
	10	133	199	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	69.6	105
	11	121	182	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	59.1	88.9
	12	110	165	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	49.8	74.8
	13	98.3	148	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	42.4	63.8
	14	87.5	131	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	36.6	55.0
	15	77.1	116	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	31.9	47.9
	16	67.8	102	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	28.0	42.1
	17	60.1	90.3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	24.8	37.3
	18	53.6	80.6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	22.1	33.3
	19	48.1	72.3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	19.9	29.9
	20	43.4	65.3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	21	39.4	59.2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	22	35.9	53.9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	23	32.8	49.3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	24	30.1	45.3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	25	27.8	41.8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	26	25.7	38.6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		

Properties

A_g, in.^{2}	11.4	9.61	7.75	5.86	3.94	8.44
r_z, in.	1.58	1.58	1.59	1.60	1.61	1.18

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

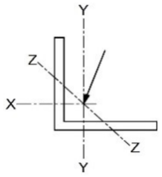
[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 30 ksi

Table 4-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L6-L5

Shape		L6×6×								L5×5×			
		⅝		½[c1]		⅜[c1]		¼[c1]		¾		⅝	
lb/ft		24.7		19.9		15.1		10.2		24.1		20.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	**0**	128	192	-S-	-S-	-S-	-S-	-S-	-S-	125	187	105	158
	1	127	190	-S-	-S-	-S-	-S-	-S-	-S-	123	185	104	156
	2	124	186	-S-	-S-	-S-	-S-	-S-	-S-	119	179	101	151
	3	119	179	-S-	-S-	-S-	-S-	-S-	-S-	112	169	95.1	143
	4	113	169	-S-	-S-	-S-	-S-	-S-	-S-	104	156	87.9	132
	5	105	158	-S-	-S-	-S-	-S-	-S-	-S-	93.5	141	79.4	119
	6	96.5	145	-S-	-S-	-S-	-S-	-S-	-S-	82.4	124	70.1	105
	7	87.2	131	-S-	-S-	-S-	-S-	-S-	-S-	71.0	107	60.5	90.9
	8	77.6	117	-S-	-S-	-S-	-S-	-S-	-S-	59.7	89.8	51.1	76.7
	9	68.0	102	-S-	-S-	-S-	-S-	-S-	-S-	49.1	73.9	42.1	63.3
	10	58.7	88.2	-S-	-S-	-S-	-S-	-S-	-S-	39.9	60.0	34.3	51.5
	11	49.8	74.9	-S-	-S-	-S-	-S-	-S-	-S-	33.0	49.6	28.3	42.6
	12	42.0	63.1	-S-	-S-	-S-	-S-	-S-	-S-	27.7	41.7	23.8	35.8
	13	35.7	53.7	-S-	-S-	-S-	-S-	-S-	-S-	23.6	35.5	20.3	30.5
	14	30.8	46.3	-S-	-S-	-S-	-S-	-S-	-S-	20.4	30.6	17.5	26.3
	15	26.8	40.4	-S-	-S-	-S-	-S-	-S-	-S-	17.7	26.7	15.2	22.9
	16	23.6	35.5	-S-	-S-	-S-	-S-	-S-	-S-	15.6	23.4	13.4	20.1
	17	20.9	31.4	-S-	-S-	-S-	-S-	-S-	-S-				
	18	18.6	28.0	-S-	-S-	-S-	-S-	-S-	-S-				
	19	16.7	25.2	-S-	-S-	-S-	-S-	-S-	-S-				
	20							-S-	-S-				
	21												
	22												
	23												
	24												
	25												
	26												

Properties

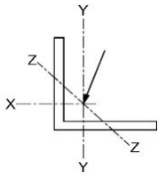
A_g, in.^{2}	7.11	5.75	4.36	2.94	6.94	5.86
r_z, in.	1.18	1.18	1.19	1.21	0.971	0.979

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L5-L4

Table 4-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 30 ksi

Shape		L5×5×								L4×4×			
		½		⅜ [c1]		5/16 [c1]		¼ [c1]		½		⅜	
lb/ft		16.5		12.5		10.5		8.45		13.0		9.92	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	85.3	128	-S-	-S-	-S-	-S-	-S-	-S-	67.4	101	51.4	77.2
	1	84.4	127	-S-	-S-	-S-	-S-	-S-	-S-	66.2	99.5	50.5	75.9
	2	81.6	123	-S-	-S-	-S-	-S-	-S-	-S-	62.7	94.3	47.9	72.0
	3	77.2	116	-S-	-S-	-S-	-S-	-S-	-S-	57.4	86.3	43.9	66.0
	4	71.4	107	-S-	-S-	-S-	-S-	-S-	-S-	50.7	76.2	38.8	58.4
	5	64.7	97.2	-S-	-S-	-S-	-S-	-S-	-S-	43.2	64.9	33.2	49.9
	6	57.2	86.0	-S-	-S-	-S-	-S-	-S-	-S-	35.5	53.4	27.4	41.1
	7	49.5	74.4	-S-	-S-	-S-	-S-	-S-	-S-	28.2	42.4	21.8	32.8
	8	41.9	63.0	-S-	-S-	-S-	-S-	-S-	-S-	21.8	32.8	16.9	25.4
	9	34.7	52.2	-S-	-S-	-S-	-S-	-S-	-S-	17.2	25.9	13.3	20.1
	10	28.3	42.5	-S-	-S-	-S-	-S-	-S-	-S-	14.0	21.0	10.8	16.2
	11	23.4	35.1	-S-	-S-	-S-	-S-	-S-	-S-	11.5	17.3	8.93	13.4
	12	19.6	29.5	-S-	-S-	-S-	-S-	-S-	-S-	9.69	14.6	7.51	11.3
	13	16.7	25.2	-S-	-S-	-S-	-S-	-S-	-S-	8.26	12.4	6.40	9.61
	14	14.4	21.7	-S-	-S-	-S-	-S-	-S-	-S-				
	15	12.6	18.9	-S-	-S-	-S-	-S-	-S-	-S-				
	16	11.1	16.6	-S-	-S-	-S-	-S-	-S-	-S-				
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
Properties													
A_g, in.^{2}		4.75		3.61		3.03		2.44		3.75		2.86	
r_z, in.		0.988		0.989		0.993		1.00		0.781		0.787	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

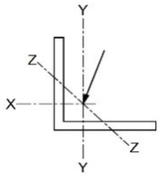
[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 30 ksi

Table 4-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L4-L3

Shape		L4×4×		L3½×3½×				L3×3×					
		¼ [c1]		⅜		¼ [c1]		½		⅜		¼ [c1]	
lb/ft		6.72		8.62		5.85		9.54		7.32		4.99	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	44.6	67.0	-S-	-S-	49.4	74.3	37.9	57.0	-S-	-S-
	1	-S-	-S-	43.5	65.5	-S-	-S-	47.9	71.9	36.7	55.2	-S-	-S-
	2	-S-	-S-	40.7	61.1	-S-	-S-	43.5	65.4	33.4	50.2	-S-	-S-
	3	-S-	-S-	36.3	54.6	-S-	-S-	37.2	55.8	28.6	42.9	-S-	-S-
	4	-S-	-S-	31.0	46.5	-S-	-S-	29.8	44.7	22.9	34.4	-S-	-S-
	5	-S-	-S-	25.2	37.9	-S-	-S-	22.4	33.6	17.3	26.0	-S-	-S-
	6	-S-	-S-	19.6	29.5	-S-	-S-	16.0	24.0	12.3	18.5	-S-	-S-
	7	-S-	-S-	14.7	22.1	-S-	-S-	11.7	17.6	9.05	13.6	-S-	-S-
	8	-S-	-S-	11.3	16.9	-S-	-S-	8.97	13.5	6.93	10.4	-S-	-S-
	9	-S-	-S-	8.89	13.4	-S-	-S-	7.09	10.7	5.48	8.23	-S-	-S-
	10	-S-	-S-	7.20	10.8	-S-	-S-						
	11	-S-	-S-	5.95	8.95	-S-	-S-						
	12	-S-	-S-										
	13	-S-	-S-										
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

	L4×4× ¼	L3½×3½× ⅜	L3½×3½× ¼	L3×3× ½	L3×3× ⅜	L3×3× ¼
A_g, in.^{2}	1.94	2.48	1.69	2.75	2.11	1.44
r_z, in.	0.796	0.690	0.693	0.585	0.587	0.589

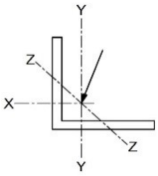
ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



L3-L2

Table 4-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 30 ksi

Shape		L3×3×		L2½×2½×						L2×2×			
		3/16 ^{c1}		3/8		1/4		3/16 ^{c1}		3/8		1/4	
lb/ft		3.78		6.01		4.12		3.13		4.71		3.25	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	31.1	46.7	21.4	32.1	-S-	-S-	24.4	36.7	16.9	25.3
	1	-S-	-S-	29.7	44.6	20.4	30.7	-S-	-S-	22.7	34.2	15.7	23.6
	2	-S-	-S-	25.9	38.9	17.9	26.8	-S-	-S-	18.3	27.6	12.7	19.1
	3	-S-	-S-	20.6	31.0	14.3	21.4	-S-	-S-	12.8	19.3	8.93	13.4
	4	-S-	-S-	15.0	22.6	10.4	15.7	-S-	-S-	7.85	11.8	5.50	8.26
	5	-S-	-S-	10.1	15.1	7.00	10.5	-S-	-S-	5.02	7.55	3.52	5.29
	6	-S-	-S-	6.98	10.5	4.86	7.31	-S-	-S-	3.49	5.24	2.44	3.67
	7	-S-	-S-	5.13	7.71	3.57	5.37	-S-	-S-				
	8	-S-	-S-	3.93	5.90	2.74	4.11	-S-	-S-				
	9	-S-	-S-										
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
Properties													
A_g, in.^{2}		1.09		1.73		1.19		0.902		1.36		0.938	
r_z, in.		0.597		0.488		0.491		0.495		0.389		0.392	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

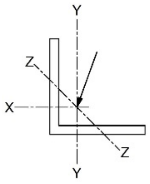
-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Table 4-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)



L2-L1¼

Shape		L2×2×				L1½×1½×						L1¼×1¼×	
		3/16		1/8 [c1]		1/4		3/16		1/8		1/4	
lb/ft		2.48		1.68		2.38		1.83		1.25		1.95	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	12.8	19.3	-S-	-S-	12.4	18.6	9.47	14.2	6.45	9.69	10.1	15.2
	1	12.0	18.0	-S-	-S-	10.9	16.4	8.35	12.6	5.70	8.57	8.42	12.7
	2	9.69	14.6	-S-	-S-	7.46	11.2	5.73	8.62	3.95	5.93	4.85	7.30
	3	6.81	10.2	-S-	-S-	4.00	6.02	3.09	4.64	2.15	3.23	2.25	3.39
	4	4.19	6.30	-S-	-S-	2.25	3.39	1.74	2.61	1.21	1.82	1.27	1.91
	5	2.68	4.03	-S-	-S-								
	6	1.86	2.80	-S-	-S-								
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

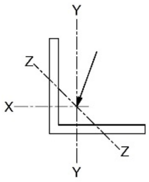
A_g, in.^{2}	0.715	0.484	0.688	0.527	0.359	0.563
r_z, in.	0.392	0.398	0.293	0.294	0.297	0.243

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L1¼-L¾

Table 4-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 30 ksi

Shape		**L1¼×1¼×**				**L1×1×**						**L¾×¾×**	
		3/16		⅛		¼		3/16		⅛		⅜	
lb/ft		**1.50**		**1.03**		**1.52**		**1.18**		**0.813**		**0.596**	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Effective length, KL (ft), with respect to least radius of gyration, r_z	**0**	7.80	11.7	5.34	8.02	7.87	11.8	6.11	9.18	4.20	6.32	3.09	4.64
	1	6.49	9.75	4.45	6.69	5.93	8.92	4.58	6.88	3.16	4.75	1.86	2.79
	2	3.74	5.62	2.59	3.90	2.57	3.86	1.95	2.93	1.36	2.04	0.559	0.841
	3	1.74	2.61	1.21	1.82	1.14	1.71	0.868	1.30	0.603	0.907		
	4	0.977	1.47	0.680	1.02								
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

A_g, in.^{2}	0.434	0.297	0.438	0.340	0.234	0.172
r_z, in.	0.243	0.245	0.196	0.194	0.195	0.146

ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

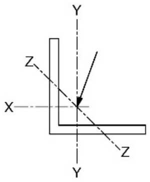
Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 30 ksi

Table 4-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)



L½

Shape		L½×½×	
		⅛	
lb/ft		0.379	
Design		P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	1.96	2.94
	1	0.635	0.954
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		

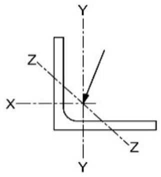
Properties

A_g, in.^{2}	0.109
r_z, in.	0.098
ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L6-L4

Table 4-9
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Hot Rolled)

F_y = 30 ksi

Shape	**L6×6×**				**L5×5×**				**L4×4×**			
	½ [c1]		⅜ [c1]		½		⅜ [c1]		½		⅜	
lb/ft	**20.0**		**15.2**		**16.6**		**12.7**		**13.0**		**9.92**	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
Effective length, KL (ft), with respect to least radius of gyration, r_z	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
0	-S-	-S-	-S-	-S-	86.0	129	-S-	-S-	67.4	101	51.4	77.2
1	-S-	-S-	-S-	-S-	85.1	128	-S-	-S-	66.2	99.4	50.5	75.9
2	-S-	-S-	-S-	-S-	82.3	124	-S-	-S-	62.7	94.2	47.8	71.9
3	-S-	-S-	-S-	-S-	77.7	117	-S-	-S-	57.3	86.1	43.8	65.8
4	-S-	-S-	-S-	-S-	71.8	108	-S-	-S-	50.5	75.9	38.6	58.0
5	-S-	-S-	-S-	-S-	64.9	97.5	-S-	-S-	43.0	64.6	32.9	49.4
6	-S-	-S-	-S-	-S-	57.3	86.2	-S-	-S-	35.2	53.0	27.0	40.6
7	-S-	-S-	-S-	-S-	49.5	74.4	-S-	-S-	27.9	41.9	21.4	32.2
8	-S-	-S-	-S-	-S-	41.8	62.8	-S-	-S-	21.5	32.4	16.5	24.9
9	-S-	-S-	-S-	-S-	34.5	51.9	-S-	-S-	17.0	25.6	13.1	19.7
10	-S-	-S-	-S-	-S-	28.1	42.2	-S-	-S-	13.8	20.7	10.6	15.9
11	-S-	-S-	-S-	-S-	23.2	34.9	-S-	-S-	11.4	17.1	8.75	13.2
12	-S-	-S-	-S-	-S-	19.5	29.3	-S-	-S-	9.57	14.4	7.35	11.1
13	-S-	-S-	-S-	-S-	16.6	25.0	-S-	-S-				
14	-S-	-S-	-S-	-S-	14.3	21.5	-S-	-S-				
15	-S-	-S-	-S-	-S-	12.5	18.8	-S-	-S-				
16	-S-	-S-	-S-	-S-	11.0	16.5	-S-	-S-				
17	-S-	-S-	-S-	-S-								
18	-S-	-S-	-S-	-S-								
19	-S-	-S-	-S-	-S-								
20												
21												
22												
23												
24												
25												
26												

Properties

A_g, in.^{2}	5.77	4.38	4.79	3.65	3.75	2.86
r_z, in.	1.18	1.19	0.980	0.986	0.776	0.779

ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

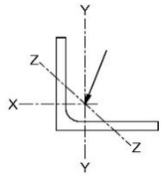
Note: Heavy line indicates KL/r_z equal to or greater than 200.

$F_y = 30$ ksi

Table 4-9 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Hot Rolled)



L4-L3

Shape	L4×4×		L3½×3½×				L3×3×					
	¼ [c1]		⅜		¼ [c1]		½		⅜		¼ [c1]	
lb/ft	6.69		8.64		5.88		9.57		7.32		4.99	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z 0	-S-	-S-	44.8	67.3	-S-	-S-	49.6	74.5	37.9	57.0	-S-	-S-
1	-S-	-S-	43.7	65.8	-S-	-S-	48.0	72.2	36.7	55.2	-S-	-S-
2	-S-	-S-	40.8	61.3	-S-	-S-	43.6	65.5	33.3	50.1	-S-	-S-
3	-S-	-S-	36.3	54.6	-S-	-S-	37.1	55.8	28.4	42.7	-S-	-S-
4	-S-	-S-	30.9	46.4	-S-	-S-	29.6	44.5	22.7	34.1	-S-	-S-
5	-S-	-S-	25.1	37.7	-S-	-S-	22.2	33.3	17.0	25.5	-S-	-S-
6	-S-	-S-	19.4	29.2	-S-	-S-	15.7	23.7	12.1	18.1	-S-	-S-
7	-S-	-S-	14.5	21.8	-S-	-S-	11.6	17.4	8.87	13.3	-S-	-S-
8	-S-	-S-	11.1	16.7	-S-	-S-	8.85	13.3	6.79	10.2	-S-	-S-
9	-S-	-S-	8.76	13.2	-S-	-S-	6.99	10.5	5.37	8.06	-S-	-S-
10	-S-	-S-	7.09	10.7	-S-	-S-						
11	-S-	-S-	5.86	8.81	-S-	-S-						
12	-S-	-S-										
13	-S-	-S-										
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												

Properties

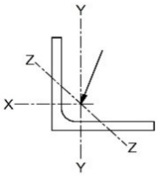
	L4×4×¼	L3½×3½×⅜	L3½×3½×¼	L3×3×½	L3×3×⅜	L3×3×¼
A_g, in.^{2}	1.93	2.49	1.70	2.76	2.11	1.44
r_z, in.	0.783	0.683	0.690	0.580	0.581	0.585

ASD	LRFD
$\Omega_c = 1.67$	$\varphi_c = 0.90$

[c1] Shape is slender for compression with $F_y = 30$ ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L3-L2

Table 4-9 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Hot Rolled)

F_y = 30 ksi

Shape		L3×3×		L2½×2½×						L2×2×			
		3/16^{c1}		3/8		1/4		3/16^{c1}		3/8		1/4	
lb/ft		3.78		6.00		4.13		3.12		4.75		3.27	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	31.1	46.7	21.4	32.1	-S-	-S-	24.6	37.0	17.0	25.5
	1	-S-	-S-	29.7	44.6	20.4	30.7	-S-	-S-	22.9	34.4	15.8	23.7
	2	-S-	-S-	25.8	38.7	17.7	26.7	-S-	-S-	18.4	27.7	12.7	19.1
	3	-S-	-S-	20.4	30.6	14.0	21.1	-S-	-S-	12.8	19.2	8.84	13.3
	4	-S-	-S-	14.7	22.1	10.1	15.2	-S-	-S-	7.78	11.7	5.39	8.10
	5	-S-	-S-	9.77	14.7	6.75	10.1	-S-	-S-	4.98	7.49	3.45	5.19
	6	-S-	-S-	6.78	10.2	4.69	7.04	-S-	-S-	3.46	5.20	2.40	3.60
	7	-S-	-S-	4.98	7.49	3.44	5.17	-S-	-S-				
	8	-S-	-S-	3.82	5.74	2.64	3.96	-S-	-S-				
	9	-S-	-S-										
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

	L3×3×3/16	L2½×2½×3/8	L2½×2½×1/4	L2½×2½×3/16	L2×2×3/8	L2×2×1/4
A_g, in.^{2}	1.09	1.73	1.19	0.901	1.37	0.944
r_z, in.	0.586	0.481	0.482	0.482	0.386	0.387

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

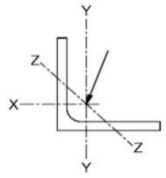
Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 30 ksi

Table 4-9 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Hot Rolled)



L2-L1¼

Shape		L2×2×				L1½×1½×						L1¼×1¼×	
		3/16		1/8 ^{c1}		1/4		3/16		1/8 ^{c1}		1/4	
lb/ft		2.50		1.70		2.40		1.84		1.26		1.96	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	13.0	19.5	-S-	-S-	12.4	18.6	9.50	14.3	-S-	-S-	10.1	15.2
	1	12.1	18.1	-S-	-S-	10.9	16.4	8.37	12.6	-S-	-S-	8.42	12.7
	2	9.74	14.6	-S-	-S-	7.42	11.2	5.72	8.60	-S-	-S-	4.84	7.27
	3	6.81	10.2	-S-	-S-	3.95	5.94	3.07	4.61	-S-	-S-	2.24	3.37
	4	4.17	6.26	-S-	-S-	2.22	3.34	1.72	2.59	-S-	-S-	1.26	1.89
	5	2.67	4.01	-S-	-S-								
	6	1.85	2.78	-S-	-S-								
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

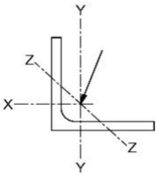
	L2×2× 3/16	L2×2× 1/8	L1½×1½× 1/4	L1½×1½× 3/16	L1½×1½× 1/8	L1¼×1¼× 1/4
A_g, in.^{2}	0.722	0.491	0.689	0.529	0.361	0.564
r_z, in.	0.389	0.391	0.291	0.292	0.295	0.242

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L1¼-L¾

Table 4-9 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Hot Rolled)

F_y = 30 ksi

Shape		L1¼×1¼×				L1×1×						L¾×¾×	
		3/16		⅛		¼		3/16		⅛		⅛	
lb/ft		1.51		1.04		1.53		1.19		0.821		0.605	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	7.82	11.8	5.36	8.06	7.89	11.9	6.14	9.22	4.24	6.37	3.13	4.71
	1	6.50	9.77	4.48	6.73	5.92	8.90	4.59	6.89	3.18	4.78	1.81	2.72
	2	3.74	5.62	2.60	3.91	2.53	3.80	1.94	2.91	1.35	2.04	0.527	0.792
	3	1.73	2.61	1.21	1.82	1.12	1.69	0.862	1.29	0.602	0.905		
	4	0.975	1.47	0.681	1.02								
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
Properties													
A_g, in.^{2}		0.435		0.299		0.439		0.342		0.236		0.174	
r_z, in.		0.242		0.245		0.194		0.193		0.194		0.141	

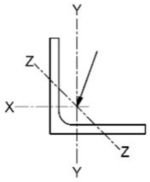
ASD	LRFD	
Ω_c = 1.67	φ_c = 0.90	[c1] Shape is slender for compression with F_y = 30 ksi. -S- Slender cross-section (outside scope of DG27). Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 30 ksi

Table 4-9 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Hot Rolled)



L1½

Shape		L½×½×	
		⅛	
lb/ft		0.388	
Design		P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	2.01	3.02
	1	0.570	0.856
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		

Properties

A_g, in.^{2}	0.112
r_z, in.	0.091
ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c1] Shape is slender for compression with F_y = 30 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

PART 5: DESIGN OF COMPRESSION MEMBERS (F_y = 65 ksi)

Table 5-1	Available strength in axial compression, kips W-Shapes (Welded)
Table 5-2	Available strength in axial compression, kips Rectangular HSS (Roll Formed)
Table 5-3	Available strength in axial compression, kips Rectangular HSS (Brake Pressed)
Table 5-4	Available strength in axial compression, kips Square HSS (Roll Formed)
Table 5-5	Available strength in axial compression, kips Square HSS (Brake Pressed)
Table 5-6	Available strength in axial compression, kips Round HSS
Table 5-7	Available strength in axial compression, kips Pipe
Table 5-8	Available strength in axial compression, kips Concentrically loaded equal angles (Welded)

W24

Table 5-1
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W24×											
lb/ft		131 ^{c2}		117 ^{c2}		104 ^{c2}		94 ^{c2}		84 ^{c2}		76 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	1350	2030	1180	1770	1020	1530	908	1370	785	1180	693	1040
	6	1260	1890	1090	1640	946	1420	779	1170	673	1010	594	893
	7	1220	1840	1060	1600	921	1380	736	1110	636	955	561	843
	8	1190	1780	1030	1550	893	1340	688	1030	594	893	524	788
	9	1140	1720	995	1500	862	1300	636	956	549	826	484	728
	10	1100	1650	956	1440	828	1240	581	874	502	755	442	665
	11	1050	1580	914	1370	792	1190	524	788	453	681	399	599
	12	999	1500	870	1310	754	1130	466	700	402	605	354	532
	13	945	1420	823	1240	714	1070	407	611	351	528	309	464
	14	889	1340	775	1160	672	1010	351	528	303	456	267	401
	15	832	1250	725	1090	629	946	306	460	264	397	232	349
	16	773	1160	674	1010	586	880	269	404	232	349	204	307
	17	713	1070	623	936	541	814	238	358	206	309	181	272
	18	652	980	571	859	497	747	212	319	184	276	161	242
	19	593	892	520	781	453	680	191	287	165	248	145	218
	20	537	808	470	707	410	616	172	259	149	224	131	196
	22	444	668	389	584	338	509	142	214	123	185	108	162
	24	373	561	327	491	284	427	119	180	103	155	90.7	136
	26	318	478	278	418	242	364	102	153	88.0	132	77.3	116
	28	274	412	240	361	209	314	87.8	132	75.9	114	66.7	100
	30	239	359	209	314	182	274	76.5	115	66.1	99.3	58.1	87.3
	32	210	316	184	276	160	240	67.2	101	58.1	87.3	51.0	76.7
	34	186	279	163	245	142	213						
	36	166	249	145	218	126	190						
	38	149	224	130	196	113	171						
	40	134	202	118	177	102	154						
Properties													
P_{wo}, kips		126	189	101	152	81.3	122	97.6	146	78.4	118	64.8	97.2
P_{wi}, kips/in.		26.2	39.3	23.8	35.8	21.7	32.5	22.3	33.5	20.4	30.6	19.1	28.6
P_{wb}, kips		194	291	145	218	109	164	120	180	90.8	136	74.6	112
P_{fb}, kips		224	337	176	264	137	206	186	280	144	217	112	169
A_g, in.^{2}		38.3		34.2		30.4		27.5		24.5		22.2	
I_x, in.^{4}		3990		3510		3080		2670		2340		2070	
I_y, in.^{4}		340		297		259		109		94.4		82.5	
r_y, in.		2.98		2.95		2.92		1.99		1.96		1.93	
r_x/r_y		3.42		3.42		3.46		4.95		4.99		5.01	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		114000		100000		88200		76400		67000		59200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		9730		8500		7410		3120		2700		2360	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W24-W21

Shape		W24×						W21×					
lb/ft		68 ^{c2}		62 ^{c2}		55 ^{c2}		122 ^{c2}		111 ^{c2}		101 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	603	906	529	796	450	677	1300	1960	1170	1750	1030	1550
	6	515	774	400	601	340	511	1200	1810	1080	1620	956	1440
	7	486	730	358	538	304	458	1170	1760	1050	1570	929	1400
	8	453	681	312	470	266	400	1130	1700	1010	1520	899	1350
	9	418	629	265	398	225	338	1090	1630	974	1460	865	1300
	10	381	573	217	326	184	277	1040	1560	933	1400	829	1250
	11	343	515	179	269	152	229	991	1490	888	1340	791	1190
	12	303	455	150	226	128	192	938	1410	842	1270	750	1130
	13	263	395	128	193	109	164	883	1330	793	1190	707	1060
	14	227	341	111	166	94.0	141	823	1240	743	1120	663	997
	15	198	297	96.3	145	81.9	123	762	1150	691	1040	618	929
	16	174	261	84.6	127	72.0	108	702	1050	637	958	572	860
	17	154	231	75.0	113	63.8	95.8	643	966	584	877	526	791
	18	137	206	66.9	100	56.9	85.5	586	880	531	799	479	721
	19	123	185	60.0	90.2	51.0	76.7	531	798	481	723	434	652
	20	111	167	54.2	81.4	46.1	69.2	480	721	435	654	392	589
	22	91.8	138	44.8	67.3	38.1	57.2	396	596	359	540	324	487
	24	77.2	116					333	501	302	454	272	409
	26	65.8	98.8					284	427	257	387	232	349
	28	56.7	85.2					245	368	222	333	200	301
	30	49.4	74.2					213	320	193	290	174	262
	32							187	282	170	255	153	230
	34							166	249	150	226	136	204
	36							148	222	134	202	121	182
	38							133	200	120	181	109	163
	40							120	180	109	163	98.0	147
Properties													
P_{wo}, kips		52.6	78.9	55.0	82.5	43.2	64.8	125	187	104	156	86.7	130
P_{wi}, kips/in.		18.0	27.0	18.6	28.0	17.1	25.7	26.0	39.0	23.8	35.8	21.7	32.5
P_{wb}, kips		62.6	94.1	69.7	105	53.8	80.9	215	324	166	250	125	187
P_{fb}, kips		83.3	125	84.7	127	62.0	93.2	224	337	186	280	156	234
A_g, in.^{2}		19.9		18.0		16.0		35.6		32.5		29.5	
I_x, in.^{4}		1800		1520		1320		2940		2650		2400	
I_y, in.^{4}		70.4		34.5		29.0		305		274		248	
r_y, in.		1.88		1.38		1.35		2.92		2.91		2.90	
r_x/r_y		5.07		6.67		6.73		3.11		3.11		3.11	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		51500		43500		37800		84100		75800		68700	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		2010		987		830		8730		7840		7100	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W21

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

F_y = 65 ksi

Shape	W21×											
lb/ft	93 ^{c2}		83 ^{c2}		73 ^{c2}		68 ^{c2}		62 ^{c2}		57 ^{c2}	
Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y												
0	966	1450	828	1250	706	1060	644	967	570	857	511	769
6	799	1200	686	1030	587	882	536	805	474	712	375	563
7	744	1120	639	961	548	823	500	752	442	664	332	498
8	683	1030	588	883	504	758	461	693	407	612	285	429
9	617	927	532	800	458	689	419	630	370	556	237	357
10	544	818	474	713	410	616	375	564	331	497	193	290
11	473	711	414	622	360	541	330	496	291	437	159	240
12	406	611	354	532	309	465	284	427	250	376	134	201
13	347	521	302	454	264	397	243	365	213	321	114	172
14	299	449	260	391	227	342	209	314	184	276	98.4	148
15	261	392	227	341	198	298	182	274	160	241	85.7	129
16	229	344	199	299	174	262	160	241	141	212	75.3	113
17	203	305	176	265	154	232	142	213	125	187	66.7	100
18	181	272	157	237	138	207	127	190	111	167	59.5	89.5
19	162	244	141	212	124	186	114	171	99.8	150	53.4	80.3
20	147	220	128	192	111	168	102	154	90.1	135	48.2	72.5
22	121	182	105	158	92.1	138	84.7	127	74.5	112	39.9	59.9
24	102	153	88.6	133	77.4	116	71.2	107	62.6	94.1		
26	86.7	130	75.5	113	66.0	99.1	60.6	91.1	53.3	80.1		
28	74.8	112	65.1	97.8	56.9	85.5	52.3	78.6	46.0	69.1		
30	65.1	97.9	56.7	85.2	49.5	74.5	45.6	68.5				
32												
34												
36												
38												
40												
Properties												
P_{wo}, kips	117	175	93.2	140	73.0	109	63.8	95.7	53.3	80.0	57.0	85.6
P_{wi}, kips/in.	25.1	37.7	22.3	33.5	19.7	29.6	18.6	28.0	17.3	26.0	17.6	26.3
P_{wb}, kips	195	293	137	205	94.2	142	79.5	120	63.9	96.0	66.2	99.5
P_{fb}, kips	210	316	170	255	133	200	114	172	92.0	138	103	154
A_g, in.^{2}	27.1		24.1		21.3		19.8		18.0		16.5	
I_x, in.^{4}	2050		1810		1580		1460		1310		1150	
I_y, in.^{4}	92.8		80.8		70.5		64.7		57.5		30.6	
r_y, in.	1.85		1.83		1.82		1.81		1.78		1.36	
r_x/r_y	4.70		4.73		4.74		4.74		4.79		6.13	
$P_{ex}(KL)^2/10^4$, k-in.^{2}	58700		51800		45200		41800		37500		32900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}	2660		2310		2020		1850		1650		876	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W21-W18

Shape		W21×				W18×							
lb/ft		50 ^{c2}		44 ^{c2}		106 ^{c2}		97 ^{c2}		86 ^{c2}		76 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	433	651	366	550	1180	1770	1050	1590	911	1370	781	1170
	6	314	472	264	396	1070	1610	956	1440	827	1240	709	1070
	7	276	415	232	348	1030	1550	923	1390	798	1200	684	1030
	8	236	355	197	296	984	1480	885	1330	766	1150	657	987
	9	194	292	161	242	933	1400	843	1270	730	1100	627	942
	10	157	236	130	196	878	1320	799	1200	692	1040	594	893
	11	130	195	108	162	821	1230	750	1130	651	979	559	841
	12	109	164	90.6	136	763	1150	697	1050	609	915	523	787
	13	93.1	140	77.2	116	705	1060	643	967	565	849	486	731
	14	80.2	121	66.6	100	647	972	590	887	519	779	448	674
	15	69.9	105	58.0	87.2	590	887	538	808	472	709	410	616
	16	61.4	92.3	51.0	76.6	535	804	487	732	427	641	371	558
	17	54.4	81.8	45.1	67.9	481	723	438	658	383	576	333	500
	18	48.5	73.0	40.3	60.5	431	648	392	589	343	515	297	447
	19	43.6	65.5	36.1	54.3	387	581	352	529	307	462	267	401
	20	39.3	59.1	32.6	49.0	349	525	317	477	277	417	241	362
	22					289	434	262	394	229	345	199	299
	24					242	364	220	331	193	290	167	251
	26					207	311	188	282	164	247	142	214
	28					178	268	162	243	142	213	123	185
	30					155	233	141	212	123	185	107	161
	32					136	205	124	186	108	163	94.1	141
	34					121	182	110	165	96.0	144	83.3	125
	36					108	162	98.0	147	85.6	129	74.3	112
	38					96.7	145	87.9	132	76.9	116	66.7	100
	40					87.3	131	79.4	119	69.4	104	60.2	90.5
Properties													
P_{wo}, kips		44.0	66.1	34.1	51.2	120	180	101	151	80.1	120	62.6	93.9
P_{wi}, kips/in.		16.5	24.7	15.2	22.8	25.6	38.4	23.2	34.8	20.8	31.2	18.4	27.6
P_{wb}, kips		54.9	82.5	42.7	64.2	241	362	179	269	129	195	89.9	135
P_{fb}, kips		69.6	105	49.3	74.0	215	323	184	277	144	217	112	169
A_g, in.^{2}		14.5		12.8		31.0		28.4		25.2		22.2	
I_x, in.^{4}		964		822		1900		1740		1520		1320	
I_y, in.^{4}		24.9		20.7		220		201		175		153	
r_y, in.		1.31		1.27		2.67		2.66		2.64		2.62	
r_x/r_y		6.22		6.32		2.93		2.94		2.94		2.95	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		27600		23500		54400		49800		43500		37800	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		713		592		6300		5750		5010		4380	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W18

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W18×											
lb/ft		71 c2		65 c2		60 c2		55 c2		50 c2		46 c2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	741	1110	661	994	596	896	537	807	470	707	428	643
	6	591	888	529	795	477	718	430	646	377	567	299	450
	7	542	815	486	730	439	660	395	594	347	522	260	391
	8	489	735	439	660	397	597	357	537	315	473	219	329
	9	430	646	389	585	353	530	317	477	280	421	177	266
	10	371	558	338	507	307	461	276	415	244	367	143	215
	11	315	474	286	430	261	392	234	352	208	313	118	178
	12	266	399	241	362	219	330	197	296	175	264	99.4	149
	13	226	340	205	309	187	281	168	252	149	225	84.7	127
	14	195	293	177	266	161	242	145	218	129	194	73.0	110
	15	170	256	154	232	140	211	126	190	112	169	63.6	95.6
	16	149	225	136	204	123	185	111	167	98.6	148	55.9	84.0
	17	132	199	120	180	109	164	98.2	148	87.4	131	49.5	74.4
	18	118	177	107	161	97.5	147	87.6	132	77.9	117	44.2	66.4
	19	106	159	96.1	144	87.5	132	78.6	118	70.0	105	39.6	59.6
	20	95.6	144	86.8	130	79.0	119	70.9	107	63.1	94.9	35.8	53.8
	22	79.0	119	71.7	108	65.3	98.1	58.6	88.1	52.2	78.4		
	24	66.4	99.8	60.2	90.6	54.8	82.4	49.3	74.0	43.8	65.9		
	26	56.6	85.1	51.3	77.2	46.7	70.2	42.0	63.1	37.4	56.1		
	28	48.8	73.3	44.3	66.5	40.3	60.6						
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		86.9	130	73.1	110	62.5	93.7	53.2	79.9	43.8	65.8	47.2	70.8
P_{wi}, kips/in.		21.5	32.2	19.5	29.3	18.0	27.0	16.9	25.4	15.4	23.1	15.6	23.4
P_{wb}, kips		142	213	106	160	83.9	126	69.5	104	52.4	78.7	54.5	81.9
P_{fb}, kips		160	240	137	206	118	177	96.6	145	79.0	119	89.0	134
A_g, in.^{2}		20.7		19.0		17.5		16.1		14.5		13.4	
I_x, in.^{4}		1160		1060		974		881		790		702	
I_y, in.^{4}		60.3		54.8		50.1		44.9		40.1		22.5	
r_y, in.		1.71		1.70		1.69		1.67		1.66		1.30	
r_x/r_y		4.38		4.40		4.41		4.43		4.44		5.57	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		33200		30300		27900		25200		22600		20100	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1730		1570		1430		1290		1150		644	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W18-W16

Shape		W18×				W16×							
lb/ft		40 ^{c2}		35 ^{c2}		100		89 ^{c2}		77 ^{c2}		67 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	355	534	301	452	1140	1710	990	1490	829	1250	697	1050
	6	249	375	208	313	1000	1510	883	1330	741	1110	624	937
	7	217	326	180	271	957	1440	847	1270	711	1070	599	900
	8	183	275	150	226	908	1360	802	1210	677	1020	571	858
	9	148	223	120	181	854	1280	754	1130	640	963	541	813
	10	120	181	97.5	147	798	1200	704	1060	601	904	508	764
	11	99.3	149	80.6	121	740	1110	653	981	560	842	474	713
	12	83.4	125	67.7	102	682	1030	600	902	515	774	439	660
	13	71.1	107	57.7	86.7	624	938	548	824	470	706	403	605
	14	61.3	92.1	49.8	74.8	567	852	497	747	425	639	366	550
	15	53.4	80.2	43.3	65.1	511	768	447	673	382	574	329	494
	16	46.9	70.5	38.1	57.3	457	687	400	601	341	512	293	441
	17	41.6	62.5	33.7	50.7	407	612	355	534	303	455	260	391
	18	37.1	55.7	30.1	45.2	363	546	317	476	270	406	232	349
	19	33.3	50.0	27.0	40.6	326	490	284	428	242	364	208	313
	20	30.0	45.1	24.4	36.6	294	442	257	386	219	329	188	283
	22					243	365	212	319	181	272	155	233
	24					204	307	178	268	152	228	131	196
	26					174	261	152	228	129	194	111	167
	28					150	225	131	197	112	168	95.9	144
	30					131	196	114	172	97.2	146	83.5	126
	32					115	173	100	151	85.4	128	73.4	110
	34					102	153	88.8	134	75.7	114	65.0	97.8
	36					90.7	136	79.2	119	67.5	101	58.0	87.2
	38					81.4	122	71.1	107	60.6	91.0	52.1	78.3
	40					73.5	110	64.2	96.5	54.7	82.2	47.0	70.6
Properties													
P_{wo}, kips		35.8	53.7	27.6	41.4	125	187	99.5	149	74.9	112	56.9	85.4
P_{wi}, kips/in.		13.7	20.5	13.0	19.5	25.4	38.0	22.8	34.1	19.7	29.6	17.1	25.7
P_{wb}, kips		36.6	55.0	31.6	47.5	263	395	190	285	124	186	81.2	122
P_{fb}, kips		67.0	101	43.9	66.0	236	355	186	280	141	211	108	162
A_g, in.^{2}		11.6		10.2		29.3		26.0		22.5		19.5	
I_x, in.^{4}		602		500		1480		1290		1100		947	
I_y, in.^{4}		19.1		15.3		186		163		138		119	
r_y, in.		1.28		1.23		2.52		2.50		2.48		2.47	
r_x/r_y		5.63		5.71		2.82		2.82		2.82		2.82	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		17200		14300		42400		36900		31500		27100	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		547		438		5320		4670		3950		3410	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

W16

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W16×											
lb/ft		57 ^{c2}		50 ^{c2}		45 ^{c2}		40 ^{c2}		36 ^{c2}		31 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	592	890	502	755	439	660	376	566	329	494	274	411
	6	458	689	390	587	341	512	293	441	255	383	179	268
	7	415	624	355	533	310	465	267	401	232	348	150	226
	8	369	554	316	475	276	415	239	359	206	310	121	182
	9	318	478	276	414	241	362	209	314	180	270	96.0	144
	10	269	405	234	352	205	308	179	269	153	230	77.8	117
	11	225	338	195	293	171	257	149	224	127	191	64.3	96.6
	12	189	284	164	247	144	216	125	189	107	161	54.0	81.2
	13	161	242	140	210	122	184	107	161	91.0	137	46.0	69.2
	14	139	209	121	181	105	158	92.2	139	78.5	118	39.7	59.6
	15	121	182	105	158	91.9	138	80.3	121	68.4	103	34.6	52.0
	16	106	160	92.3	139	80.7	121	70.6	106	60.1	90.3	30.4	45.7
	17	94.1	141	81.7	123	71.5	107	62.5	94.0	53.2	80.0	26.9	40.4
	18	83.9	126	72.9	110	63.8	95.9	55.8	83.8	47.5	71.4	24.0	36.1
	19	75.3	113	65.4	98.3	57.3	86.0	50.1	75.2	42.6	64.1	21.5	32.4
	20	68.0	102	59.1	88.8	51.7	77.7	45.2	67.9	38.5	57.8		
	22	56.2	84.4	48.8	73.4	42.7	64.2	37.3	56.1	31.8	47.8		
	24	47.2	71.0	41.0	61.6	35.9	53.9	31.4	47.2	26.7	40.1		
	26	40.2	60.5	34.9	52.5	30.6	46.0	26.7	40.2				
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		66.6	99.9	51.9	77.8	42.2	63.4	33.4	50.1	27.5	41.2	26.2	39.3
P_{wi}, kips/in.		18.6	28.0	16.5	24.7	15.0	22.4	13.2	19.8	12.8	19.2	11.9	17.9
P_{wb}, kips		105	158	72.0	108	54.1	81.3	37.3	56.1	33.7	50.6	27.3	41.1
P_{fb}, kips		124	187	96.6	145	77.7	117	62.0	93.2	45.0	67.6	47.1	70.8
A_g, in.^{2}		16.6		14.6		13.1		11.6		10.4		8.99	
I_x, in.^{4}		750		651		579		511		441		367	
I_y, in.^{4}		43.1		37.2		32.8		28.8		24.5		12.4	
r_y, in.		1.61		1.60		1.58		1.57		1.53		1.17	
r_x/r_y		4.17		4.18		4.20		4.22		4.25		5.46	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		21500		18600		16600		14600		12600		10500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1230		1060		939		824		701		355	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

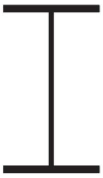
W16-W14

Shape		W16x		W14×									
lb/ft		26 ^{c2}		120		109		99		90 ^{c2}		82	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	218	328	1360	2050	1230	1850	1120	1680	991	1490	922	1390
	6	141	213	1280	1920	1160	1740	1050	1580	935	1400	810	1220
	7	119	178	1260	1890	1130	1700	1030	1550	916	1380	772	1160
	8	95.2	143	1230	1850	1110	1670	1000	1510	896	1350	731	1100
	9	75.2	113	1200	1800	1080	1620	978	1470	874	1310	688	1030
	10	60.9	91.6	1160	1740	1050	1580	952	1430	851	1280	642	965
	11	50.4	75.7	1120	1690	1020	1530	920	1380	826	1240	595	894
	12	42.3	63.6	1080	1630	978	1470	887	1330	797	1200	547	822
	13	36.1	54.2	1040	1560	940	1410	851	1280	765	1150	500	751
	14	31.1	46.7	995	1500	900	1350	815	1220	732	1100	453	681
	15	27.1	40.7	950	1430	859	1290	777	1170	699	1050	408	613
	16	23.8	35.8	904	1360	817	1230	739	1110	665	999	365	548
	17	21.1	31.7	857	1290	774	1160	700	1050	630	947	324	487
	18	18.8	28.3	810	1220	732	1100	661	994	596	895	289	434
	19			764	1150	690	1040	623	936	561	843	259	390
	20			717	1080	647	973	584	878	527	792	234	352
	22			627	942	566	850	509	766	460	692	193	291
	24			541	813	488	733	439	659	397	596	163	244
	26			463	695	417	626	375	563	339	509	138	208
	28			399	600	359	540	323	485	292	439	119	179
	30			347	522	313	470	281	423	255	383	104	156
	32			305	459	275	414	247	372	224	336	91.4	137
	34			271	407	244	366	219	329	198	298	81.0	122
	36			241	363	217	327	195	294	177	266	72.2	109
	38			217	325	195	293	175	264	159	239	64.8	97.4
	40			195	294	176	265	158	238	143	215	58.5	87.9
Properties													
P_{wo}, kips		18.7	28.0	120	180	97.8	147	82.0	123	67.7	102	94.5	142
P_{wi}, kips/in.		10.8	16.3	25.6	38.4	22.8	34.1	21.0	31.5	19.1	28.6	22.1	33.2
P_{wb}, kips		20.5	30.9	321	483	227	341	178	268	134	201	208	312
P_{fb}, kips		29.0	43.5	215	323	180	270	148	222	123	184	178	267
A_g, in.^{2}		7.55		35.0		31.7		28.8		26.2		23.7	
I_x, in.^{4}		294		1360		1230		1100		987		870	
I_y, in.^{4}		9.59		495		447		402		362		148	
r_y, in.		1.13		3.76		3.75		3.73		3.72		2.50	
r_x/r_y		5.52		1.66		1.66		1.65		1.65		2.42	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		8410		38900		35200		31500		28200		24900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		274		14200		12800		11500		10400		4240	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.



W14

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		**W14×**											
lb/ft		**74** ^{c2}		**68** ^{c2}		**61** ^{c2}		**53** ^{c2}		**48** ^{c2}		**43** ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**	**ASD**	**LRFD**
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	**0**	824	1240	744	1120	650	977	560	841	494	743	430	646
	6	733	1100	662	994	579	870	465	699	412	619	358	538
	7	700	1050	634	952	555	834	434	653	385	578	334	503
	8	662	995	603	906	528	794	401	602	355	534	309	464
	9	622	935	569	855	499	750	365	548	324	486	281	423
	10	581	873	530	797	468	703	326	490	291	437	253	381
	11	538	808	491	738	436	655	287	432	257	387	224	337
	12	494	743	451	678	401	603	250	376	224	336	196	294
	13	451	678	411	618	366	550	215	324	192	289	168	252
	14	409	614	372	560	331	497	186	279	166	249	145	217
	15	368	553	335	503	297	446	162	243	144	217	126	189
	16	328	493	298	449	265	398	142	214	127	191	111	166
	17	292	438	265	398	235	353	126	189	112	169	98.1	147
	18	260	391	236	355	209	315	112	169	100	151	87.5	132
	19	233	351	212	319	188	283	101	152	90.0	135	78.6	118
	20	211	317	191	288	170	255	91.0	137	81.2	122	70.9	107
	22	174	262	158	238	140	211	75.2	113	67.1	101	58.6	88.1
	24	146	220	133	200	118	177	63.2	95.0	56.4	84.8	49.2	74.0
	26	125	187	113	170	100	151	53.8	80.9	48.1	72.2	42.0	63.1
	28	107	162	97.7	147	86.6	130	46.4	69.8	41.4	62.3	36.2	54.4
	30	93.6	141	85.1	128	75.4	113	40.4	60.8	36.1	54.3	31.5	47.4
	32	82.3	124	74.8	112	66.3	99.6	35.5	53.4	31.7	47.7		
	34	72.9	110	66.2	99.6	58.7	88.2						
	36	65.0	97.7	59.1	88.8	52.4	78.7						
	38	58.3	87.7	53.0	79.7	47.0	70.6						
	40	52.7	79.1	47.9	71.9	42.4	63.7						
Properties													
P_{wo}, kips		76.5	115	64.7	97.1	52.4	78.6	52.9	79.4	43.8	65.7	35.0	52.5
P_{wi}, kips/in.		19.5	29.3	18.0	27.0	16.3	24.4	16.0	24.1	14.7	22.1	13.2	19.8
P_{wb}, kips		142	214	112	169	82.5	124	79.4	119	61.5	92.4	44.3	66.6
P_{fb}, kips		150	225	126	190	101	152	106	159	86.1	129	68.3	103
A_g, in.^{2}		21.5		19.7		17.6		15.3		13.8		12.3	
I_x, in.^{4}		784		711		628		530		473		416	
I_y, in.^{4}		134		121		107		57.6		51.4		45.2	
r_y, in.		2.49		2.48		2.47		1.94		1.93		1.91	
r_x/r_y		2.43		2.42		2.42		3.03		3.03		3.04	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		22400		20400		18000		15200		13500		11900	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		3840		3460		3060		1650		1470		1290	

ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

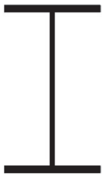
W14-W12

Shape		W14×										W12×	
lb/ft		38 ^{c2}		34 ^{c2}		30 ^{c2}		26 ^{c2}		22 ^{c2}		106	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	**0**	375	564	328	493	283	425	236	355	190	286	1200	1810
	6	287	432	251	377	215	323	141	212	112	168	1110	1660
	7	260	391	227	341	194	291	114	172	89.8	135	1070	1610
	8	230	346	201	302	171	257	88.6	133	69.2	104	1040	1560
	9	200	300	174	262	148	222	70.0	105	54.7	82.2	997	1500
	10	169	253	147	221	124	186	56.7	85.2	44.3	66.6	954	1430
	11	140	210	122	184	102	154	46.9	70.4	36.6	55.0	909	1370
	12	117	177	103	154	86.0	129	39.4	59.2	30.8	46.3	862	1300
	13	100	150	87.4	131	73.3	110	33.5	50.4	26.2	39.4	813	1220
	14	86.3	130	75.4	113	63.2	95.0	28.9	43.5	22.6	34.0	764	1150
	15	75.2	113	65.7	98.7	55.0	82.7	25.2	37.9	19.7	29.6	715	1070
	16	66.1	99.3	57.7	86.8	48.4	72.7	22.1	33.3	17.3	26.0	665	1000
	17	58.5	88.0	51.1	76.9	42.9	64.4	19.6	29.5	15.3	23.0	616	926
	18	52.2	78.5	45.6	68.6	38.2	57.5	17.5	26.3			568	854
	19	46.9	70.4	40.9	61.5	34.3	51.6					522	784
	20	42.3	63.6	36.9	55.5	31.0	46.5					477	716
	22	35.0	52.5	30.5	45.9	25.6	38.5					395	594
	24	29.4	44.1	25.7	38.6	21.5	32.3					332	499
	26	25.0	37.6									283	425
	28											244	367
	30											213	320
	32											187	281
	34											166	249
	36											148	222
	38											132	199
	40											120	180
Properties													
P_{wo}, kips		34.6	51.9	28.1	42.1	22.5	33.8	23.2	34.8	16.7	25.0	131	196
P_{wi}, kips/in.		13.4	20.2	12.4	18.5	11.7	17.6	11.1	16.6	9.97	15.0	26.4	39.7
P_{wb}, kips		45.0	67.6	34.9	52.4	29.8	44.8	25.1	37.7	18.4	27.7	410	616
P_{fb}, kips		64.5	97.0	50.4	75.7	36.1	54.2	42.9	64.5	27.3	41.0	238	358
A_g, in.^{2}		11.0		9.86		8.71		7.55		6.36		30.9	
I_x, in.^{4}		380		334		285		240		193		925	
I_y, in.^{4}		26.7		23.3		19.6		8.90		6.99		301	
r_y, in.		1.56		1.54		1.50		1.09		1.05		3.13	
r_x/r_y		3.76		3.78		3.81		5.17		5.25		1.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		10900		9560		8160		6870		5520		26500	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		764		667		561		255		200		8620	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.



W12

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×											
lb/ft		96		87		79		72		65 [c2]		58 [c2]	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1090	1630	985	1480	891	1340	810	1220	723	1090	632	950
	6	998	1500	904	1360	816	1230	740	1110	665	1000	564	848
	7	968	1460	877	1320	792	1190	718	1080	647	972	541	813
	8	935	1400	846	1270	764	1150	693	1040	626	941	515	775
	9	898	1350	812	1220	734	1100	665	1000	601	903	488	733
	10	859	1290	777	1170	701	1050	636	955	573	862	456	686
	11	818	1230	739	1110	666	1000	604	908	545	819	423	636
	12	775	1160	700	1050	630	948	571	859	515	774	390	587
	13	731	1100	659	991	594	892	538	808	485	729	357	537
	14	686	1030	618	929	556	836	504	757	454	682	325	488
	15	641	963	577	868	519	780	470	706	423	636	293	440
	16	596	896	536	806	482	724	436	655	392	589	263	395
	17	552	829	496	745	445	669	402	604	362	544	234	351
	18	508	764	456	686	409	615	370	555	332	499	209	313
	19	466	700	418	628	374	562	338	508	304	456	187	281
	20	425	639	381	573	341	512	307	462	276	415	169	254
	22	352	530	315	474	282	424	254	382	228	343	140	210
	24	296	445	265	398	237	356	214	321	192	288	117	176
	26	252	379	226	339	202	303	182	274	164	246	99.9	150
	28	218	327	195	293	174	261	157	236	141	212	86.2	130
	30	189	285	170	255	152	228	137	206	123	185	75.1	113
	32	167	250	149	224	133	200	120	181	108	162	66.0	99.2
	34	148	222	132	198	118	177	106	160	95.6	144	58.4	87.8
	36	132	198	118	177	105	158	95.0	143	85.3	128	52.1	78.3
	38	118	178	106	159	94.5	142	85.2	128	76.5	115	46.8	70.3
	40	107	160	95.4	143	85.3	128	76.9	116	69.1	104	42.2	63.5
Properties													
P_{wo}, kips		107	161	90.4	136	74.8	112	62.4	93.6	51.1	76.7	49.9	74.9
P_{wi}, kips/in.		23.8	35.8	22.3	33.5	20.4	30.6	18.6	28.0	16.9	25.4	15.6	23.4
P_{wb}, kips		301	453	248	372	187	282	143	215	107	162	84.3	127
P_{fb}, kips		197	296	160	240	131	198	109	164	89.0	134	99.6	150
A_g, in.^{2}		27.9		25.3		22.9		20.8		18.8		16.7	
I_x, in.^{4}		824		731		654		588		524		467	
I_y, in.^{4}		270		241		216		195		174		107	
r_y, in.		3.11		3.09		3.07		3.06		3.05		2.53	
r_x/r_y		1.75		1.74		1.74		1.74		1.73		2.09	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		23600		20900		18700		16800		15000		13400	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		7730		6900		6180		5580		4980		3060	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W12

Shape		W12×											
lb/ft		53 ^{c2}		50 ^{c2}		45 ^{c2}		40 ^{c2}		35 ^{c2}		30 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	574	862	546	820	478	718	416	625	364	547	298	448
	6	511	768	454	682	398	598	348	523	274	411	225	338
	7	490	736	422	635	372	559	325	489	245	369	202	304
	8	466	701	387	582	344	516	301	453	216	324	178	268
	9	441	663	351	527	313	470	275	414	185	278	154	231
	10	414	622	314	473	280	421	248	373	154	232	129	194
	11	384	577	278	418	248	372	221	332	128	192	107	160
	12	353	531	244	366	217	325	193	290	107	161	89.6	135
	13	323	485	211	317	187	281	167	251	91.3	137	76.3	115
	14	293	440	182	274	161	243	144	216	78.8	118	65.8	98.9
	15	263	396	159	238	141	211	125	188	68.6	103	57.3	86.2
	16	235	354	139	209	124	186	110	166	60.3	90.6	50.4	75.7
	17	209	314	123	186	109	165	97.6	147	53.4	80.3	44.6	67.1
	18	187	280	110	166	97.7	147	87.1	131	47.6	71.6	39.8	59.8
	19	167	252	98.8	149	87.6	132	78.1	117	42.8	64.3	35.7	53.7
	20	151	227	89.2	134	79.1	119	70.5	106	38.6	58.0	32.3	48.5
	22	125	188	73.7	111	65.4	98.3	58.3	87.6	31.9	47.9	26.7	40.1
	24	105	158	61.9	93.1	54.9	82.6	49.0	73.6	26.8	40.3	22.4	33.7
	26	89.4	134	52.8	79.3	46.8	70.3	41.7	62.7				
	28	77.1	116	45.5	68.4	40.4	60.7	36.0	54.1				
	30	67.1	101	39.6	59.6	35.2	52.8	31.3	47.1				
	32	59.0	88.7	34.8	52.4	30.9	46.4	27.5	41.4				
	34	52.3	78.6										
	36	46.6	70.1										
	38	41.9	62.9										
	40	37.8	56.8										
Properties													
P_{wo}, kips		43.0	64.5	51.3	77.0	41.7	62.6	32.9	49.4	33.8	50.7	24.8	37.2
P_{wi}, kips/in.		15.0	22.4	16.0	24.1	14.5	21.8	12.8	19.2	13.0	19.5	11.3	16.9
P_{wb}, kips		74.0	111	91.5	138	67.7	102	46.6	70.0	46.5	69.9	30.4	45.6
P_{fb}, kips		80.4	121	99.6	150	80.4	121	64.5	97.0	65.8	98.9	47.1	70.8
A_g, in.^{2}		15.3		14.4		12.9		11.5		10.3		8.72	
I_x, in.^{4}		417		385		342		303		283		236	
I_y, in.^{4}		95.7		56.3		49.9		44.8		24.5		20.3	
r_y, in.		2.50		1.98		1.97		1.97		1.54		1.53	
r_x/r_y		2.09		2.62		2.61		2.60		3.41		3.40	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		11900		11000		9790		8670		8100		6750	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		2740		1610		1430		1280		701		581	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W12-W10

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

F_y = 65 ksi

Shape		W12×										W10×	
lb/ft		26 ^{c2}		22 ^{c2}		19 ^{c2}		16 ^{c2}		14 ^{c2}		88	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	251	377	208	312	170	255	136	205	114	172	1000	1500
	6	189	285	81.7	123	66.0	99.3	49.4	74.3	41.4	62.2	890	1340
	7	170	256	60.0	90.2	48.5	72.9	36.3	54.6	30.4	45.7	853	1280
	8	150	226	45.9	69.1	37.1	55.8	27.8	41.8	23.3	35.0	812	1220
	9	130	195	36.3	54.6	29.3	44.1	22.0	33.0	18.4	27.6	769	1160
	10	109	164	29.4	44.2	23.8	35.7	17.8	26.7	14.9	22.4	723	1090
	11	90.2	135	24.3	36.5	19.6	29.5	14.7	22.1	12.3	18.5	675	1010
	12	75.8	114	20.4	30.7	16.5	24.8	12.4	18.6	10.3	15.5	626	941
	13	64.5	97.0	17.4	26.2	14.1	21.1					577	868
	14	55.7	83.7	15.0	22.6							529	795
	15	48.5	72.9									481	723
	16	42.6	64.0									435	654
	17	37.7	56.7									391	587
	18	33.7	50.6									349	525
	19	30.2	45.4									314	471
	20	27.3	41.0									283	425
	22	22.5	33.9									234	352
	24	18.9	28.5									197	295
	26											167	252
	28											144	217
	30											126	189
	32											111	166
	34											97.9	147
	36											87.3	131
	38											78.4	118
	40											70.8	106
Properties													
P_{wo}, kips		18.9	28.4	23.9	35.9	17.8	26.7	12.6	18.9	9.75	14.6	130	195
P_{wi}, kips/in.		9.97	15.0	11.3	16.9	10.2	15.3	9.53	14.3	8.67	13.0	26.2	39.3
P_{wb}, kips		21.0	31.5	30.3	45.5	22.3	33.5	18.3	27.5	13.8	20.7	495	745
P_{fb}, kips		35.1	52.8	43.9	66.0	29.8	44.8	17.1	25.7	12.3	18.5	238	358
A_g, in.^{2}		7.57		6.41		5.50		4.64		4.08		25.7	
I_x, in.^{4}		202		154		127		100		86.1		530	
I_y, in.^{4}		17.3		4.65		3.76		2.82		2.35		179	
r_y, in.		1.51		0.852		0.827		0.779		0.760		2.64	
r_x/r_y		3.42		5.75		5.82		5.97		6.04		1.72	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		5780		4410		3630		2860		2460		15200	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		495		133		108		80.7		67.3		5120	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

W10

Shape		W10×											
lb/ft		77		68		60		54		49		45	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	872	1310	771	1160	677	1020	607	913	553	831	506	761
	6	774	1160	683	1030	599	900	537	807	487	732	414	623
	7	742	1110	654	983	573	861	513	771	467	701	385	579
	8	706	1060	622	935	545	819	487	733	443	666	355	533
	9	667	1000	587	883	514	773	460	691	418	628	323	485
	10	627	942	551	828	482	724	431	647	391	588	290	436
	11	585	879	514	772	449	674	401	602	364	547	258	388
	12	542	814	476	715	415	623	370	557	336	505	227	342
	13	499	750	437	657	381	572	340	511	308	463	198	297
	14	456	686	399	600	347	522	310	466	281	422	171	257
	15	415	623	362	545	315	473	281	422	254	381	149	224
	16	374	563	327	491	283	426	252	379	228	343	131	197
	17	336	505	292	440	253	380	225	338	204	306	116	174
	18	300	451	261	392	226	340	201	302	182	273	103	156
	19	269	405	234	352	203	305	180	271	163	245	92.9	140
	20	243	365	211	318	183	275	163	245	147	221	83.8	126
	22	201	302	175	263	151	227	135	202	122	183	69.3	104
	24	169	254	147	221	127	191	113	170	102	153	58.2	87.5
	26	144	216	125	188	108	163	96.3	145	87.0	131	49.6	74.5
	28	124	186	108	162	93.4	140	83.1	125	75.0	113	42.8	64.3
	30	108	162	94.0	141	81.3	122	72.4	109	65.3	98.2	37.2	56.0
	32	94.9	143	82.6	124	71.5	107	63.6	95.6	57.4	86.3	32.7	49.2
	34	84.1	126	73.2	110	63.3	95.2	56.3	84.7	50.9	76.5		
	36	75.0	113	65.3	98.1	56.5	84.9	50.2	75.5	45.4	68.2		
	38	67.3	101	58.6	88.0	50.7	76.2	45.1	67.8	40.7	61.2		
	40	60.7	91.3	52.9	79.5	45.7	68.8	40.7	61.2	36.8	55.2		
Properties													
P_{wo}, kips		99.9	150	78.4	118	61.9	92.8	49.3	74.0	41.3	61.9	47.0	70.5
P_{wi}, kips/in.		23.0	34.5	20.4	30.6	18.2	27.3	16.0	24.1	14.7	22.1	15.2	22.8
P_{wb}, kips		332	498	231	348	165	249	113	169	87.5	132	95.5	144
P_{fb}, kips		184	277	144	217	112	169	92.0	138	76.3	115	93.5	141

	77	68	60	54	49	45
A_g, in.^{2}	22.4	19.8	17.4	15.6	14.2	13.0
I_x, in.^{4}	451	390	337	299	268	244
I_y, in.^{4}	154	133	116	103	93.4	53.3
r_y, in.	2.62	2.60	2.58	2.57	2.56	2.02
r_x/r_y	1.71	1.71	1.71	1.70	1.70	2.14
$P_{ex}(KL)^2/10^4$, k-in.^{2}	12900	11200	9650	8560	7670	6980
$P_{ey}(KL)^2/10^4$, k-in.^{2}	4410	3810	3320	2950	2670	1530

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W10

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W10×											
lb/ft		39 ^{c2}		33 ^{c2}		30 ^{c2}		26 ^{c2}		22 ^{c2}		19 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	433	652	357	537	325	488	270	406	223	336	191	287
	6	359	539	296	445	222	334	187	280	153	229	75.3	113
	7	333	501	276	415	190	286	162	243	132	198	55.3	83.2
	8	306	460	253	381	159	239	135	203	110	165	42.4	63.7
	9	278	418	229	344	130	195	110	166	88.5	133	33.5	50.3
	10	250	375	205	308	105	158	89.3	134	71.7	108	27.1	40.8
	11	222	333	181	272	87.1	131	73.8	111	59.2	89.0	22.4	33.7
	12	194	292	158	237	73.2	110	62.0	93.2	49.8	74.8	18.8	28.3
	13	169	254	136	205	62.4	93.8	52.9	79.4	42.4	63.7	16.0	24.1
	14	146	219	118	177	53.8	80.8	45.6	68.5	36.6	55.0	13.8	20.8
	15	127	191	102	154	46.9	70.4	39.7	59.7	31.8	47.9		
	16	112	168	90.0	135	41.2	61.9	34.9	52.4	28.0	42.1		
	17	98.8	149	79.7	120	36.5	54.8	30.9	46.5	24.8	37.3		
	18	88.2	133	71.1	107	32.5	48.9	27.6	41.4	22.1	33.2		
	19	79.1	119	63.8	95.9	29.2	43.9	24.7	37.2	19.9	29.8		
	20	71.4	107	57.6	86.6	26.4	39.6	22.3	33.6	17.9	26.9		
	22	59.0	88.7	47.6	71.5	21.8	32.7	18.5	27.7	14.8	22.3		
	24	49.6	74.5	40.0	60.1								
	26	42.3	63.5	34.1	51.2								
	28	36.4	54.8	29.4	44.2								
	30	31.7	47.7	25.6	38.5								
	32	27.9	41.9	22.5	33.8								
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		36.2	54.3	27.3	41.0	33.2	49.7	24.8	37.2	18.7	28.1	21.4	32.1
P_{wi}, kips/in.		13.7	20.5	12.6	18.9	13.0	19.5	11.3	16.9	10.4	15.6	10.8	16.3
P_{wb}, kips		69.6	105	54.3	81.6	56.2	84.5	36.8	55.3	28.8	43.2	32.8	49.2
P_{fb}, kips		68.3	103	46.0	69.2	63.3	95.1	47.1	70.8	31.5	47.4	38.0	57.0
A_g, in.^{2}		11.3		9.49		8.76		7.53		6.41		5.54	
I_x, in.^{4}		205		166		168		143		117		94.6	
I_y, in.^{4}		45.0		36.6		16.7		14.1		11.4		4.29	
r_y, in.		2.00		1.96		1.38		1.37		1.33		0.880	
r_x/r_y		2.14		2.14		3.17		3.18		3.20		4.69	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		5870		4750		4810		4090		3350		2710	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1290		1050		478		404		326		123	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

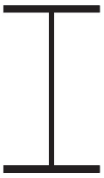
W10-W8

Shape		W10×						W8×					
lb/ft		17 ^{c2}		15 ^{c2}		12 ^{c2}		67		58		48	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	165	248	141	213	105	157	759	1140	662	995	545	819
	6	62.4	93.8	50.7	76.3	38.3	57.6	634	953	550	826	452	679
	7	45.9	68.9	37.3	56.0	28.1	42.3	594	893	514	773	423	635
	8	35.1	52.8	28.5	42.9	21.5	32.4	551	829	476	716	391	588
	9	27.7	41.7	22.6	33.9	17.0	25.6	506	761	436	656	358	538
	10	22.5	33.8	18.3	27.5	13.8	20.7	461	692	396	595	324	487
	11	18.6	27.9	15.1	22.7	11.4	17.1	415	623	355	534	291	437
	12	15.6	23.5	12.7	19.1	9.57	14.4	370	556	316	474	258	388
	13	13.3	20.0	10.8	16.2	8.16	12.3	326	490	278	417	227	341
	14	11.5	17.2					285	428	242	363	197	296
	15							248	373	211	317	172	258
	16							218	328	185	278	151	227
	17							193	291	164	246	134	201
	18							173	259	146	220	119	179
	19							155	233	131	197	107	161
	20							140	210	118	178	96.6	145
	22							116	174	97.9	147	79.9	120
	24							97.1	146	82.3	124	67.1	101
	26							82.7	124	70.1	105	57.2	85.9
	28							71.3	107	60.4	90.8	49.3	74.1
	30							62.1	93.4	52.6	79.1	42.9	64.5
	32							54.6	82.1	46.3	69.5	37.7	56.7
	34							48.4	72.7	41.0	61.6	33.4	50.2
	36												
	38												
	40												
Properties													
P_{wo}, kips		17.2	25.7	13.5	20.2	8.7	13.0	115	173	89.5	134	59.4	89.1
P_{wi}, kips/in.		10.4	15.6	9.97	15.0	8.23	12.4	24.7	37.1	22.1	33.2	17.3	26.0
P_{wb}, kips		28.9	43.4	25.4	38.2	14.3	21.5	512	770	367	552	177	266
P_{fb}, kips		26.5	39.8	17.7	26.7	10.7	16.1	213	320	160	240	114	172
A_g, in.^{2}		4.91		4.33		3.46		19.5		17.0		14.0	
I_x, in.^{4}		80.2		67.2		52.2		270		226		182	
I_y, in.^{4}		3.56		2.89		2.18		88.6		75.1		60.9	
r_y, in.		0.851		0.817		0.794		2.13		2.10		2.09	
r_x/r_y		4.75		4.82		4.89		1.75		1.74		1.73	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		2300		1920		1490		7730		6470		5210	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		102		82.7		62.4		2540		2150		1740	
ASD		**LRFD**											
Ω_c = 1.67		φ_c = 0.90											

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



W8

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W8×											
lb/ft		40		35		31		28		24 ^{c2}		21 ^{c2}	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	451	679	397	597	350	526	316	474	264	397	229	345
	6	373	560	327	491	287	431	232	349	198	297	143	215
	7	348	522	305	458	267	402	208	312	177	266	119	179
	8	321	482	281	423	246	370	183	275	155	234	96.4	145
	9	293	440	256	385	224	337	158	238	134	202	76.6	115
	10	265	398	231	348	202	303	134	202	114	171	62.1	93.3
	11	237	356	207	311	180	270	113	169	95.1	143	51.3	77.1
	12	209	314	183	274	158	238	94.6	142	79.9	120	43.1	64.8
	13	183	275	160	240	138	208	80.6	121	68.1	102	36.7	55.2
	14	159	239	138	208	119	180	69.5	104	58.7	88.3	31.7	47.6
	15	138	208	120	181	104	156	60.5	91.0	51.2	76.9	27.6	41.5
	16	122	183	106	159	91.5	137	53.2	80.0	45.0	67.6	24.2	36.4
	17	108	162	93.7	141	81.0	122	47.1	70.8	39.8	59.9	21.5	32.3
	18	96.0	144	83.6	126	72.3	109	42.0	63.2	35.5	53.4	19.2	28.8
	19	86.2	130	75.0	113	64.9	97.5	37.7	56.7	31.9	47.9	17.2	25.8
	20	77.8	117	67.7	102	58.5	88.0	34.0	51.2	28.8	43.3	15.5	23.3
	22	64.3	96.6	56.0	84.1	48.4	72.7	28.1	42.3	23.8	35.7		
	24	54.0	81.2	47.0	70.7	40.6	61.1	23.6	35.5	20.0	30.0		
	26	46.0	69.2	40.1	60.2	34.6	52.1	20.1	30.3	17.0	25.6		
	28	39.7	59.6	34.6	51.9	29.9	44.9						
	30	34.6	52.0	30.1	45.2	26.0	39.1						
	32	30.4	45.7	26.5	39.8	22.9	34.4						
	34	26.9	40.4	23.4	35.2								
	36												
	38												
	40												
Properties													
P_{wo}, kips		43.7	65.5	33.2	49.9	26.9	40.3	28.7	43.1	21.2	31.9	21.7	32.5
P_{wi}, kips/in.		15.6	23.4	13.4	20.2	12.4	18.5	12.4	18.5	10.6	15.9	10.8	16.3
P_{wb}, kips		129	194	82.4	124	64.1	96.3	64.1	96.3	40.7	61.2	41.2	61.9
P_{fb}, kips		76.3	115	59.6	89.6	46.0	69.2	52.6	79.1	38.9	58.5	38.9	58.5
A_g, in.^{2}		11.6		10.2		8.99		8.11		6.94		6.09	
I_x, in.^{4}		145		125		108		96.4		81.1		74.2	
I_y, in.^{4}		49.1		42.6		37.1		21.6		18.3		9.77	
r_y, in.		2.06		2.05		2.03		1.63		1.62		1.27	
r_x/r_y		1.71		1.71		1.71		2.12		2.11		2.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		4150		3580		3090		2760		2320		2120	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		1410		1220		1060		618		524		280	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

W8-W6

Shape		W8×								W6×			
lb/ft		18 ^{c2}		15 ^{c2}		13 ^{c2}		10 ^{c2}		25		20	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	191	287	161	242	135	203	94.6	142	283	426	227	340
	6	119	179	59.8	89.9	47.9	72.0	36.7	55.2	200	301	158	238
	7	98.1	147	43.9	66.0	35.2	52.9	27.0	40.6	176	265	139	209
	8	78.6	118	33.6	50.6	27.0	40.5	20.7	31.1	152	229	120	180
	9	62.3	93.6	26.6	40.0	21.3	32.0	16.3	24.5	129	194	101	152
	10	50.4	75.8	21.5	32.4	17.2	25.9	13.2	19.9	108	162	83.8	126
	11	41.7	62.6	17.8	26.7	14.3	21.4	10.9	16.4	89.0	134	69.3	104
	12	35.0	52.6	15.0	22.5	12.0	18.0	9.19	13.8	74.8	112	58.2	87.5
	13	29.8	44.9	12.7	19.2	10.2	15.3	7.83	11.8	63.7	95.8	49.6	74.6
	14	25.7	38.7	11.0	16.5	8.80	13.2	6.75	10.1	55.0	82.6	42.8	64.3
	15	22.4	33.7							47.9	71.9	37.3	56.0
	16	19.7	29.6							42.1	63.2	32.8	49.2
	17	17.5	26.2							37.3	56.0	29.0	43.6
	18	15.6	23.4							33.2	50.0	25.9	38.9
	19	14.0	21.0							29.8	44.8	23.2	34.9
	20	12.6	19.0							26.9	40.5	21.0	31.5
	22									22.3	33.4	17.3	26.0
	24									18.7	28.1	14.6	21.9
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												
Properties													
P_{wo}, kips		16.4	24.7	16.7	25.1	12.7	19.1	7.55	11.3	31.5	47.3	20.6	30.8
P_{wi}, kips/in.		9.97	15.0	10.6	15.9	9.97	15.0	7.37	11.1	13.9	20.8	11.3	16.9
P_{wb}, kips		32.1	48.2	38.8	58.3	32.1	48.2	13.0	19.5	118	178	63.4	95.3
P_{fb}, kips		26.5	39.8	24.1	36.3	15.8	23.8	10.2	15.4	50.4	75.7	32.4	48.7
A_g, in.^{2}		5.19		4.36		3.76		2.89		7.28		5.82	
I_x, in.^{4}		60.9		47.0		38.5		29.8		53.0		41.0	
I_y, in.^{4}		7.97		3.41		2.73		2.09		17.1		13.3	
r_y, in.		1.24		0.884		0.852		0.851		1.53		1.51	
r_x/r_y		2.77		3.71		3.76		3.77		1.76		1.75	
$P_{ex}(KL)^2/10^4$, k-in.^{2}		1740		1350		1100		853		1520		1170	
$P_{ey}(KL)^2/10^4$, k-in.^{2}		228		97.6		78.1		59.8		489		381	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

W6-W5

Table 5-1 (continued)
Available Strength in Axial Compression, kips
W-Shapes (Welded)

F_y = 65 ksi

Shape		W6×								W5×			
lb/ft		16		15 ^{c2}		12		9 ^{c2}		19		18.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	183	274	156	235	136	205	96.2	145	213	321	213	321
	6	77.0	116	110	165	52.5	78.9	38.4	57.7	131	196	128	192
	7	57.2	85.9	96.9	146	38.6	58.1	28.2	42.4	109	164	106	159
	8	43.8	65.8	83.7	126	29.6	44.4	21.6	32.5	89.2	134	85.5	129
	9	34.6	52.0	70.8	106	23.4	35.1	17.1	25.7	71.2	107	67.9	102
	10	28.0	42.1	58.8	88.4	18.9	28.4	13.8	20.8	57.6	86.6	55.0	82.6
	11	23.1	34.8	48.7	73.1	15.6	23.5	11.4	17.2	47.6	71.6	45.4	68.3
	12	19.4	29.2	40.9	61.4	13.1	19.8	9.61	14.4	40.0	60.2	38.2	57.4
	13	16.6	24.9	34.8	52.4	11.2	16.8	8.19	12.3	34.1	51.3	32.5	48.9
	14	14.3	21.5	30.0	45.1	9.66	14.5	7.06	10.6	29.4	44.2	28.1	42.2
	15	12.4	18.7	26.2	39.3	8.41	12.6	6.15	9.24	25.6	38.5	24.4	36.7
	16	10.9	16.4	23.0	34.6					22.5	33.8	21.5	32.3
	17			20.4	30.6					19.9	30.0	19.0	28.6
	18			18.2	27.3					17.8	26.7	17.0	25.5
	19			16.3	24.5					16.0	24.0	15.2	22.9
	20			14.7	22.1					14.4	21.7	13.7	20.7
	22			12.2	18.3								
	24			10.2	15.4								
	26												
	28												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

P_{wo}, kips	22.8	34.2	13.0	19.4	14.0	20.9	7.92	11.9	25.2	37.7	28.5	42.7
P_{wi}, kips/in.	11.3	16.9	9.97	15.0	9.97	15.0	7.37	11.1	11.7	17.6	13.7	20.5
P_{wb}, kips	63.4	95.3	43.9	66.0	43.9	66.0	17.7	26.6	90.5	136	149	225
P_{fb}, kips	39.9	60.0	16.4	24.7	19.1	28.7	11.2	16.9	45.0	67.6	42.1	63.3
A_g, in.^{2}	4.69		4.37		3.50		2.62		5.48		5.48	
I_x, in.^{4}	31.8		28.7		21.7		16.0		25.9		23.8	
I_y, in.^{4}	4.43		9.32		2.99		2.19		9.13		8.69	
r_y, in.	0.972		1.46		0.925		0.914		1.29		1.26	
r_x/r_y	2.67		1.75		2.69		2.70		1.68		1.66	
$P_{ex}(KL)^2/10^4$, k-in.^{2}	910		821		621		458		741		681	
$P_{ey}(KL)^2/10^4$, k-in.^{2}	127		267		85.6		62.7		261		249	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-1 (continued)

Available Strength in Axial Compression, kips

W-Shapes (Welded)

W5-W4

Shape		W5×		W4×	
lb/ft		16		13	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	180	271	147	221
	6	109	163	65.9	99.1
	7	90.5	136	49.6	74.6
	8	73.3	110	38.0	57.1
	9	58.3	87.6	30.0	45.1
	10	47.2	70.9	24.3	36.5
	11	39.0	58.6	20.1	30.2
	12	32.8	49.3	16.9	25.4
	13	27.9	42.0	14.4	21.6
	14	24.1	36.2	12.4	18.6
	15	21.0	31.5	10.8	16.2
	16	18.4	27.7	9.49	14.3
	17	16.3	24.5		
	18	14.6	21.9		
	19	13.1	19.6		
	20	11.8	17.7		
	22				
	24				
	26				
	28				
	30				
	32				
	34				
	36				
	38				
	40				

Properties

P_{wo}, kips	18.7	28.1	20.9	31.4
P_{wi}, kips/in.	10.4	15.6	12.1	18.2
P_{wb}, kips	63.6	95.6	125	188
P_{fb}, kips	31.5	47.4	29.0	43.5

A_g, in.^{2}	4.63	3.77
I_x, in.^{4}	21.1	11.2
I_y, in.^{4}	7.50	3.85
r_y, in.	1.27	1.01
r_x/r_y	1.68	1.70
$P_{ex}(KL)^2/10^4$, k-in.^{2}	604	321
$P_{ey}(KL)^2/10^4$, k-in.^{2}	215	110

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS16-HSS10

Table 5-2
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 65 ksi

	Shape	HSS16×8×		HSS12×8×		HSS12×4×				HSS10×6×			
		0.250 ^{c2}		0.250 ^{c2}		0.250 ^{c2}		0.180 ^{c2}		0.250 ^{c2}		0.180 ^{c2}	
	t_{design}, in.	0.250		0.250		0.250		0.180		0.250		0.180	
	lb/ft	40.2		33.3		26.3		19.2		26.3		19.2	
	Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	293	440	289	434	218	328	131	197	254	382	152	228
	6	285	428	278	419	186	280	116	174	232	349	143	215
	7	282	424	275	413	175	264	110	166	225	338	140	211
	8	278	419	271	407	163	244	104	157	216	325	137	206
	9	275	413	266	399	148	223	97.4	146	206	310	133	199
	10	270	406	259	389	133	199	89.9	135	196	294	127	191
	11	264	397	251	378	115	173	81.8	123	184	277	121	182
	12	258	388	243	366	97.4	146	72.9	110	172	258	114	172
	13	251	377	235	353	83.0	125	63.4	95.4	159	239	108	162
	14	243	366	225	339	71.6	108	54.7	82.2	144	217	100	151
	15	235	354	216	324	62.3	93.7	47.7	71.6	130	195	92.7	139
	16	227	341	206	309	54.8	82.4	41.9	63.0	116	174	84.8	128
	17	218	328	195	293	48.5	72.9	37.1	55.8	103	155	76.7	115
	18	209	315	184	277	43.3	65.1	33.1	49.7	91.8	138	68.6	103
	19	200	300	173	260	38.9	58.4	29.7	44.6	82.4	124	61.6	92.6
	20	190	286	161	242	35.1	52.7	26.8	40.3	74.4	112	55.6	83.5
	21	180	270	149	224	31.8	47.8	24.3	36.5	67.4	101	50.4	75.8
	22	169	255	137	206	29.0	43.6	22.2	33.3	61.4	92.4	45.9	69.0
	23	159	238	126	189	26.5	39.9	20.3	30.5	56.2	84.5	42.0	63.2
	24	148	222	115	173	24.4	36.6	18.6	28.0	51.6	77.6	38.6	58.0
	25	136	205	106	160	22.4	33.7	17.2	25.8	47.6	71.5	35.6	53.5
	26	126	190	98.2	148	20.7	31.2	15.9	23.8	44.0	66.1	32.9	49.4
	27	117	176	91.1	137	19.2	28.9	14.7	22.1	40.8	61.3	30.5	45.8
	28	109	163	84.7	127	17.9	26.9	13.7	20.6	37.9	57.0	28.4	42.6
	29	101	152	79.0	119			12.7	19.2	35.4	53.2	26.4	39.7
	30	94.7	142	73.8	111					33.0	49.7	24.7	37.1
	32	83.2	125	64.8	97.5					29.0	43.7	21.7	32.6
	34	73.7	111	57.4	86.3					25.7	38.7	19.2	28.9
	36	65.8	98.9	51.2	77.0					22.9	34.5	17.2	25.8
	38	59.0	88.7	46.0	69.1					20.6	31.0	15.4	23.1
	40	53.3	80.1	41.5	62.4					18.6	27.9	13.9	20.9

Properties

	HSS16×8×0.250	HSS12×8×0.250	HSS12×4×0.250	HSS12×4×0.180	HSS10×6×0.250	HSS10×6×0.180
A_g, in.^{2}	11.6	9.59	7.59	5.54	7.59	5.54
I_x, in.^{4}	393	196	127	94.5	103	76.8
I_y, in.^{4}	135	105	22.3	16.9	46.9	35.1
r_y, in.	3.41	3.31	1.71	1.75	2.49	2.52
r_x/r_y	1.71	1.37	2.39	2.36	1.48	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

HSS8-HSS6

Shape		HSS8×4×						HSS6×4×					
		0.250 c2		0.180 c2		0.120 c2		0.250		0.180 c2		0.120 c2	
t_{design}, in.		0.250		0.180		0.120		0.250		0.180		0.120	
lb/ft		19.4		14.2		9.67		15.9		11.7		8.01	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	210	316	128	193	67.1	101	179	269	125	188	66.3	99.7
	6	161	242	106	160	60.2	90.4	130	195	96.8	145	57.4	86.3
	7	145	217	99.0	149	57.5	86.4	116	174	86.6	130	53.5	80.4
	8	128	192	90.6	136	53.8	80.8	101	152	76.2	115	48.9	73.5
	9	111	167	81.3	122	49.7	74.7	87.2	131	65.9	99.1	44.0	66.1
	10	94.6	142	71.2	107	45.3	68.0	73.7	111	56.1	84.2	38.7	58.2
	11	79.5	119	60.4	90.8	40.6	61.0	61.4	92.2	46.9	70.5	33.2	49.9
	12	66.8	100	50.8	76.3	35.6	53.5	51.6	77.5	39.4	59.2	27.9	42.0
	13	56.9	85.5	43.3	65.0	30.5	45.9	43.9	66.0	33.6	50.5	23.8	35.8
	14	49.1	73.8	37.3	56.1	26.3	39.5	37.9	56.9	29.0	43.5	20.5	30.8
	15	42.7	64.2	32.5	48.9	22.9	34.4	33.0	49.6	25.2	37.9	17.9	26.9
	16	37.6	56.5	28.6	42.9	20.1	30.3	29.0	43.6	22.2	33.3	15.7	23.6
	17	33.3	50.0	25.3	38.0	17.8	26.8	25.7	38.6	19.6	29.5	13.9	20.9
	18	29.7	44.6	22.6	33.9	15.9	23.9	22.9	34.4	17.5	26.3	12.4	18.7
	19	26.6	40.0	20.3	30.4	14.3	21.5	20.6	30.9	15.7	23.6	11.1	16.7
	20	24.0	36.1	18.3	27.5	12.9	19.4	18.6	27.9	14.2	21.3	10.1	15.1
	21	21.8	32.8	16.6	24.9	11.7	17.6	16.8	25.3	12.9	19.3	9.12	13.7
	22	19.9	29.9	15.1	22.7	10.7	16.0	15.3	23.1	11.7	17.6	8.31	12.5
	23	18.2	27.3	13.8	20.8	9.75	14.6	14.0	21.1	10.7	16.1	7.60	11.4
	24	16.7	25.1	12.7	19.1	8.95	13.5	12.9	19.4	9.85	14.8	6.98	10.5
	25	15.4	23.1	11.7	17.6	8.25	12.4	11.9	17.9	9.08	13.6	6.44	9.67
	26	14.2	21.4	10.8	16.3	7.63	11.5	11.0	16.5	8.40	12.6	5.95	8.94
	27	13.2	19.8	10.0	15.1	7.07	10.6			7.79	11.7	5.52	8.29
	28			9.33	14.0	6.58	9.88						
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	HSS8×4×0.250	HSS8×4×0.180	HSS8×4×0.120	HSS6×4×0.250	HSS6×4×0.180	HSS6×4×0.120
A_g, in.^{2}	5.59	4.10	2.79	4.59	3.38	2.31
I_x, in.^{4}	45.1	34.0	23.7	22.1	16.8	11.8
I_y, in.^{4}	15.3	11.6	8.16	11.7	8.99	6.36
r_y, in.	1.65	1.68	1.71	1.60	1.63	1.66
r_x/r_y	1.72	1.71	1.70	1.37	1.37	1.36

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS4-HSS3

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS4×3×				HSS4×2×				HSS3×2×			
		0.120 ^{c2}		0.080 ^{c2}		0.120 ^{c2}		0.080 ^{c2}		0.120		0.080 ^{c2}	
t_{design}, in.		0.120		0.080		0.120		0.080		0.120		0.080	
lb/ft		5.51		3.75		4.68		3.19		3.85		2.64	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	58.6	88.0	29.6	44.5	49.2	74.0	26.8	40.2	43.2	64.9	26.3	39.5
	6	35.4	53.3	22.6	34.0	16.3	24.5	11.6	17.4	12.6	18.9	8.98	13.5
	7	29.0	43.6	19.5	29.3	12.0	18.0	8.52	12.8	9.23	13.9	6.60	9.92
	8	23.0	34.5	16.1	24.1	9.16	13.8	6.52	9.81	7.07	10.6	5.05	7.59
	9	18.2	27.3	12.7	19.2	7.24	10.9	5.16	7.75	5.58	8.39	3.99	6.00
	10	14.7	22.1	10.3	15.5	5.86	8.81	4.18	6.28	4.52	6.80	3.23	4.86
	11	12.2	18.3	8.53	12.8	4.85	7.28	3.45	5.19	3.74	5.62	2.67	4.02
	12	10.2	15.4	7.17	10.8	4.07	6.12	2.90	4.36	3.14	4.72	2.25	3.38
	13	8.71	13.1	6.11	9.18	3.47	5.21	2.47	3.71	2.68	4.02	1.91	2.88
	14	7.51	11.3	5.27	7.92			2.13	3.20				
	15	6.54	9.83	4.59	6.90								
	16	5.75	8.64	4.03	6.06								
	17	5.09	7.65	3.57	5.37								
	18	4.54	6.82	3.19	4.79								
	19	4.08	6.13	2.86	4.30								
	20	3.68	5.53	2.58	3.88								
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.59	1.08	1.35	0.921	1.11	0.761
I_x, in.^{4}	3.65	2.54	2.74	1.93	1.35	0.957
I_y, in.^{4}	2.34	1.64	0.927	0.660	0.715	0.512
r_y, in.	1.21	1.23	0.829	0.847	0.803	0.820
r_x/r_y	1.26	1.24	1.71	1.71	1.37	1.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-2 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Roll Formed)

HSS3-HSS2

Shape		HSS3×1×				HSS2×1.5×				HSS2×1×			
		0.080 ^{c2}		0.060 ^{c2}		0.080		0.060 ^{c2}		0.080		0.060 ^{c2}	
t_{design}, in.		0.080		0.060		0.080		0.060		0.080		0.060	
lb/ft		2.08		1.58		1.81		1.37		1.53		1.16	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	20.0	30.1	12.8	19.3	20.3	30.5	14.7	22.1	17.2	25.8	12.4	18.6
	1	18.5	27.8	12.0	18.0	19.0	28.6	14.0	21.1	15.0	22.5	11.2	16.9
	2	14.0	21.1	9.64	14.5	15.7	23.6	12.0	18.1	9.90	14.9	7.71	11.6
	3	7.52	11.3	5.89	8.86	11.4	17.2	8.83	13.3	5.10	7.67	4.04	6.08
	4	4.23	6.35	3.31	4.98	7.33	11.0	5.72	8.60	2.87	4.32	2.27	3.42
	5	2.71	4.07	2.12	3.19	4.69	7.06	3.66	5.51	1.84	2.76	1.46	2.19
	6	1.88	2.82	1.47	2.21	3.26	4.90	2.54	3.82	1.28	1.92	1.01	1.52
	7	1.38	2.07	1.08	1.63	2.39	3.60	1.87	2.81				
	8					1.83	2.76	1.43	2.15				
	9					1.45	2.18	1.13	1.70				
	10							0.916	1.38				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.601	0.456	0.521	0.396	0.441	0.336
I_x, in.^{4}	0.616	0.477	0.291	0.226	0.217	0.170
I_y, in.^{4}	0.107	0.084	0.186	0.145	0.073	0.058
r_y, in.	0.422	0.429	0.597	0.605	0.406	0.414
r_x/r_y	2.39	2.38	1.25	1.25	1.73	1.72

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS1.5

Table 5-2 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS1.5×1×			
		0.080		0.060	
t_{design}, in.		0.080		0.060	
lb/ft		1.25		0.957	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	14.1	21.1	10.7	16.1
	1	12.1	18.2	9.33	14.0
	2	7.79	11.7	6.11	9.19
	3	3.90	5.85	3.12	4.68
	4	2.19	3.29	1.75	2.63
	5	1.40	2.11	1.12	1.69
	6	0.974	1.46	0.779	1.17
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

Properties

A_g, in.^{2}	0.361	0.276
I_x, in.^{4}	0.105	0.083
I_y, in.^{4}	0.056	0.044
r_y, in.	0.392	0.401
r_x/r_y	1.38	1.37

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS20

Table 5-3

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS20×16×						HSS20×12×					
		0.500 ^{c2}		0.375 ^{c2}		0.312 ^{c2}		0.500 ^{c2}		0.375 ^{c2}		0.312 ^{c2}	
t_{design}, in.		0.500		0.375		0.312		0.500		0.375		0.312	
lb/ft		118		90		75.4		105		79.6		66.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1170	1750	684	1030	479	720	1020	1540	669	1010	471	708
	6	1150	1730	678	1020	476	715	1000	1500	659	991	465	699
	7	1150	1730	676	1020	475	714	992	1490	656	985	463	696
	8	1140	1720	674	1010	474	712	983	1480	651	979	461	692
	9	1140	1710	672	1010	472	710	972	1460	647	972	458	688
	10	1130	1700	669	1010	470	707	960	1440	641	963	455	684
	11	1120	1690	666	1000	469	704	947	1420	633	952	452	679
	12	1110	1680	662	996	467	702	933	1400	625	940	448	673
	13	1100	1660	659	990	465	698	918	1380	617	927	444	667
	14	1090	1640	655	984	462	695	902	1360	607	913	440	661
	15	1080	1620	650	977	460	691	884	1330	597	898	435	654
	16	1070	1600	646	970	457	687	866	1300	587	882	430	646
	17	1050	1580	641	963	454	683	846	1270	576	865	425	638
	18	1040	1560	635	955	451	679	826	1240	564	848	419	630
	19	1020	1530	630	947	448	674	805	1210	552	829	413	621
	20	1000	1510	624	938	445	669	782	1180	539	810	406	611
	21	988	1480	618	928	441	663	759	1140	526	790	400	601
	22	970	1460	611	918	438	658	735	1100	512	770	392	590
	23	952	1430	604	908	434	652	710	1070	498	748	385	578
	24	933	1400	597	897	430	646	685	1030	483	726	377	566
	25	913	1370	589	886	425	639	658	989	468	704	368	554
	26	893	1340	581	874	421	633	628	945	453	680	359	540
	27	872	1310	573	861	416	626	598	900	437	657	350	525
	28	851	1280	564	848	411	618	569	855	421	632	338	508
	29	829	1250	555	835	406	611	540	811	404	607	327	491
	30	807	1210	546	820	401	603	511	768	387	582	315	473
	32	761	1140	526	790	390	586	456	685	352	530	290	437
	34	711	1070	504	757	377	567	405	608	317	476	265	399
	36	659	991	480	721	364	548	361	543	283	425	240	360
	38	609	915	454	682	350	526	324	487	254	381	215	323
	40	560	841	425	638	335	503	292	440	229	344	194	292

Properties

A_g, in.^{2}	34.1	26.0	21.7	30.1	23.0	19.2
I_x, in.^{4}	2010	1550	1310	1630	1260	1070
I_y, in.^{4}	1430	1110	936	742	579	491
r_y, in.	6.48	6.53	6.57	4.96	5.02	5.06
r_x/r_y	1.19	1.18	1.18	1.48	1.47	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS20-HSS18

Shape		HSS20×12×		HSS20×8×								HSS18×16×	
		0.250 ^{c2}		0.500 ^{c2}		0.375 ^{c2}		0.312 ^{c2}		0.250 ^{c2}		0.500 ^{c2}	
t_{design}, in.		0.250		0.500		0.375		0.312		0.250		0.500	
lb/ft		53.9		90.7		69.2		58.1		46.9		76.8	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	308	463	868	1300	560	842	421	632	300	451	781	1170
	6	305	459	829	1250	539	810	407	611	293	440	716	1080
	7	304	457	815	1220	532	799	402	604	290	436	693	1040
	8	303	456	799	1200	523	786	396	595	287	432	667	1000
	9	302	454	781	1170	513	772	390	586	283	425	637	957
	10	300	451	761	1140	503	756	382	575	278	418	602	905
	11	298	449	739	1110	491	738	375	563	273	411	558	839
	12	297	446	716	1080	478	719	366	550	268	402	514	773
	13	295	443	690	1040	465	698	357	536	262	394	471	707
	14	292	439	663	996	450	676	347	522	256	384	427	642
	15	290	436	633	952	434	653	337	506	249	374	385	579
	16	287	432	603	906	418	628	326	489	242	363	345	518
	17	285	428	570	857	400	602	314	472	234	352	307	461
	18	282	423	532	800	382	574	302	454	226	340	274	411
	19	279	419	494	743	363	546	289	434	218	328	246	369
	20	275	414	457	687	343	516	276	415	210	315	222	333
	21	272	409	421	633	323	485	262	394	201	302	201	302
	22	268	403	387	581	301	453	248	372	192	289	183	275
	23	264	397	354	532	279	419	233	350	183	275	168	252
	24	260	391	325	489	257	386	218	327	173	260	154	231
	25	256	385	300	450	237	356	202	304	163	245	142	213
	26	252	378	277	417	219	329	187	281	153	230	131	197
	27	247	371	257	386	203	305	173	261	143	214	122	183
	28	242	364	239	359	189	283	161	242	133	199	113	170
	29	237	356	223	335	176	264	150	226	124	186	105	159
	30	232	348	208	313	164	247	140	211	115	174	98.6	148
	32	220	330	183	275	144	217	123	185	101	153	86.6	130
	34	207	311	162	244	128	192	109	164	89.9	135	76.7	115
	36	192	289	145	217	114	171	97.5	147	80.2	121	68.4	103
	38	176	264	130	195	102	154	87.5	132	72.0	108	61.4	92.3
	40	159	238	117	176	92.4	139	79.0	119	64.9	97.6	55.4	83.3

Properties

A_g, in.^{2}	15.5	26.1	20.0	16.7	13.5	22.1
I_x, in.^{4}	873	1250	976	829	678	800
I_y, in.^{4}	401	297	234	200	164	140
r_y, in.	5.09	3.37	3.42	3.46	3.49	2.52
r_x/r_y	1.47	2.05	2.04	2.04	2.03	2.39

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS18-HSS16

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS18×16×						HSS16×12×					
		0.375 ^{c2}		0.312 ^{c2}		0.250 ^{c2}		0.500 ^{c2}		0.375 ^{c2}		0.312 ^{c2}	
t_{design}, in.		0.375		0.312		0.250		0.500		0.375		0.312	
lb/ft		58.8		49.4		40.0		90.7		69.2		58.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	498	749	374	562	263	396	1000	1510	661	993	466	701
	6	465	699	352	529	250	375	975	1470	649	975	459	690
	7	453	681	344	517	245	368	965	1450	645	969	457	687
	8	439	660	335	503	239	360	955	1430	640	961	454	682
	9	424	638	325	488	233	351	939	1410	634	952	451	678
	10	407	612	313	471	226	340	922	1390	626	940	447	672
	11	389	584	301	452	219	329	903	1360	617	927	443	666
	12	369	554	288	432	211	317	883	1330	607	913	439	659
	13	347	522	273	411	202	304	862	1300	597	897	434	652
	14	324	487	258	388	193	290	840	1260	586	880	429	644
	15	299	450	242	363	183	275	816	1230	574	863	423	636
	16	273	411	224	337	173	259	792	1190	562	844	417	627
	17	245	369	206	310	162	243	767	1150	548	824	411	617
	18	219	329	187	281	150	226	742	1110	535	804	404	607
	19	197	295	168	252	138	208	715	1080	520	782	396	596
	20	177	267	152	228	126	189	689	1040	506	760	389	584
	21	161	242	137	207	114	171	662	995	490	737	380	572
	22	147	220	125	188	104	156	635	954	474	713	372	558
	23	134	202	115	172	95.0	143	608	913	458	688	362	544
	24	123	185	105	158	87.3	131	580	872	441	663	352	530
	25	114	171	97.0	146	80.4	121	553	832	424	637	341	513
	26	105	158	89.7	135	74.4	112	527	792	406	610	329	494
	27	97.3	146	83.2	125	69.0	104	500	752	388	583	316	475
	28	90.5	136	77.3	116	64.1	96.4	474	713	369	555	303	456
	29	84.4	127	72.1	108	59.8	89.8	449	674	350	525	290	436
	30	78.8	119	67.4	101	55.9	84.0	424	637	331	497	277	416
	32	69.3	104	59.2	89.0	49.1	73.8	376	565	294	441	249	375
	34	61.4	92.3	52.4	78.8	43.5	65.4	333	500	260	391	222	334
	36	54.8	82.3	46.8	70.3	38.8	58.3	297	446	232	349	198	297
	38	49.1	73.9	42.0	63.1	34.8	52.3	266	401	208	313	178	267
	40	44.4	66.7	37.9	56.9	31.4	47.2	241	361	188	283	160	241
Properties													
A_g, in.^{2}		17.0		14.3		11.5		26.1		20.0		16.7	
I_x, in.^{4}		632		539		442		948		741		629	
I_y, in.^{4}		112		96.1		79.5		610		477		406	
r_y, in.		2.57		2.59		2.63		4.83		4.88		4.93	
r_x/r_y		2.37		2.37		2.36		1.25		1.25		1.25	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-3 (continued)
Available Strength in Axial Compression, kips
Rectangular HSS (Press Braked)

HSS16-HSS12

Shape		HSS16×12×		HSS14×10×								HSS12×8×	
		0.250 ^{c2}		0.500		0.375 ^{c2}		0.312 ^{c2}		0.250 ^{c2}		0.500	
t_{design}, in.		0.250		0.500		0.375		0.312		0.250		0.500	
lb/ft		46.9		76.8		58.8		49.4		40.0		62.9	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	306	460	860	1290	604	908	460	691	301	453	704	1060
	6	303	455	818	1230	583	876	448	674	295	444	650	977
	7	301	453	803	1210	575	865	444	667	293	441	632	949
	8	300	451	786	1180	567	852	439	660	291	437	611	918
	9	298	448	767	1150	557	837	432	649	288	433	588	884
	10	296	445	747	1120	546	821	424	638	285	428	564	847
	11	294	442	725	1090	534	803	416	625	282	423	538	809
	12	292	439	702	1060	521	783	407	612	278	417	511	768
	13	290	435	678	1020	507	763	397	597	274	411	483	727
	14	287	431	653	981	493	741	387	582	269	404	455	684
	15	284	427	626	941	477	717	376	565	264	397	427	641
	16	281	422	600	901	461	693	364	548	259	389	398	599
	17	278	417	572	860	444	667	352	530	253	381	370	556
	18	274	412	545	819	425	638	340	511	247	372	342	515
	19	270	406	517	777	404	607	327	491	241	362	315	474
	20	266	400	489	736	383	575	313	471	234	352	289	434
	21	262	394	462	694	362	544	299	450	227	341	264	396
	22	258	387	435	653	341	513	285	428	219	329	241	361
	23	253	380	408	613	321	482	270	406	210	316	220	331
	24	248	373	382	574	301	452	255	383	200	301	202	304
	25	243	365	356	536	281	423	240	360	190	286	186	280
	26	237	357	332	499	262	394	224	336	180	270	172	259
	27	232	348	308	463	244	367	208	313	169	254	160	240
	28	225	339	286	431	227	341	194	291	159	238	148	223
	29	219	329	267	401	212	318	181	272	148	223	138	208
	30	212	319	250	375	198	297	169	254	138	208	129	194
	32	197	297	219	330	174	261	148	223	122	183	114	171
	34	180	271	194	292	154	231	131	198	108	162	101	151
	36	162	243	173	260	137	206	117	176	96.1	144	89.8	135
	38	145	218	156	234	123	185	105	158	86.3	130	80.6	121
	40	131	197	140	211	111	167	95.0	143	77.9	117	72.8	109
Properties													
A_g, in.^{2}		13.5		22.1		17.0		14.3		11.5		18.1	
I_x, in.^{4}		514		598		470		401		328		345	
I_y, in.^{4}		332		356		281		240		197		184	
r_y, in.		4.96		4.01		4.07		4.10		4.14		3.19	
r_x/r_y		1.24		1.30		1.29		1.29		1.29		1.37	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS10

Table 5-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

F_y = 65 ksi

Shape		HSS12×8×						HSS10×6×					
		0.375 ^{c2}		0.312 ^{c2}		0.250 ^{c2}		0.500		0.375		0.312 ^{c2}	
t_{design}, in.		0.375		0.312		0.250		0.500		0.375		0.312	
lb/ft		48.4		40.8		33.1		49.0		38.0		32.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	537	808	412	619	295	444	549	825	428	644	355	533
	6	504	758	390	586	284	428	475	713	372	560	315	473
	7	490	737	382	575	279	420	450	677	354	532	300	450
	8	475	713	373	561	274	411	424	637	334	502	283	425
	9	457	688	364	546	267	402	396	595	313	470	265	399
	10	439	660	353	530	260	391	367	551	291	437	247	371
	11	420	631	341	512	253	380	337	506	268	403	228	343
	12	399	600	328	493	244	367	307	461	245	369	209	314
	13	378	569	314	472	235	354	277	417	223	335	190	286
	14	357	536	300	450	226	340	249	374	201	301	172	258
	15	335	504	284	428	216	325	221	333	179	269	154	232
	16	314	471	267	401	206	309	196	294	159	239	137	206
	17	292	439	249	374	195	293	173	260	141	212	122	183
	18	271	407	231	347	184	276	154	232	126	189	108	163
	19	250	376	214	321	172	259	139	208	113	170	97.3	146
	20	230	345	197	296	160	241	125	188	102	153	87.8	132
	21	210	316	180	271	148	222	113	171	92.3	139	79.7	120
	22	192	288	165	248	136	204	103	155	84.1	126	72.6	109
	23	176	264	151	227	124	187	94.6	142	77.0	116	66.4	100
	24	161	242	138	208	114	171	86.9	131	70.7	106	61.0	91.7
	25	149	223	128	192	105	158	80.1	120	65.1	97.9	56.2	84.5
	26	137	207	118	177	97.1	146	74.0	111	60.2	90.5	52.0	78.1
	27	127	191	109	164	90.1	135	68.7	103	55.8	83.9	48.2	72.4
	28	118	178	102	153	83.7	126	63.8	96.0	51.9	78.1	44.8	67.3
	29	110	166	94.8	143	78.1	117	59.5	89.5	48.4	72.8	41.8	62.8
	30	103	155	88.6	133	73.0	110	55.6	83.6	45.2	68.0	39.0	58.7
	32	90.7	136	77.9	117	64.1	96.4	48.9	73.5	39.8	59.8	34.3	51.6
	34	80.3	121	69.0	104	56.8	85.4	43.3	65.1	35.2	52.9	30.4	45.7
	36	71.7	108	61.5	92.5	50.7	76.1	38.6	58.0	31.4	47.2	27.1	40.7
	38	64.3	96.7	55.2	83.0	45.5	68.3	34.7	52.1	28.2	42.4	24.3	36.6
	40	58.1	87.3	49.8	74.9	41.0	61.7			25.4	38.2	22.0	33.0

Properties

A_g, in.^{2}	14.0	11.8	9.54	14.1	11.0	9.26
I_x, in.^{4}	275	235	194	175	142	123
I_y, in.^{4}	147	126	104	78.9	64.3	55.7
r_y, in.	3.24	3.27	3.30	2.37	2.42	2.45
r_x/r_y	1.37	1.36	1.37	1.49	1.48	1.49

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-3 (continued)

Available Strength in Axial Compression, kips

Rectangular HSS (Press Braked)

HSS10

Shape		HSS10×6×	
		0.250 ^{c2}	
t_{design}, in.		0.250	
lb/ft		26.1	
Design		P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	256	385
	6	234	351
	7	226	340
	8	217	326
	9	207	311
	10	196	295
	11	184	277
	12	171	258
	13	157	237
	14	143	214
	15	128	192
	16	114	172
	17	101	152
	18	90.5	136
	19	81.2	122
	20	73.3	110
	21	66.5	100
	22	60.6	91.0
	23	55.4	83.3
	24	50.9	76.5
	25	46.9	70.5
	26	43.4	65.2
	27	40.2	60.4
	28	37.4	56.2
	29	34.8	52.4
	30	32.6	48.9
	32	28.6	43.0
	34	25.4	38.1
	36	22.6	34.0
	38	20.3	30.5
	40	18.3	27.5

Properties

A_g, in.^{2}	7.54
I_x, in.^{4}	102
I_y, in.^{4}	46.4
r_y, in.	2.48
r_x/r_y	1.48

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS12-HSS6

Table 5-4
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS12×12×		HSS10×10×		HSS8×8×				HSS6×6×			
		0.250 ^{c2}		0.250 ^{c2}		0.250 ^{c2}		0.180 ^{c2}		0.250		0.180 ^{c2}	
t_{design}, in.		0.250		0.250		0.250		0.180		0.250		0.180	
lb/ft		40.2		33.3		26.3		19.2		19.4		14.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	297	446	290	436	281	422	153	230	218	327	147	221
	6	293	440	283	426	267	401	148	222	187	281	134	202
	7	291	438	281	422	262	394	146	219	177	267	130	195
	8	290	435	278	418	255	384	144	216	167	250	123	185
	9	288	432	274	412	246	369	141	212	155	233	115	172
	10	286	429	271	407	235	353	138	208	143	215	106	160
	11	283	425	266	400	224	337	135	203	131	197	97.5	147
	12	280	421	262	393	213	320	132	198	119	179	88.8	133
	13	277	417	257	386	201	302	128	192	107	161	80.2	121
	14	274	412	251	377	189	284	123	186	96.0	144	71.9	108
	15	271	407	245	368	177	266	119	179	85.0	128	63.9	96.0
	16	267	402	239	359	165	247	114	171	74.9	113	56.4	84.7
	17	263	396	232	348	153	229	108	163	66.4	100	49.9	75.1
	18	259	389	224	337	141	212	102	153	59.2	89.0	44.5	66.9
	19	255	383	216	325	130	195	95.4	143	53.1	79.9	40.0	60.1
	20	250	375	207	311	118	178	88.0	132	47.9	72.1	36.1	54.2
	21	245	368	198	297	108	162	80.2	121	43.5	65.4	32.7	49.2
	22	239	360	186	280	98.3	148	73.2	110	39.6	59.6	29.8	44.8
	23	234	351	174	262	90.0	135	66.9	101	36.3	54.5	27.3	41.0
	24	228	342	163	245	82.6	124	61.5	92.4	33.3	50.0	25.1	37.7
	25	221	332	152	228	76.2	114	56.6	85.1	30.7	46.1	23.1	34.7
	26	214	322	141	212	70.4	106	52.4	78.7	28.4	42.6	21.3	32.1
	27	207	311	131	197	65.3	98.1	48.6	73.0	26.3	39.5	19.8	29.8
	28	200	300	122	183	60.7	91.2	45.2	67.9	24.5	36.8	18.4	27.7
	29	191	288	114	171	56.6	85.1	42.1	63.3	22.8	34.3	17.2	25.8
	30	183	275	106	160	52.9	79.5	39.3	59.1	21.3	32.0	16.0	24.1
	32	164	246	93.3	140	46.5	69.9	34.6	52.0	18.7	28.2	14.1	21.2
	34	145	218	82.6	124	41.2	61.9	30.6	46.0	16.6	24.9	12.5	18.8
	36	129	194	73.7	111	36.7	55.2	27.3	41.1	14.8	22.2	11.1	16.7
	38	116	174	66.2	99.4	33.0	49.5	24.5	36.9	13.3	20.0	10.0	15.0
	40	105	157	59.7	89.7	29.7	44.7	22.1	33.3				

Properties

	HSS12×12× 0.250	HSS10×10× 0.250	HSS8×8× 0.250	HSS8×8× 0.180	HSS6×6× 0.250	HSS6×6× 0.180
A_g, in.^{2}	11.6	9.59	7.59	5.54	5.59	4.10
$I_x = I_y$, in.^{4}	265	151	75.1	56.0	30.3	22.9
$r_x = r_y$, in.	4.78	3.97	3.15	3.18	2.33	2.36

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-4 (continued)
Available Strength in Axial Compression, kips
Square HSS (Roll Formed)

HSS6-HSS4

Shape		HSS6×6×		HSS5×5×						HSS4×4×			
		0.120 ^{c2}		0.250		0.180		0.120 ^{c2}		0.250		0.180	
t_{design}, in.		0.120		0.250		0.180		0.120		0.250		0.180	
lb/ft		9.67		15.9		11.7		8.01		12.4		9.23	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	68.0	102	179	269	132	198	66.7	100	140	210	104	156
	6	64.5	96.9	143	215	106	160	60.5	90.9	97.7	147	73.7	111
	7	63.2	94.9	132	199	98.2	148	58.2	87.4	85.8	129	65.2	98.0
	8	61.6	92.6	121	181	89.8	135	55.4	83.3	74.0	111	56.6	85.1
	9	59.9	90.0	109	163	81.2	122	52.3	78.5	62.5	93.9	48.2	72.5
	10	57.9	87.0	96.6	145	72.5	109	48.6	73.0	51.7	77.7	40.3	60.6
	11	55.6	83.6	84.9	128	64.0	96.1	44.3	66.6	42.8	64.3	33.4	50.2
	12	53.1	79.8	73.7	111	55.8	83.8	39.1	58.8	35.9	54.0	28.0	42.2
	13	50.2	75.5	63.3	95.1	48.1	72.2	33.8	50.9	30.6	46.0	23.9	35.9
	14	47.0	70.7	54.6	82.0	41.4	62.3	29.2	43.9	26.4	39.7	20.6	31.0
	15	43.4	65.2	47.5	71.4	36.1	54.3	25.4	38.2	23.0	34.6	18.0	27.0
	16	39.2	59.0	41.8	62.8	31.7	47.7	22.4	33.6	20.2	30.4	15.8	23.7
	17	34.9	52.4	37.0	55.6	28.1	42.2	19.8	29.8	17.9	26.9	14.0	21.0
	18	31.1	46.7	33.0	49.6	25.1	37.7	17.7	26.6	16.0	24.0	12.5	18.7
	19	27.9	41.9	29.6	44.5	22.5	33.8	15.9	23.8	14.3	21.5	11.2	16.8
	20	25.2	37.8	26.7	40.2	20.3	30.5	14.3	21.5	12.9	19.4	10.1	15.2
	21	22.8	34.3	24.2	36.4	18.4	27.7	13.0	19.5	11.7	17.6	9.16	13.8
	22	20.8	31.3	22.1	33.2	16.8	25.2	11.8	17.8	10.7	16.1	8.34	12.5
	23	19.0	28.6	20.2	30.4	15.4	23.1	10.8	16.3	9.78	14.7	7.63	11.5
	24	17.5	26.3	18.6	27.9	14.1	21.2	9.94	14.9	8.98	13.5	7.01	10.5
	25	16.1	24.2	17.1	25.7	13.0	19.5	9.16	13.8	8.28	12.4	6.46	9.71
	26	14.9	22.4	15.8	23.8	12.0	18.1	8.47	12.7				
	27	13.8	20.8	14.7	22.0	11.1	16.7	7.85	11.8				
	28	12.8	19.3	13.6	20.5	10.4	15.6	7.30	11.0				
	29	12.0	18.0	12.7	19.1	9.66	14.5	6.81	10.2				
	30	11.2	16.8	11.9	17.9	9.03	13.6	6.36	9.56				
	32	9.84	14.8			7.93	11.9	5.59	8.40				
	34	8.71	13.1										
	36	7.77	11.7										
	38	6.98	10.5										
	40												

Properties

	HSS6×6× 0.120	HSS5×5× 0.250	HSS5×5× 0.180	HSS5×5× 0.120	HSS4×4× 0.250	HSS4×4× 0.180
A_g, in.^{2}	2.79	4.59	3.38	2.31	3.59	2.66
$I_x = I_y$, in.^{4}	16.0	16.9	12.9	9.10	8.22	6.36
$r_x = r_y$, in.	2.39	1.92	1.95	1.98	1.51	1.55

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS4-HSS2.5

Table 5-4 (continued)

Available Strength in Axial Compression, kips

Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS4×4×		HSS3.5×3.5×				HSS3×3×				HSS2.5×2.5×	
		0.120 ^{c2}		0.180		0.120		0.120		0.080 ^{c2}		0.120	
t_{design}, in.		0.120		0.180		0.120		0.120		0.080		0.120	
lb/ft		6.35		7.98		5.51		4.68		3.19		3.85	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	64.6	97.1	89.5	135	61.9	93.0	52.5	79.0	29.2	43.8	43.2	64.9
	6	51.4	77.2	56.8	85.4	40.1	60.2	28.9	43.5	20.1	30.3	17.9	26.9
	7	45.6	68.6	48.2	72.5	34.2	51.5	23.3	35.1	16.4	24.6	13.3	20.0
	8	39.8	59.9	39.9	60.0	28.6	42.9	18.2	27.4	12.9	19.4	10.2	15.3
	9	34.1	51.3	32.2	48.4	23.3	35.0	14.4	21.7	10.2	15.3	8.03	12.1
	10	28.7	43.2	26.1	39.2	18.9	28.3	11.7	17.6	8.24	12.4	6.51	9.78
	11	23.9	35.9	21.6	32.4	15.6	23.4	9.65	14.5	6.81	10.2	5.38	8.08
	12	20.1	30.1	18.1	27.2	13.1	19.7	8.11	12.2	5.72	8.60	4.52	6.79
	13	17.1	25.7	15.4	23.2	11.2	16.8	6.91	10.4	4.88	7.33	3.85	5.79
	14	14.7	22.1	13.3	20.0	9.62	14.5	5.96	8.96	4.21	6.32	3.32	4.99
	15	12.8	19.3	11.6	17.4	8.38	12.6	5.19	7.80	3.66	5.51	2.89	4.35
	16	11.3	17.0	10.2	15.3	7.37	11.1	4.56	6.86	3.22	4.84	2.54	3.82
	17	10.0	15.0	9.03	13.6	6.53	9.81	4.04	6.07	2.85	4.29		
	18	8.91	13.4	8.06	12.1	5.82	8.75	3.60	5.42	2.54	3.82		
	19	8.00	12.0	7.23	10.9	5.22	7.85	3.24	4.86	2.28	3.43		
	20	7.22	10.8	6.53	9.81	4.72	7.09						
	21	6.55	9.84	5.92	8.90	4.28	6.43						
	22	5.97	8.97	5.39	8.11	3.90	5.86						
	23	5.46	8.20										
	24	5.01	7.53										
	25	4.62	6.94										
	26	4.27	6.42										
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	HSS4×4×0.120	HSS3.5×3.5×0.180	HSS3.5×3.5×0.120	HSS3×3×0.120	HSS3×3×0.080	HSS2.5×2.5×0.120
A_g, in.^{2}	1.83	2.30	1.59	1.35	0.921	1.11
I_x = I_y, in.^{4}	4.55	4.14	3.00	1.84	1.30	1.03
r_x = r_y, in.	1.58	1.34	1.37	1.17	1.19	0.963

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-4 (continued)

Available Strength in Axial Compression, kips

Square HSS (Roll Formed)

HSS2.5-HSS1.25

Shape		HSS2.5×2.5×		HSS2×2×				HSS1.5×1.5×				HSS1.25×1.25×	
		0.080 ^{c2}		0.080		0.060 ^{c2}		0.080		0.060		0.080	
t_{design}, in.		0.080		0.080		0.060		0.080		0.060		0.080	
lb/ft		2.64		2.08		1.58		1.53		1.16		1.25	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	28.3	42.6	23.4	35.2	16.3	24.6	17.2	25.8	13.1	19.7	14.1	21.1
	1	27.9	42.0	22.5	33.9	16.0	24.0	16.0	24.1	12.2	18.4	12.7	19.1
	2	26.7	40.2	20.1	30.3	15.0	22.5	13.0	19.6	10.0	15.0	9.37	14.1
	3	24.0	36.0	16.7	25.1	12.8	19.2	9.26	13.9	7.16	10.8	5.65	8.5
	4	20.4	30.6	12.9	19.3	9.90	14.9	5.76	8.66	4.50	6.76	3.19	4.79
	5	16.5	24.8	9.19	13.8	7.13	10.7	3.69	5.54	2.88	4.32	2.04	3.07
	6	12.7	19.1	6.40	9.62	4.97	7.47	2.56	3.85	2.00	3.00	1.42	2.13
	7	9.48	14.3	4.70	7.07	3.65	5.49	1.88	2.83	1.47	2.21	1.04	1.57
	8	7.26	10.9	3.60	5.41	2.80	4.20	1.44	2.16	1.12	1.69		
	9	5.74	8.62	2.85	4.28	2.21	3.32	1.14	1.71	0.888	1.33		
	10	4.65	6.98	2.30	3.46	1.79	2.69						
	11	3.84	5.77	1.90	2.86	1.48	2.22						
	12	3.23	4.85	1.60	2.41	1.24	1.87						
	13	2.75	4.13			1.06	1.59						
	14	2.37	3.56										
	15	2.07	3.10										
	16	1.82	2.73										
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.761	0.601	0.456	0.441	0.336	0.361
$I_x = I_y$, in.^{4}	0.736	0.365	0.283	0.146	0.114	0.081
$r_x = r_y$, in.	0.983	0.779	0.788	0.575	0.582	0.473

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS1.25-HSS1

Table 5-4 (continued)

Available Strength in Axial Compression, kips

Square HSS (Roll Formed)

F_y = 65 ksi

Shape		HSS1.25×1.25×		HSS1×1×	
		0.060		0.060	
t_{design}, in.		0.060		0.060	
lb/ft		0.957		0.748	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	10.7	16.1	8.41	12.6
	1	9.74	14.6	7.18	10.8
	2	7.26	10.9	4.47	6.72
	3	4.45	6.69	2.18	3.27
	4	2.52	3.79	1.23	1.84
	5	1.61	2.43	0.784	1.18
	6	1.12	1.68	0.545	0.819
	7	0.824	1.24		
	8	0.631	0.948		
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

Properties

A_g, in.^{2}	0.276	0.216
$I_x = I_y$, in.^{4}	0.064	0.031
$r_x = r_y$, in.	0.481	0.379

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS20-HSS14

Table 5-5

Available Strength in Axial Compression, kips

Square HSS (Press Braked)

F_y = 65 ksi

Shape		HSS20×20×				HSS16×16×						HSS14×14×	
		0.500 ^{c2}		0.375 ^{c2}		0.500 ^{c2}		0.375 ^{c2}		0.312 ^{c2}		0.500	
t_{design}, in.		0.500		0.375		0.500		0.375		0.312		0.500	
lb/ft		132		100		105		79.6		66.7		90.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	1190	1780	692	1040	1140	1720	676	1020	474	713	1020	1530
	6	1180	1770	689	1040	1130	1700	669	1010	471	707	989	1490
	7	1180	1770	687	1030	1120	1690	667	1000	469	705	979	1470
	8	1170	1760	686	1030	1120	1680	664	999	468	703	968	1450
	9	1170	1760	685	1030	1110	1670	661	994	466	701	955	1440
	10	1170	1750	683	1030	1100	1660	658	989	464	698	942	1420
	11	1160	1740	681	1020	1090	1640	654	983	462	695	927	1390
	12	1160	1740	679	1020	1080	1620	650	977	460	691	911	1370
	13	1150	1730	677	1020	1060	1600	646	971	457	687	894	1340
	14	1140	1720	674	1010	1050	1570	641	964	455	683	876	1320
	15	1140	1710	672	1010	1030	1550	636	956	452	679	857	1290
	16	1130	1700	669	1010	1010	1520	630	947	449	674	837	1260
	17	1130	1690	666	1000	993	1490	624	939	445	669	816	1230
	18	1120	1680	663	996	973	1460	618	929	442	664	795	1190
	19	1110	1670	659	991	953	1430	612	919	438	658	773	1160
	20	1100	1660	656	985	932	1400	604	909	434	652	750	1130
	21	1090	1640	652	980	910	1370	597	897	430	646	727	1090
	22	1080	1630	648	974	888	1330	589	886	425	639	704	1060
	23	1070	1610	644	968	865	1300	581	873	420	632	680	1020
	24	1060	1600	639	961	842	1270	572	860	416	625	657	987
	25	1050	1580	635	954	819	1230	563	846	410	617	633	951
	26	1040	1570	630	947	795	1200	554	832	405	609	609	915
	27	1030	1550	625	940	772	1160	544	817	399	600	585	879
	28	1020	1530	620	932	748	1120	533	801	394	592	561	843
	29	1010	1510	615	924	724	1090	522	785	387	582	537	807
	30	992	1490	609	916	700	1050	511	768	381	573	514	772
	32	965	1450	598	898	652	979	487	731	367	552	468	703
	34	935	1400	585	879	604	908	460	691	353	530	423	636
	36	903	1360	571	859	558	838	431	648	336	506	381	572
	38	868	1300	557	837	512	770	397	596	319	479	342	514
	40	831	1250	542	814	468	704	363	546	299	450	308	464

Properties

A_g, in.^{2}	38.1	29.0	30.1	23.0	19.2	26.1
$I_x = I_y$, in.^{4}	2390	1840	1190	924	782	780
$r_x = r_y$, in.	7.92	7.97	6.29	6.34	6.38	5.47

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

HSS14-HSS12

Shape		HSS14×14×				HSS12×12×							
		0.375 ^{c2}		0.312 ^{c2}		0.500		0.375 ^{c2}		0.312 ^{c2}		0.250 ^{c2}	
t_{design}, in.		0.375		0.312		0.500		0.375		0.312		0.250	
lb/ft		69.2		58.1		76.8		58.8		49.4		40.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	663	997	467	702	860	1290	646	972	462	694	302	454
	6	654	983	462	694	828	1240	632	949	453	681	298	448
	7	651	978	460	692	817	1230	626	941	450	676	296	445
	8	647	972	458	688	804	1210	620	931	446	671	294	442
	9	642	965	455	684	790	1190	609	915	442	665	292	439
	10	637	958	453	680	775	1160	597	898	438	658	290	436
	11	632	949	449	675	758	1140	584	878	433	650	287	432
	12	626	940	446	670	740	1110	571	858	427	642	285	428
	13	619	930	442	665	721	1080	556	836	421	633	282	423
	14	612	920	438	659	700	1050	541	813	414	623	278	418
	15	604	908	434	652	679	1020	525	789	407	612	275	413
	16	596	895	429	645	658	989	509	765	399	600	271	407
	17	587	882	424	637	635	955	492	739	391	588	266	401
	18	577	868	419	629	612	921	475	713	382	574	262	394
	19	567	853	413	621	589	886	457	687	373	560	257	387
	20	557	837	407	612	566	850	439	660	363	545	252	379
	21	545	820	401	602	542	814	421	633	352	529	247	371
	22	534	802	394	592	518	778	403	605	341	512	241	363
	23	521	783	387	581	494	743	385	578	326	489	235	354
	24	507	762	379	570	470	707	366	551	311	467	229	344
	25	489	735	371	558	447	671	348	524	295	444	222	334
	26	471	708	363	546	423	636	331	497	281	422	215	323
	27	453	680	354	532	401	602	313	471	266	400	208	312
	28	434	653	345	519	378	568	296	445	252	378	199	300
	29	416	626	335	504	356	535	279	420	237	357	191	287
	30	399	599	325	489	335	503	263	395	224	336	182	273
	32	363	546	304	456	295	443	232	348	197	297	162	244
	34	329	495	279	420	261	393	205	309	175	263	144	216
	36	297	446	252	379	233	350	183	275	156	234	128	193
	38	267	401	227	341	209	314	164	247	140	210	115	173
	40	241	362	205	308	189	284	148	223	126	190	104	156
Properties													
A_g, in.^{2}		20.0		16.7		22.1		17.0		14.3		11.5	
$I_x = I_y$, in.^{4}		609		518		478		376		320		263	
$r_x = r_y$, in.		5.52		5.57		4.65		4.70		4.73		4.78	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

HSS10-HSS8

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

F_y = 65 ksi

Shape		HSS10×10×								HSS8×8×			
		0.500		0.375		0.312 ^{c2}		0.250 ^{c2}		0.500		0.375	
t_{design}, in.		0.500		0.375		0.312		0.250		0.500		0.375	
lb/ft		62.9		48.4		40.8		33.1		49.0		38.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	704	1060	545	819	448	673	297	447	549	825	428	644
	6	666	1000	516	776	433	651	290	435	502	754	393	590
	7	653	982	506	761	427	642	287	431	485	730	381	572
	8	638	959	495	744	418	628	284	426	468	703	367	552
	9	622	934	482	725	408	613	280	421	448	674	352	530
	10	604	907	469	705	396	596	276	415	427	642	337	506
	11	584	878	454	683	384	577	271	408	405	609	320	481
	12	564	848	439	659	371	558	266	400	383	575	303	455
	13	543	815	422	635	358	538	261	392	360	540	285	429
	14	520	782	406	610	344	517	255	383	336	505	267	402
	15	498	748	388	584	330	495	248	373	313	470	249	375
	16	474	713	371	557	315	473	241	363	289	435	231	348
	17	451	677	353	530	300	451	234	351	266	400	214	321
	18	427	642	335	503	285	428	226	339	244	367	196	295
	19	403	606	316	476	270	405	217	326	222	334	180	270
	20	380	571	298	448	255	383	208	312	202	303	164	246
	21	356	536	281	422	240	360	196	294	183	275	149	223
	22	333	501	263	395	225	338	184	276	167	251	135	203
	23	311	468	246	369	210	316	172	259	153	229	124	186
	24	289	435	229	344	196	295	161	242	140	211	114	171
	25	268	403	213	320	183	275	150	225	129	194	105	158
	26	248	373	197	296	169	255	139	209	119	180	96.9	146
	27	230	346	183	275	157	236	129	194	111	166	89.9	135
	28	214	322	170	255	146	220	120	180	103	155	83.6	126
	29	200	300	158	238	136	205	112	168	96.0	144	77.9	117
	30	186	280	148	222	127	191	105	157	89.7	135	72.8	109
	32	164	246	130	196	112	168	91.9	138	78.8	119	64.0	96.2
	34	145	218	115	173	99.1	149	81.4	122	69.8	105	56.7	85.2
	36	129	195	103	154	88.4	133	72.6	109	62.3	93.6	50.6	76.0
	38	116	175	92.2	139	79.4	119	65.1	97.9	55.9	84.0	45.4	68.2
	40	105	158	83.3	125	71.6	108	58.8	88.4	50.5	75.8	41.0	61.5

Properties

	HSS10×10×0.500	HSS10×10×0.375	HSS10×10×0.312	HSS10×10×0.250	HSS8×8×0.500	HSS8×8×0.375
A_g, in.^{2}	18.1	14.0	11.8	9.54	14.1	11.0
$I_x = I_y$, in.^{4}	266	211	181	149	128	104
$r_x = r_y$, in.	3.83	3.88	3.92	3.95	3.01	3.07

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

F_y = 65 ksi

Table 5-5 (continued)

Available Strength in Axial Compression, kips

Square HSS (Press Braked)

HSS8-HSS7

Shape		HSS8×8×				HSS7×7×							
		0.312		0.250 ^{c2}		0.500		0.375		0.312		0.250	
t_{design}, in.		0.312		0.250		0.500		0.375		0.312		0.250	
lb/ft		32.1		26.1		42.1		32.8		27.8		22.7	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_y	0	360	542	287	431	471	708	368	553	312	469	255	383
	6	331	498	270	406	417	627	328	493	279	419	228	343
	7	321	483	262	394	400	601	315	473	268	402	219	330
	8	310	466	253	381	380	571	300	451	256	384	210	315
	9	298	448	244	366	359	539	284	427	242	364	199	299
	10	285	429	233	350	337	506	268	402	228	343	188	282
	11	271	408	222	334	314	472	250	376	214	322	176	265
	12	257	387	211	317	291	437	233	350	199	299	164	247
	13	243	365	199	299	267	402	215	323	184	277	152	229
	14	228	342	187	281	244	367	197	296	169	255	140	211
	15	213	320	175	263	221	333	180	270	155	233	128	193
	16	198	297	163	245	200	300	163	245	141	211	117	176
	17	183	275	151	227	179	269	147	221	127	191	106	159
	18	169	254	139	209	160	240	131	198	114	171	95.0	143
	19	155	232	128	192	143	215	118	177	102	154	85.3	128
	20	141	212	117	176	129	194	106	160	92.3	139	77.0	116
	21	128	193	107	160	117	176	96.5	145	83.7	126	69.9	105
	22	117	176	97.1	146	107	161	88.0	132	76.2	115	63.6	95.7
	23	107	161	88.8	133	97.7	147	80.5	121	69.8	105	58.2	87.5
	24	98.3	148	81.6	123	89.7	135	73.9	111	64.1	96.3	53.5	80.4
	25	90.6	136	75.2	113	82.7	124	68.1	102	59.0	88.7	49.3	74.1
	26	83.7	126	69.5	104	76.5	115	63.0	94.7	54.6	82.1	45.6	68.5
	27	77.6	117	64.4	96.9	70.9	107	58.4	87.8	50.6	76.1	42.3	63.5
	28	72.2	109	59.9	90.1	65.9	99.1	54.3	81.6	47.1	70.7	39.3	59.1
	29	67.3	101	55.9	84.0	61.5	92.4	50.6	76.1	43.9	66.0	36.6	55.1
	30	62.9	94.5	52.2	78.5	57.4	86.3	47.3	71.1	41.0	61.6	34.2	51.4
	32	55.3	83.1	45.9	69.0	50.5	75.9	41.6	62.5	36.0	54.2	30.1	45.2
	34	49.0	73.6	40.6	61.1	44.7	67.2	36.8	55.4	31.9	48.0	26.6	40.1
	36	43.7	65.6	36.3	54.5	39.9	60.0	32.9	49.4	28.5	42.8	23.8	35.7
	38	39.2	58.9	32.5	48.9	35.8	53.8	29.5	44.3	25.6	38.4	21.3	32.1
	40	35.4	53.2	29.4	44.1	32.3	48.6	26.6	40.0	23.1	34.7	19.3	28.9

Properties

A_g, in.^{2}	9.26	7.54	12.1	9.45	8.01	6.54
$I_x = I_y$, in.^{4}	89.4	74.3	82.0	67.2	58.4	48.7
$r_x = r_y$, in.	3.11	3.14	2.60	2.67	2.70	2.73

ASD	LRFD
$\Omega_c = 1.67$	$\varphi_c = 0.90$

^{c2} Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS6

Table 5-5 (continued)
Available Strength in Axial Compression, kips
Square HSS (Press Braked)

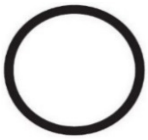
F_y = 65 ksi

Shape		HSS6×6×							
		0.500		0.375		0.312		0.250	
t_{design}, in.		0.500		0.375		0.312		0.250	
lb/ft		35.2		27.6		23.5		19.2	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_y	0	393	591	309	465	263	395	216	324
	6	332	498	264	396	225	338	185	278
	7	312	469	249	374	213	320	175	264
	8	291	437	233	350	200	300	165	248
	9	268	403	216	325	185	279	153	230
	10	245	368	199	298	171	257	142	213
	11	222	334	181	272	156	234	130	195
	12	199	299	163	245	141	212	118	177
	13	177	266	146	220	127	190	106	159
	14	156	234	130	195	113	169	94.5	142
	15	136	205	114	171	100	150	83.6	126
	16	120	180	100	151	87.5	132	73.6	111
	17	106	159	88.8	133	77.5	117	65.2	98.0
	18	94.5	142	79.2	119	69.1	104	58.2	87.4
	19	84.8	127	71.1	107	62.1	93.3	52.2	78.5
	20	76.5	115	64.2	96.4	56.0	84.2	47.1	70.8
	21	69.4	104	58.2	87.5	50.8	76.4	42.7	64.2
	22	63.3	95.1	53.0	79.7	46.3	69.6	38.9	58.5
	23	57.9	87.0	48.5	72.9	42.4	63.7	35.6	53.5
	24	53.1	79.9	44.6	67.0	38.9	58.5	32.7	49.2
	25	49.0	73.6	41.1	61.7	35.8	53.9	30.2	45.3
	26	45.3	68.1	38.0	57.1	33.1	49.8	27.9	41.9
	27	42.0	63.1	35.2	52.9	30.7	46.2	25.9	38.9
	28	39.0	58.7	32.7	49.2	28.6	43.0	24.0	36.1
	29	36.4	54.7	30.5	45.9	26.6	40.0	22.4	33.7
	30	34.0	51.1	28.5	42.9	24.9	37.4	20.9	31.5
	32	29.9	44.9	25.1	37.7	21.9	32.9	18.4	27.7
	34	26.5	39.8	22.2	33.4	19.4	29.1	16.3	24.5
	36	23.6	35.5	19.8	29.8	17.3	26.0	14.5	21.9
	38					15.5	23.3	13.1	19.6
	40								
Properties									
A_g, in.^{2}		10.1		7.95		6.76		5.54	
$I_x = I_y$, in.^{4}		48.6		40.5		35.5		29.9	
$r_x = r_y$, in.		2.19		2.26		2.29		2.32	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

Note: Heavy line indicates KL/r_y equal to or greater than 200.



HSS7.5-HSS6.25

Table 5-6
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS7.5×								HSS6.25×			
		0.375		0.250		0.180		0.120 ^{c2}		0.375		0.250	
t_{design}, in.		0.375		0.250		0.180		0.120		0.375		0.250	
lb/ft		29.1		19.7		14.4		9.65		24.0		16.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	310	464	210	314	153	229	-S-	-S-	256	382	174	260
	6	272	408	186	278	135	203	-S-	-S-	212	317	145	217
	7	260	389	178	266	130	194	-S-	-S-	198	296	136	203
	8	247	369	169	252	123	184	-S-	-S-	183	273	126	188
	9	232	347	159	238	116	174	-S-	-S-	167	250	116	173
	10	217	324	149	223	109	163	-S-	-S-	151	226	105	157
	11	201	301	139	208	102	152	-S-	-S-	136	203	94.5	141
	12	185	277	128	192	94.0	141	-S-	-S-	120	180	84.1	126
	13	170	254	118	176	86.4	129	-S-	-S-	105	158	74.2	111
	14	154	230	107	160	78.8	118	-S-	-S-	91.6	137	64.7	96.8
	15	139	208	97.1	145	71.5	107	-S-	-S-	79.8	119	56.4	84.4
	16	124	186	87.3	131	64.4	96.3	-S-	-S-	70.1	105	49.6	74.2
	17	111	165	77.9	117	57.6	86.1	-S-	-S-	62.1	92.9	43.9	65.7
	18	98.6	148	69.6	104	51.4	76.9	-S-	-S-	55.4	82.9	39.2	58.6
	19	88.5	132	62.4	93.4	46.1	69.0	-S-	-S-	49.7	74.4	35.2	52.6
	20	79.9	119	56.3	84.3	41.6	62.3	-S-	-S-	44.9	67.1	31.7	47.5
	21	72.5	108	51.1	76.5	37.8	56.5	-S-	-S-	40.7	60.9	28.8	43.1
	22	66.0	98.8	46.6	69.7	34.4	51.5	-S-	-S-	37.1	55.5	26.2	39.2
	23	60.4	90.4	42.6	63.7	31.5	47.1	-S-	-S-	33.9	50.8	24.0	35.9
	24	55.5	83.0	39.1	58.5	28.9	43.3	-S-	-S-	31.2	46.6	22.0	33.0
	25	51.1	76.5	36.1	53.9	26.6	39.9	-S-	-S-	28.7	43.0	20.3	30.4
	26	47.3	70.7	33.3	49.9	24.6	36.9	-S-	-S-	26.6	39.7	18.8	28.1
	27	43.8	65.6	30.9	46.2	22.8	34.2	-S-	-S-	24.6	36.8	17.4	26.1
	28	40.8	61.0	28.7	43.0	21.2	31.8	-S-	-S-	22.9	34.3	16.2	24.2
	29	38.0	56.8	26.8	40.1	19.8	29.6	-S-	-S-	21.3	31.9	15.1	22.6
	30	35.5	53.1	25.0	37.5	18.5	27.7	-S-	-S-	19.9	29.8	14.1	21.1
	32	31.2	46.7	22.0	32.9	16.3	24.3	-S-	-S-	17.5	26.2	12.4	18.5
	34	27.6	41.3	19.5	29.2	14.4	21.6	-S-	-S-	15.5	23.2	11.0	16.4
	36	24.7	36.9	17.4	26.0	12.9	19.2	-S-	-S-				
	38	22.1	33.1	15.6	23.3	11.5	17.3	-S-	-S-				
	40	20.0	29.9	14.1	21.1	10.4	15.6	-S-	-S-				

Properties

	HSS7.5×0.375	HSS7.5×0.250	HSS7.5×0.180	HSS7.5×0.120	HSS6.25×0.375	HSS6.25×0.250
A_g, in.^{2}	8.39	5.69	4.14	2.78	6.92	4.71
I, in.^{4}	53.4	37.5	27.7	18.9	30.0	21.2
r, in.	2.52	2.57	2.59	2.61	2.08	2.12

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

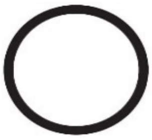
Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS6.25-HSS5

Shape		HSS6.25×				HSS5×							
		0.180		0.120^{c2}		0.250		0.180		0.120		0.109^{c2}	
t_{design}, in.		0.180		0.120		0.250		0.180		0.120		0.109	
lb/ft		11.9		8.01		12.9		9.45		6.38		5.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	127	190	-S-	-S-	138	206	101	151	68.0	102	-S-	-S-
	6	106	159	-S-	-S-	104	155	76.0	114	51.7	77.4	-S-	-S-
	7	99.6	149	-S-	-S-	93.4	140	68.7	103	46.9	70.1	-S-	-S-
	8	92.6	138	-S-	-S-	82.9	124	61.0	91.3	41.9	62.6	-S-	-S-
	9	85.2	127	-S-	-S-	72.4	108	53.4	79.9	36.8	55.0	-S-	-S-
	10	77.6	116	-S-	-S-	62.3	93.2	46.0	68.8	31.9	47.7	-S-	-S-
	11	70.0	105	-S-	-S-	52.7	78.9	39.0	58.4	27.2	40.7	-S-	-S-
	12	62.5	93.5	-S-	-S-	44.4	66.4	32.9	49.2	22.9	34.3	-S-	-S-
	13	55.3	82.7	-S-	-S-	37.8	56.6	28.0	41.9	19.5	29.2	-S-	-S-
	14	48.4	72.5	-S-	-S-	32.6	48.8	24.1	36.1	16.8	25.2	-S-	-S-
	15	42.3	63.2	-S-	-S-	28.4	42.5	21.0	31.5	14.7	22.0	-S-	-S-
	16	37.1	55.6	-S-	-S-	25.0	37.3	18.5	27.6	12.9	19.3	-S-	-S-
	17	32.9	49.2	-S-	-S-	22.1	33.1	16.4	24.5	11.4	17.1	-S-	-S-
	18	29.3	43.9	-S-	-S-	19.7	29.5	14.6	21.8	10.2	15.2	-S-	-S-
	19	26.3	39.4	-S-	-S-	17.7	26.5	13.1	19.6	9.15	13.7	-S-	-S-
	20	23.8	35.6	-S-	-S-	16.0	23.9	11.8	17.7	8.26	12.4	-S-	-S-
	21	21.6	32.3	-S-	-S-	14.5	21.7	10.7	16.0	7.49	11.2	-S-	-S-
	22	19.6	29.4	-S-	-S-	13.2	19.7	9.78	14.6	6.82	10.2	-S-	-S-
	23	18.0	26.9	-S-	-S-	12.1	18.1	8.94	13.4	6.24	9.34	-S-	-S-
	24	16.5	24.7	-S-	-S-	11.1	16.6	8.21	12.3	5.73	8.58	-S-	-S-
	25	15.2	22.8	-S-	-S-	10.2	15.3	7.57	11.3	5.28	7.90	-S-	-S-
	26	14.1	21.0	-S-	-S-	9.45	14.1	7.00	10.5	4.89	7.31	-S-	-S-
	27	13.0	19.5	-S-	-S-	8.76	13.1	6.49	9.71	4.53	6.78	-S-	-S-
	28	12.1	18.1	-S-	-S-	8.15	12.2	6.03	9.03	4.21	6.30	-S-	-S-
	29	11.3	16.9	-S-	-S-								
	30	10.6	15.8	-S-	-S-								
	32	9.29	13.9	-S-	-S-								
	34	8.22	12.3	-S-	-S-								
	36			-S-	-S-								
	38												
	40												

Properties

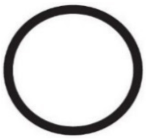
A_g, in.^{2}	3.43	2.31	3.73	2.73	1.84	1.67
I, in.^{4}	15.8	10.9	10.6	7.93	5.48	5.01
r, in.	2.15	2.17	1.69	1.70	1.73	1.73

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS5-HSS4.5

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS5×		HSS4.5×									
		0.083 ^{c2}		0.250		0.180		0.148		0.120		0.109	
t_{design}, in.		0.083		0.250		0.180		0.148		0.120		0.109	
lb/ft		4.45		11.6		8.47		7.02		5.73		5.21	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	-S-	-S-	123	185	90.1	135	74.6	112	60.9	91.2	55.4	82.9
	6	-S-	-S-	85.8	128.0	63.6	95.1	52.9	79.1	43.4	64.9	39.6	59.3
	7	-S-	-S-	75.3	113.0	56.1	83.9	46.7	69.9	38.4	57.4	35.1	52.5
	8	-S-	-S-	64.7	96.8	48.5	72.5	40.5	60.5	33.3	49.8	30.5	45.7
	9	-S-	-S-	54.5	81.6	41.1	61.5	34.4	51.5	28.4	42.5	26.1	39.0
	10	-S-	-S-	45.1	67.4	34.2	51.2	28.7	42.9	23.7	35.5	21.8	32.7
	11	-S-	-S-	37.2	55.7	28.3	42.3	23.7	35.5	19.6	29.4	18.1	27.1
	12	-S-	-S-	31.3	46.8	23.8	35.6	20.0	29.8	16.5	24.7	15.2	22.7
	13	-S-	-S-	26.7	39.9	20.3	30.3	17.0	25.4	14.1	21.0	13.0	19.4
	14	-S-	-S-	23.0	34.4	17.5	26.1	14.7	21.9	12.1	18.1	11.2	16.7
	15	-S-	-S-	20.0	30.0	15.2	22.8	12.8	19.1	10.6	15.8	9.73	14.6
	16	-S-	-S-	17.6	26.3	13.4	20.0	11.2	16.8	9.29	13.9	8.55	12.8
	17	-S-	-S-	15.6	23.3	11.9	17.7	9.94	14.9	8.23	12.3	7.57	11.3
	18	-S-	-S-	13.9	20.8	10.6	15.8	8.87	13.3	7.34	11.0	6.76	10.1
	19	-S-	-S-	12.5	18.7	9.49	14.2	7.96	11.9	6.59	9.85	6.06	9.07
	20	-S-	-S-	11.3	16.9	8.56	12.8	7.18	10.7	5.94	8.89	5.47	8.19
	21	-S-	-S-	10.2	15.3	7.77	11.6	6.51	9.75	5.39	8.06	4.96	7.43
	22	-S-	-S-	9.31	13.9	7.08	10.6	5.94	8.88	4.91	7.35	4.52	6.77
	23	-S-	-S-	8.52	12.7	6.47	9.69	5.43	8.12	4.49	6.72	4.14	6.19
	24	-S-	-S-	7.82	11.7	5.95	8.90	4.99	7.46	4.13	6.17	3.80	5.69
	25	-S-	-S-	7.21	10.8	5.48	8.20	4.60	6.88	3.80	5.69	3.50	5.24
	26	-S-	-S-									3.24	4.84
	27	-S-	-S-										
	28	-S-	-S-										
	29	-S-	-S-										
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.28	3.34	2.44	2.02	1.65	1.50
I, in.^{4}	3.88	7.56	5.71	4.80	3.96	3.63
r, in.	1.74	1.50	1.53	1.54	1.55	1.56

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

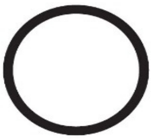
Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS4.5-HSS3.75

Shape		HSS4.5×		HSS4×						HSS3.75×			
		0.083 [c2]		0.120		0.109		0.083 [c2]		0.250		0.180	
t_{design}, in.		0.083		0.120		0.109		0.083		0.250		0.180	
lb/ft		3.99		5.07		4.62		3.54		9.53		7.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	53.9	80.7	49.1	73.5	-S-	-S-	102	152	74.6	112
	6	-S-	-S-	34.9	52.2	32.0	47.9	-S-	-S-	59.7	89.4	44.6	66.8
	7	-S-	-S-	29.8	44.6	27.4	41.0	-S-	-S-	49.3	73.8	37.1	55.4
	8	-S-	-S-	24.9	37.2	22.9	34.3	-S-	-S-	39.5	59.1	29.9	44.8
	9	-S-	-S-	20.3	30.3	18.7	28.0	-S-	-S-	31.3	46.8	23.7	35.5
	10	-S-	-S-	16.4	24.6	15.2	22.7	-S-	-S-	25.4	37.9	19.2	28.8
	11	-S-	-S-	13.6	20.3	12.6	18.8	-S-	-S-	21.0	31.4	15.9	23.8
	12	-S-	-S-	11.4	17.1	10.5	15.8	-S-	-S-	17.6	26.3	13.4	20.0
	13	-S-	-S-	9.72	14.5	8.99	13.4	-S-	-S-	15.0	22.4	11.4	17.0
	14	-S-	-S-	8.38	12.5	7.75	11.6	-S-	-S-	12.9	19.4	9.81	14.7
	15	-S-	-S-	7.30	10.9	6.75	10.1	-S-	-S-	11.3	16.9	8.55	12.8
	16	-S-	-S-	6.42	9.60	5.93	8.88	-S-	-S-	9.90	14.8	7.51	11.2
	17	-S-	-S-	5.69	8.51	5.26	7.86	-S-	-S-	8.77	13.1	6.65	10.0
	18	-S-	-S-	5.07	7.59	4.69	7.01	-S-	-S-	7.83	11.7	5.94	8.88
	19	-S-	-S-	4.55	6.81	4.21	6.29	-S-	-S-	7.02	10.5	5.33	7.97
	20	-S-	-S-	4.11	6.15	3.80	5.68	-S-	-S-	6.34	9.48	4.81	7.19
	21	-S-	-S-	3.73	5.57	3.44	5.15	-S-	-S-			4.36	6.52
	22	-S-	-S-	3.40	5.08	3.14	4.69	-S-	-S-				
	23	-S-	-S-			2.87	4.30	-S-	-S-				
	24	-S-	-S-										
	25	-S-	-S-										
	26	-S-	-S-										
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

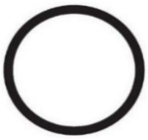
A_g, in.^{2}	1.15	1.46	1.33	1.02	2.75	2.02
I, in.^{4}	2.81	2.76	2.52	1.96	4.23	3.22
r, in.	1.56	1.37	1.38	1.39	1.24	1.26

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS3.75-HSS3.5

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS3.75×								HSS3.5×			
		0.148		0.120		0.109		0.083 ^{c2}		0.180		0.148	
t_{design}, in.		0.148		0.120		0.109		0.083		0.180		0.148	
lb/ft		5.81		4.75		4.32		3.32		6.51		5.40	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	61.7	92.3	50.6	75.7	46.2	69.1	-S-	-S-	69.4	104	57.6	86.2
	6	37.5	56.1	30.7	46.0	28.3	42.3	-S-	-S-	38.3	57.2	32.1	48.0
	7	31.3	46.8	25.7	38.4	23.7	35.4	-S-	-S-	30.8	46.1	25.9	38.8
	8	25.4	38.1	20.9	31.2	19.3	28.9	-S-	-S-	24.1	36.1	20.4	30.4
	9	20.3	30.3	16.6	24.9	15.4	23.0	-S-	-S-	19.1	28.5	16.1	24.1
	10	16.4	24.5	13.5	20.1	12.5	18.7	-S-	-S-	15.4	23.1	13.0	19.5
	11	13.6	20.3	11.1	16.6	10.3	15.4	-S-	-S-	12.8	19.1	10.8	16.1
	12	11.4	17.0	9.35	14.0	8.66	13.0	-S-	-S-	10.7	16.0	9.05	13.5
	13	9.71	14.5	7.96	11.9	7.38	11.0	-S-	-S-	9.13	13.7	7.71	11.5
	14	8.37	12.5	6.87	10.3	6.36	9.52	-S-	-S-	7.87	11.8	6.65	9.94
	15	7.29	10.9	5.98	8.95	5.54	8.29	-S-	-S-	6.86	10.3	5.79	8.66
	16	6.41	9.59	5.26	7.87	4.87	7.29	-S-	-S-	6.03	9.02	5.09	7.61
	17	5.68	8.49	4.66	6.97	4.32	6.46	-S-	-S-	5.34	7.99	4.51	6.74
	18	5.06	7.58	4.15	6.22	3.85	5.76	-S-	-S-	4.76	7.13	4.02	6.01
	19	4.55	6.80	3.73	5.58	3.46	5.17	-S-	-S-	4.28	6.40	3.61	5.40
	20	4.10	6.14	3.37	5.03	3.12	4.67	-S-	-S-				
	21	3.72	5.57	3.05	4.57	2.83	4.23	-S-	-S-				
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.67	1.37	1.25	0.956	1.88	1.56
I, in.^{4}	2.72	2.26	2.07	1.61	2.59	2.19
r, in.	1.28	1.28	1.29	1.30	1.17	1.18

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

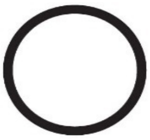
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS3.5-HSS3.125

Shape		HSS3.5×										HSS3.125×	
		0.120		0.109		0.083		0.063^{c2}		0.049^{c2}		0.250	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.250	
lb/ft		4.42		4.03		3.09		2.34		1.84		7.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	46.9	70.2	42.8	64.1	32.9	49.2	-S-	-S-	-S-	-S-	83.5	125
	6	26.6	39.8	24.3	36.4	18.8	28.2	-S-	-S-	-S-	-S-	38.1	57.0
	7	21.7	32.4	19.8	29.6	15.4	23.1	-S-	-S-	-S-	-S-	28.8	43.0
	8	17.1	25.6	15.7	23.4	12.2	18.3	-S-	-S-	-S-	-S-	22.0	33.0
	9	13.5	20.3	12.4	18.5	9.66	14.4	-S-	-S-	-S-	-S-	17.4	26.0
	10	11.0	16.4	10.0	15.0	7.82	11.7	-S-	-S-	-S-	-S-	14.1	21.1
	11	9.06	13.6	8.28	12.4	6.47	9.67	-S-	-S-	-S-	-S-	11.7	17.4
	12	7.62	11.4	6.96	10.4	5.43	8.13	-S-	-S-	-S-	-S-	9.79	14.6
	13	6.49	9.71	5.93	8.87	4.63	6.92	-S-	-S-	-S-	-S-	8.34	12.5
	14	5.60	8.37	5.11	7.65	3.99	5.97	-S-	-S-	-S-	-S-	7.19	10.8
	15	4.87	7.29	4.45	6.66	3.48	5.20	-S-	-S-	-S-	-S-	6.27	9.38
	16	4.28	6.41	3.91	5.85	3.06	4.57	-S-	-S-	-S-	-S-	5.51	8.24
	17	3.79	5.68	3.47	5.19	2.71	4.05	-S-	-S-	-S-	-S-	4.88	7.30
	18	3.38	5.06	3.09	4.63	2.41	3.61	-S-	-S-	-S-	-S-		
	19	3.04	4.54	2.77	4.15	2.17	3.24	-S-	-S-	-S-	-S-		
	20	2.74	4.10	2.50	3.75	1.96	2.93	-S-	-S-	-S-	-S-		
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	1.27	1.16	0.891	0.675	0.531	2.26
I, in.^{4}	1.82	1.67	1.30	0.997	0.791	2.35
r, in.	1.20	1.20	1.21	1.22	1.22	1.02

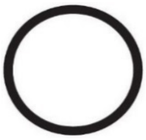
ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HS3.125-HSS3

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS3.125×										HSS3×	
		0.180		0.120		0.109		0.083		0.063 [c2]		0.250	
t_{design}, in.		0.180		0.120		0.109		0.083		0.063		0.250	
lb/ft		5.78		3.93		3.58		2.75		2.09		7.49	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	61.7	92.3	41.7	62.4	38.0	56.9	29.3	43.8	-S-	-S-	79.8	119
	6	29.0	43.4	20.2	30.2	18.7	27.9	14.5	21.8	-S-	-S-	33.9	50.8
	7	22.1	33.1	15.5	23.2	14.4	21.6	11.3	16.9	-S-	-S-	25.2	37.7
	8	16.9	25.3	11.9	17.8	11.0	16.5	8.67	13.0	-S-	-S-	19.3	28.9
	9	13.4	20.0	9.40	14.1	8.73	13.1	6.85	10.2	-S-	-S-	15.3	22.8
	10	10.8	16.2	7.61	11.4	7.07	10.6	5.55	8.30	-S-	-S-	12.4	18.5
	11	8.95	13.4	6.29	9.41	5.84	8.74	4.58	6.86	-S-	-S-	10.2	15.3
	12	7.52	11.3	5.29	7.91	4.91	7.35	3.85	5.76	-S-	-S-	8.59	12.8
	13	6.41	9.59	4.51	6.74	4.18	6.26	3.28	4.91	-S-	-S-	7.32	10.9
	14	5.53	8.27	3.88	5.81	3.61	5.40	2.83	4.23	-S-	-S-	6.31	9.44
	15	4.81	7.20	3.38	5.06	3.14	4.70	2.47	3.69	-S-	-S-	5.50	8.22
	16	4.23	6.33	2.97	4.45	2.76	4.13	2.17	3.24	-S-	-S-	4.83	7.23
	17	3.75	5.61	2.63	3.94	2.45	3.66	1.92	2.87	-S-	-S-		
	18							1.71	2.56	-S-	-S-		
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties						
A_g, in.^{2}	1.67	1.13	1.03	0.793	0.601	2.16
I, in.^{4}	1.81	1.28	1.18	0.918	0.705	2.06
r, in.	1.04	1.06	1.07	1.08	1.08	0.98

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

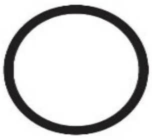
Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS3

Shape		HSS3×											
		0.180		0.148		0.120		0.109		0.083		0.063 ^{c2}	
t_{design}, in.		0.180		0.148		0.120		0.109		0.083		0.063	
lb/ft		5.53		4.60		3.77		3.43		2.64		2.00	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	58.7	87.8	49.1	73.5	40.3	60.2	36.6	54.7	28.1	42.0	-S-	-S-
	1	57.4	85.9	48.0	71.9	39.4	58.9	35.8	53.5	27.5	41.2	-S-	-S-
	2	53.6	80.2	44.9	67.2	36.9	55.2	33.5	50.1	25.8	38.6	-S-	-S-
	3	47.9	71.6	40.2	60.2	33.1	49.5	30.1	45.0	23.2	34.7	-S-	-S-
	4	40.9	61.1	34.4	51.5	28.4	42.5	25.8	38.6	20.0	29.9	-S-	-S-
	5	33.3	49.8	28.2	42.2	23.3	34.9	21.2	31.7	16.5	24.6	-S-	-S-
	6	26.0	38.8	22.1	33.0	18.4	27.5	16.7	25.0	13.0	19.5	-S-	-S-
	7	19.5	29.1	16.6	24.8	13.9	20.8	12.6	18.9	9.88	14.8	-S-	-S-
	8	14.9	22.3	12.7	19.0	10.6	15.9	9.65	14.4	7.56	11.3	-S-	-S-
	9	11.8	17.6	10.0	15.0	8.40	12.6	7.63	11.4	5.98	8.94	-S-	-S-
	10	9.53	14.3	8.14	12.2	6.80	10.2	6.18	9.24	4.84	7.24	-S-	-S-
	11	7.88	11.8	6.72	10.1	5.62	8.41	5.10	7.64	4.00	5.99	-S-	-S-
	12	6.62	9.91	5.65	8.45	4.72	7.07	4.29	6.42	3.36	5.03	-S-	-S-
	13	5.64	8.44	4.81	7.20	4.02	6.02	3.65	5.47	2.86	4.29	-S-	-S-
	14	4.86	7.28	4.15	6.21	3.47	5.19	3.15	4.71	2.47	3.70	-S-	-S-
	15	4.24	6.34	3.62	5.41	3.02	4.52	2.75	4.11	2.15	3.22	-S-	-S-
	16	3.72	5.57	3.18	4.75	2.66	3.97	2.41	3.61	1.89	2.83	-S-	-S-
	17							2.14	3.20	1.68	2.51	-S-	-S-
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		1.59		1.33		1.09		0.990		0.761		0.577	
I, in.^{4}		1.59		1.35		1.13		1.04		0.810		0.622	
r, in.		1.00		1.01		1.02		1.02		1.03		1.04	

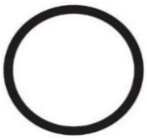
ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS3-HSS2.75

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS3×		HSS2.875×								HSS2.75×	
		0.049 [c2]		0.180		0.120		0.109		0.083		0.250	
t_{design}, in.		0.049		0.180		0.120		0.109		0.083		0.250	
lb/ft		1.58		5.29		3.60		3.28		2.52		6.81	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	56.1	84.0	38.4	57.5	35.0	52.3	26.9	40.2	72.4	108
	1	-S-	-S-	54.8	81.9	37.5	56.1	34.2	51.1	26.3	39.3	70.3	105
	2	-S-	-S-	50.8	76.0	34.9	52.2	31.8	47.6	24.5	36.7	64.5	96.6
	3	-S-	-S-	44.9	67.2	31.0	46.3	28.3	42.3	21.8	32.6	55.9	83.7
	4	-S-	-S-	37.7	56.5	26.2	39.2	24.0	35.8	18.5	27.7	45.7	68.4
	5	-S-	-S-	30.2	45.2	21.1	31.6	19.4	29.0	15.0	22.5	35.3	52.9
	6	-S-	-S-	23.0	34.4	16.3	24.3	14.9	22.3	11.7	17.4	25.8	38.6
	7	-S-	-S-	17.0	25.4	12.1	18.1	11.1	16.6	8.70	13.0	19.0	28.4
	8	-S-	-S-	13.0	19.5	9.24	13.8	8.50	12.7	6.66	9.96	14.5	21.7
	9	-S-	-S-	10.3	15.4	7.30	10.9	6.72	10.1	5.26	7.87	11.5	17.2
	10	-S-	-S-	8.33	12.5	5.92	8.85	5.44	8.14	4.26	6.38	9.29	13.9
	11	-S-	-S-	6.88	10.3	4.89	7.32	4.50	6.73	3.52	5.27	7.68	11.5
	12	-S-	-S-	5.79	8.65	4.11	6.15	3.78	5.65	2.96	4.43	6.45	9.65
	13	-S-	-S-	4.93	7.37	3.50	5.24	3.22	4.82	2.52	3.77	5.50	8.22
	14	-S-	-S-	4.25	6.36	3.02	4.52	2.78	4.15	2.17	3.25	4.74	7.09
	15	-S-	-S-	3.70	5.54	2.63	3.93	2.42	3.62	1.89	2.83		
	16	-S-	-S-			2.31	3.46	2.13	3.18	1.66	2.49		
	17	-S-	-S-										
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

	HSS3×0.049	HSS2.875×0.180	HSS2.875×0.120	HSS2.875×0.109	HSS2.875×0.083	HSS2.75×0.250
A_g, in.^{2}	0.454	1.52	1.04	0.947	0.728	1.96
I, in.^{4}	0.495	1.39	0.987	0.907	0.710	1.55
r, in.	1.04	0.956	0.974	0.979	0.988	0.889

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

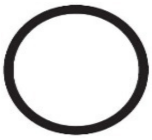
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS2.75

Shape		HSS2.75×											
		0.180		0.148		0.120		0.109		0.083		0.065	
t_{design}, in.		0.180		0.148		0.120		0.109		0.083		0.065	
lb/ft		5.04		4.20		3.44		3.14		2.41		1.90	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	53.6	80.1	44.7	66.9	36.6	54.8	33.4	49.9	25.7	38.4	20.2	30.3
	1	52.1	78.0	43.5	65.1	35.7	53.3	32.5	48.7	25.0	37.4	19.7	29.5
	2	48.0	71.9	40.2	60.1	33.0	49.3	30.1	45.0	23.2	34.7	18.3	27.4
	3	41.9	62.8	35.2	52.6	28.9	43.3	26.4	39.6	20.4	30.5	16.1	24.1
	4	34.7	51.9	29.2	43.7	24.1	36.0	22.0	33.0	17.1	25.6	13.5	20.2
	5	27.2	40.7	23.0	34.4	19.0	28.5	17.5	26.1	13.6	20.3	10.8	16.1
	6	20.2	30.2	17.1	25.7	14.3	21.4	13.1	19.6	10.3	15.4	8.18	12.2
	7	14.8	22.2	12.6	18.9	10.5	15.7	9.67	14.5	7.58	11.3	6.04	9.04
	8	11.4	17.0	9.66	14.4	8.05	12.0	7.41	11.1	5.80	8.68	4.62	6.92
	9	8.97	13.4	7.63	11.4	6.36	9.51	5.85	8.75	4.59	6.86	3.65	5.47
	10	7.26	10.9	6.18	9.25	5.15	7.71	4.74	7.09	3.71	5.56	2.96	4.43
	11	6.00	8.98	5.11	7.64	4.26	6.37	3.92	5.86	3.07	4.59	2.45	3.66
	12	5.04	7.55	4.29	6.42	3.58	5.35	3.29	4.92	2.58	3.86	2.06	3.07
	13	4.30	6.43	3.66	5.47	3.05	4.56	2.80	4.20	2.20	3.29	1.75	2.62
	14	3.71	5.54	3.15	4.72	2.63	3.93	2.42	3.62	1.89	2.83	1.51	2.26
	15	3.23	4.83	2.75	4.11	2.29	3.42	2.11	3.15	1.65	2.47	1.32	1.97
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.45	1.21	0.991	0.904	0.695	0.548
I, in.^{4}	1.21	1.03	0.859	0.790	0.619	0.494
r, in.	0.914	0.923	0.931	0.935	0.944	0.949

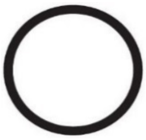
ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS2.5

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS2.5×											
		0.250		0.180		0.148		0.120		0.109		0.083	
t_{design}, in.		0.250		0.180		0.148		0.120		0.109		0.083	
lb/ft		6.13		4.55		3.79		3.11		2.84		2.19	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	65.4	97.8	48.4	72.4	40.3	60.2	33.1	49.6	30.2	45.2	23.3	34.8
	1	63.1	94.4	46.8	70.0	39.0	58.3	32.1	48.0	29.3	43.8	22.6	33.7
	2	56.7	84.8	42.3	63.3	35.3	52.9	29.2	43.6	26.6	39.9	20.6	30.7
	3	47.5	71.0	35.8	53.6	30.0	44.9	24.9	37.2	22.7	34.0	17.6	26.3
	4	37.0	55.4	28.3	42.4	23.9	35.8	19.9	29.7	18.2	27.3	14.2	21.2
	5	26.9	40.3	21.0	31.4	17.8	26.7	14.9	22.3	13.7	20.5	10.7	16.0
	6	18.8	28.2	14.8	22.1	12.6	18.9	10.6	15.9	9.76	14.6	7.67	11.5
	7	13.8	20.7	10.9	16.2	9.28	13.9	7.80	11.7	7.17	10.7	5.64	8.43
	8	10.6	15.8	8.31	12.4	7.10	10.6	5.97	8.94	5.49	8.22	4.32	6.46
	9	8.37	12.5	6.57	9.83	5.61	8.40	4.72	7.06	4.34	6.49	3.41	5.10
	10	6.78	10.1	5.32	7.96	4.55	6.80	3.82	5.72	3.52	5.26	2.76	4.13
	11	5.60	8.38	4.40	6.58	3.76	5.62	3.16	4.73	2.91	4.35	2.28	3.41
	12	4.71	7.04	3.70	5.53	3.16	4.72	2.65	3.97	2.44	3.65	1.92	2.87
	13	4.01	6.00	3.15	4.71	2.69	4.02	2.26	3.38	2.08	3.11	1.63	2.44
	14							1.95	2.92	1.79	2.68	1.41	2.11
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.77	1.31	1.09	0.897	0.819	0.630
I, in.^{4}	1.13	0.888	0.759	0.637	0.586	0.461
r, in.	0.799	0.823	0.834	0.843	0.846	0.855

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

HSS2.5-HSS2.375

Shape		HSS2.5×				HSS2.375×							
		0.063		0.049 ^{c2}		0.180		0.148		0.120		0.109	
t_{design}, in.		0.063		0.049		0.180		0.148		0.120		0.109	
lb/ft		1.66		1.31		4.30		3.59		2.95		2.69	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	17.7	26.5	-S-	-S-	45.8	68.5	38.4	57.5	31.4	47.0	28.7	42.9
	1	17.2	25.7	-S-	-S-	44.1	66.0	37.0	55.4	30.3	45.3	27.7	41.4
	2	15.7	23.4	-S-	-S-	39.4	59.0	33.2	49.7	27.2	40.7	24.9	37.2
	3	13.4	20.1	-S-	-S-	32.7	49.0	27.7	41.4	22.8	34.1	20.9	31.2
	4	10.9	16.2	-S-	-S-	25.2	37.7	21.4	32.0	17.8	26.6	16.3	24.4
	5	8.25	12.3	-S-	-S-	18.0	26.9	15.4	23.1	12.9	19.3	11.9	17.8
	6	5.93	8.9	-S-	-S-	12.5	18.8	10.8	16.1	9.04	13.5	8.31	12.4
	7	4.36	6.52	-S-	-S-	9.21	13.8	7.90	11.8	6.64	9.93	6.11	9.14
	8	3.33	4.99	-S-	-S-	7.05	10.5	6.05	9.05	5.08	7.61	4.68	7.00
	9	2.64	3.94	-S-	-S-	5.57	8.33	4.78	7.15	4.02	6.01	3.70	5.53
	10	2.13	3.19	-S-	-S-	4.51	6.75	3.87	5.79	3.25	4.87	2.99	4.48
	11	1.76	2.64	-S-	-S-	3.73	5.58	3.20	4.79	2.69	4.02	2.47	3.70
	12	1.48	2.22	-S-	-S-	3.13	4.69	2.69	4.02	2.26	3.38	2.08	3.11
	13	1.26	1.89	-S-	-S-			2.29	3.43	1.93	2.88	1.77	2.65
	14	1.09	1.63	-S-	-S-								
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

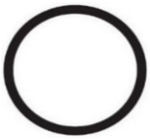
	HSS2.5× 0.063	HSS2.5× 0.049	HSS2.375× 0.180	HSS2.375× 0.148	HSS2.375× 0.120	HSS2.375× 0.109
A_g, in.^{2}	0.479	0.377	1.24	1.04	0.850	0.776
I, in.^{4}	0.356	0.283	0.753	0.645	0.542	0.499
r, in.	0.862	0.867	0.779	0.788	0.799	0.802

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



HSS2.375-HSS2.25

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS2.375×						HSS2.25×					
		0.083		0.063		0.049 [c2]		0.180		0.148		0.120	
t_{design}, in.		0.083		0.063		0.049		0.180		0.148		0.120	
lb/ft		2.07		1.57		1.24		4.06		3.39		2.78	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	22.1	33.0	16.8	25.1	-S-	-S-	43.2	64.6	36.1	54.0	29.7	44.4
	1	21.3	31.9	16.2	24.2	-S-	-S-	41.4	62.0	34.6	51.8	28.5	42.6
	2	19.2	28.8	14.6	21.9	-S-	-S-	36.5	54.7	30.6	45.8	25.3	37.8
	3	16.2	24.2	12.4	18.5	-S-	-S-	29.6	44.3	25.0	37.4	20.7	31.0
	4	12.7	19.0	9.8	14.6	-S-	-S-	22.1	33.0	18.8	28.1	15.7	23.4
	5	9.33	14.0	7.19	10.8	-S-	-S-	15.2	22.7	13.0	19.5	10.9	16.4
	6	6.55	9.8	5.06	7.6	-S-	-S-	10.5	15.8	9.03	13.5	7.60	11.4
	7	4.81	7.20	3.72	5.56	-S-	-S-	7.74	11.6	6.64	9.93	5.59	8.36
	8	3.69	5.51	2.85	4.26	-S-	-S-	5.92	8.86	5.08	7.60	4.28	6.40
	9	2.91	4.36	2.25	3.36	-S-	-S-	4.68	7.00	4.01	6.01	3.38	5.06
	10	2.36	3.53	1.82	2.73	-S-	-S-	3.79	5.67	3.25	4.86	2.74	4.10
	11	1.95	2.92	1.51	2.25	-S-	-S-	3.13	4.69	2.69	4.02	2.26	3.38
	12	1.64	2.45	1.27	1.89	-S-	-S-	2.63	3.94	2.26	3.38	1.90	2.84
	13	1.40	2.09	1.08	1.61	-S-	-S-						
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.598	0.454	0.358	1.17	0.977	0.803
I, in.^{4}	0.393	0.304	0.242	0.632	0.542	0.457
r, in.	0.811	0.818	0.822	0.735	0.745	0.754

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

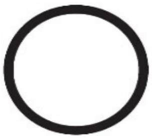
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS2.25-HSS2

Shape		HSS2.25×						HSS2×					
		0.109		0.083		0.063		0.180		0.148		0.120	
t_{design}, in.		0.109		0.083		0.063		0.180		0.148		0.120	
lb/ft		2.54		1.96		1.49		3.57		2.99		2.46	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	27.1	40.5	20.9	31.2	15.9	23.8	38.0	56.9	31.8	47.6	26.2	39.2
	1	26.0	38.9	20.1	30.0	15.3	22.9	36.0	53.9	30.2	45.1	24.9	37.2
	2	23.1	34.6	17.9	26.8	13.6	20.4	30.6	45.8	25.8	38.6	21.3	31.9
	3	19.0	28.4	14.8	22.1	11.3	16.9	23.3	34.9	19.8	29.7	16.5	24.7
	4	14.4	21.5	11.3	16.9	8.65	12.9	16.0	23.9	13.7	20.5	11.5	17.3
	5	10.1	15.1	7.96	11.9	6.15	9.20	10.3	15.4	8.91	13.3	7.52	11.3
	6	7.02	10.5	5.54	8.28	4.28	6.40	7.16	10.7	6.19	9.26	5.22	7.81
	7	5.15	7.71	4.07	6.09	3.14	4.70	5.26	7.87	4.55	6.80	3.84	5.74
	8	3.95	5.90	3.11	4.66	2.41	3.60	4.03	6.03	3.48	5.21	2.94	4.39
	9	3.12	4.66	2.46	3.68	1.90	2.85	3.18	4.76	2.75	4.12	2.32	3.47
	10	2.53	3.78	1.99	2.98	1.54	2.31	2.58	3.86	2.23	3.33	1.88	2.81
	11	2.09	3.12	1.65	2.46	1.27	1.90					1.55	2.32
	12	1.75	2.62	1.38	2.07	1.07	1.60						
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.733		0.565		0.430		1.03		0.861		0.709	
I, in.^{4}		0.421		0.332		0.257		0.430		0.372		0.314	
r, in.		0.758		0.767		0.773		0.646		0.657		0.665	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

HSS2-HSS1.9

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS

F_y = 65 ksi

Shape		HSS2×										HSS1.9×	
		0.109		0.083		0.063		0.049		0.035 ^{c2}		0.148	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.148	
lb/ft		2.25		1.73		1.32		1.04		0.749		2.83	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	23.9	35.8	18.5	27.6	14.0	21.0	11.1	16.6	-S-	-S-	30.1	45.0
	1	22.7	34.0	17.6	26.3	13.4	20.0	10.6	15.8	-S-	-S-	28.4	42.5
	2	19.5	29.2	15.2	22.7	11.6	17.3	9.16	13.7	-S-	-S-	23.8	35.6
	3	15.2	22.7	11.8	17.7	9.10	13.6	7.22	10.8	-S-	-S-	17.8	26.6
	4	10.6	15.9	8.39	12.6	6.49	9.71	5.17	7.74	-S-	-S-	11.8	17.6
	5	6.96	10.4	5.51	8.25	4.29	6.42	3.43	5.13	-S-	-S-	7.56	11.3
	6	4.83	7.2	3.83	5.73	2.98	4.46	2.38	3.56	-S-	-S-	5.25	7.9
	7	3.55	5.31	2.81	4.21	2.19	3.27	1.75	2.62	-S-	-S-	3.86	5.77
	8	2.72	4.07	2.15	3.22	1.68	2.51	1.34	2.00	-S-	-S-	2.95	4.42
	9	2.15	3.21	1.70	2.55	1.32	1.98	1.06	1.58	-S-	-S-	2.33	3.49
	10	1.74	2.60	1.38	2.06	1.07	1.60	0.857	1.28	-S-	-S-	1.89	2.83
	11	1.44	2.15	1.14	1.70	0.886	1.33	0.708	1.06	-S-	-S-		
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties						
A_g, in.^{2}	0.648	0.500	0.380	0.300	0.216	0.815
I, in.^{4}	0.290	0.230	0.179	0.143	0.104	0.315
r, in.	0.669	0.678	0.686	0.690	0.694	0.622

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

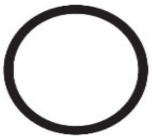
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS1.9

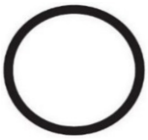
Shape		HSS1.9×											
		0.120		0.109		0.083		0.063		0.049		0.035 [c2]	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.33		2.13		1.64		1.25		0.988		0.711	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	24.8	37.1	22.6	33.9	17.5	26.2	13.3	19.9	10.5	15.7	-S-	-S-
	1	23.4	35.0	21.4	32.0	16.6	24.8	12.6	18.9	10.0	14.9	-S-	-S-
	2	19.7	29.5	18.1	27.0	14.1	21.0	10.8	16.1	8.51	12.7	-S-	-S-
	3	14.8	22.2	13.7	20.4	10.7	16.0	8.21	12.3	6.53	9.77	-S-	-S-
	4	10.0	14.9	9.2	13.8	7.28	10.9	5.64	8.43	4.51	6.74	-S-	-S-
	5	6.41	9.59	5.93	8.87	4.70	7.03	3.65	5.46	2.92	4.37	-S-	-S-
	6	4.45	6.66	4.12	6.16	3.26	4.88	2.53	3.79	2.03	3.04	-S-	-S-
	7	3.27	4.89	3.03	4.53	2.40	3.59	1.86	2.78	1.49	2.23	-S-	-S-
	8	2.50	3.74	2.32	3.46	1.84	2.75	1.42	2.13	1.14	1.71	-S-	-S-
	9	1.98	2.96	1.83	2.74	1.45	2.17	1.13	1.68	0.902	1.35	-S-	-S-
	10	1.60	2.40	1.48	2.22	1.18	1.76	0.912	1.36	0.731	1.09	-S-	-S-
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.671		0.613		0.474		0.361		0.285		0.205	
I, in.^{4}		0.267		0.247		0.196		0.152		0.122		0.089	
r, in.		0.631		0.635		0.643		0.649		0.654		0.660	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



HSS1.75

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS1.75×											
		0.120		0.109		0.083		0.063		0.049		0.035 [c2]	
t_{design}, in.		0.120		0.109		0.083		0.063		0.049		0.035	
lb/ft		2.13		1.95		1.51		1.15		0.908		0.654	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	22.7	33.9	20.8	31.1	16.1	24.0	12.2	18.3	9.68	14.5	-S-	-S-
	1	21.2	31.7	19.4	29.0	15.0	22.5	11.5	17.2	9.09	13.6	-S-	-S-
	2	17.3	25.9	15.9	23.7	12.4	18.5	9.48	14.2	7.53	11.3	-S-	-S-
	3	12.3	18.4	11.3	17.0	8.92	13.3	6.90	10.3	5.51	8.24	-S-	-S-
	4	7.69	11.5	7.1	10.6	5.66	8.46	4.42	6.61	3.56	5.32	-S-	-S-
	5	4.92	7.36	4.55	6.81	3.62	5.42	2.83	4.23	2.28	3.41	-S-	-S-
	6	3.42	5.11	3.16	4.73	2.51	3.76	1.97	2.94	1.58	2.37	-S-	-S-
	7	2.51	3.76	2.32	3.47	1.85	2.76	1.44	2.16	1.16	1.74	-S-	-S-
	8	1.92	2.88	1.78	2.66	1.41	2.12	1.11	1.65	0.890	1.33	-S-	-S-
	9	1.52	2.27	1.40	2.10	1.12	1.67	0.873	1.31	0.703	1.05	-S-	-S-
	10									0.569	0.852	-S-	-S-
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.614		0.562		0.435		0.331		0.262		0.189	
I, in.^{4}		0.205		0.190		0.151		0.118		0.095		0.069	
r, in.		0.578		0.581		0.589		0.597		0.602		0.606	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

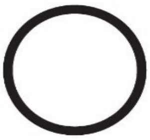
Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS1.66-HSS1.5

Shape		HSS1.66×										HSS1.5×	
		0.148		0.120		0.109		0.083		0.063		0.120	
t_{design}, in.		0.148		0.120		0.109		0.083		0.063		0.120	
lb/ft		2.44		2.01		1.84		1.43		1.09		1.80	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	26.0	38.8	21.5	32.1	19.6	29.3	15.2	22.7	11.6	17.3	19.2	28.7
	1	24.0	35.9	19.9	29.7	18.2	27.2	14.1	21.1	10.8	16.2	17.5	26.1
	2	19.0	28.4	15.8	23.7	14.5	21.7	11.3	17.0	8.72	13.0	13.2	19.7
	3	12.8	19.1	10.8	16.2	10.0	14.9	7.88	11.8	6.11	9.14	8.21	12.3
	4	7.60	11.4	6.49	9.71	6.00	8.97	4.80	7.18	3.74	5.60	4.68	7.00
	5	4.86	7.27	4.15	6.22	3.84	5.74	3.07	4.59	2.40	3.58	2.99	4.48
	6	3.38	5.05	2.89	4.32	2.67	3.99	2.13	3.19	1.66	2.49	2.08	3.11
	7	2.48	3.71	2.12	3.17	1.96	2.93	1.57	2.34	1.22	1.83	1.53	2.29
	8	1.90	2.84	1.62	2.43	1.50	2.24	1.20	1.79	0.936	1.40	1.17	1.75
	9			1.28	1.92	1.18	1.77	0.947	1.42	0.739	1.11		
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	0.703	0.581	0.531	0.411	0.314	0.520
I, in.^{4}	0.203	0.173	0.160	0.128	0.100	0.125
r, in.	0.537	0.546	0.549	0.558	0.564	0.490

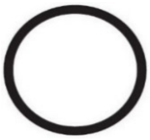
ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



HSS1.5-HSS1.25

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS1.5×										HSS1.25×	
		0.109		0.083		0.063		0.049		0.035		0.120	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.120	
lb/ft		1.65		1.28		0.979		0.775		0.559		1.48	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	17.6	26.3	13.6	20.4	10.4	15.6	8.24	12.3	5.95	8.90	15.7	23.5
	1	16.0	24.0	12.5	18.6	9.54	14.3	7.56	11.3	5.46	8.17	13.7	20.5
	2	12.1	18.1	9.51	14.2	7.34	11.0	5.84	8.74	4.24	6.34	8.98	13.4
	3	7.62	11.4	6.07	9.07	4.74	7.09	3.80	5.69	2.78	4.16	4.59	6.86
	4	4.35	6.51	3.49	5.21	2.74	4.10	2.21	3.30	1.62	2.42	2.58	3.86
	5	2.79	4.17	2.23	3.34	1.75	2.62	1.41	2.11	1.04	1.55	1.65	2.47
	6	1.93	2.89	1.55	2.32	1.22	1.82	0.981	1.47	0.720	1.08	1.15	1.72
	7	1.42	2.13	1.14	1.70	0.894	1.34	0.721	1.08	0.529	0.791		
	8	1.09	1.63	0.871	1.30	0.685	1.02	0.552	0.826	0.405	0.606		
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.476		0.369		0.282		0.223		0.161		0.426	
I, in.^{4}		0.116		0.093		0.073		0.059		0.043		0.069	
r, in.		0.494		0.502		0.509		0.514		0.518		0.402	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

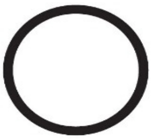
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)
Available Strength in Axial Compression, kips
Round HSS



HSS1.25-HSS1

Shape		HSS1.25×										HSS1×	
		0.109		0.083		0.063		0.049		0.035		0.120	
t_{design}, in.		0.109		0.083		0.063		0.049		0.035		0.120	
lb/ft		1.36		1.06		0.809		0.641		0.463		1.15	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	14.4	21.6	11.2	16.8	8.61	12.9	6.83	10.2	4.95	7.40	12.3	18.3
	1	12.6	18.8	9.84	14.7	7.57	11.3	6.03	9.02	4.38	6.55	9.74	14.6
	2	8.31	12.4	6.61	9.90	5.16	7.72	4.14	6.19	3.02	4.52	4.89	7.31
	3	4.27	6.39	3.47	5.19	2.75	4.12	2.23	3.33	1.64	2.46	2.18	3.26
	4	2.40	3.60	1.95	2.92	1.55	2.32	1.25	1.87	0.924	1.38	1.23	1.84
	5	1.54	2.30	1.25	1.87	0.991	1.48	0.802	1.20	0.592	0.885	0.785	1.17
	6	1.07	1.60	0.868	1.30	0.688	1.03	0.557	0.833	0.411	0.615		
	7					0.505	0.756	0.409	0.612	0.302	0.452		
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

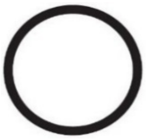
A_g, in.^{2}	0.391	0.304	0.233	0.185	0.134	0.332
I, in.^{4}	0.064	0.052	0.041	0.033	0.025	0.033
r, in.	0.405	0.414	0.421	0.425	0.429	0.314

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



HSS1

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS

F_y = 65 ksi

Shape		HSS1×											
		0.109		0.083		0.065		0.063		0.049		0.042	
t_{design}, in.		0.109		0.083		0.065		0.063		0.049		0.042	
lb/ft		1.06		0.829		0.662		0.638		0.508		0.438	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	11.3	16.9	8.83	13.2	7.05	10.6	6.80	10.2	5.39	8.07	4.65	6.96
	1	8.99	13.4	7.12	10.7	5.74	8.59	5.53	8.28	4.42	6.61	3.82	5.72
	2	4.57	6.84	3.74	5.60	3.10	4.64	2.99	4.47	2.43	3.63	2.11	3.16
	3	2.04	3.06	1.68	2.52	1.40	2.10	1.35	2.02	1.10	1.65	0.97	1.44
	4	1.15	1.72	0.946	1.42	0.789	1.18	0.760	1.14	0.621	0.930	0.543	0.812
	5	0.735	1.10	0.606	0.906	0.505	0.755	0.486	0.728	0.398	0.595	0.347	0.520
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
Properties													
A_g, in.^{2}		0.305		0.239		0.191		0.184		0.146		0.126	
I, in.^{4}		0.031		0.025		0.021		0.020		0.017		0.015	
r, in.		0.317		0.325		0.332		0.332		0.337		0.339	

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

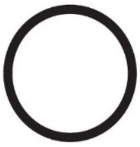
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-6 (continued)

Available Strength in Axial Compression, kips

Round HSS



HSS1

Shape		HSS1×			
		0.035		0.032	
t_{design}, in.		0.035		0.032	
lb/ft		0.368		0.337	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	3.91	5.86	3.59	5.38
	1	3.23	4.82	2.96	4.43
	2	1.80	2.70	1.66	2.48
	3	0.826	1.24	0.758	1.13
	4	0.465	0.695	0.427	0.638
	5	0.297	0.445	0.273	0.408
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				

Properties

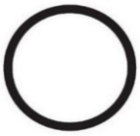
A_g, in.^{2}	0.106	0.097
I, in.^{4}	0.012	0.011
r, in.	0.342	0.342

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 12-PIPE 8

Table 5-7
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 12				Pipe 10				Pipe 8			
		Std. 40S		Std. 10S [c2]		Std. 40S		Std. 10S [c2]		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.180		0.365		0.165		0.500		0.322	
lb/ft		50.6		24.7		41.3		19.0		44.3		29.1	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	539	807	-S-	-S-	443	663	-S-	-S-	473	707	310	464
	6	517	773	-S-	-S-	417	624	-S-	-S-	428	641	282	422
	7	509	762	-S-	-S-	408	611	-S-	-S-	413	619	273	408
	8	500	748	-S-	-S-	398	596	-S-	-S-	397	594	262	392
	9	490	734	-S-	-S-	387	579	-S-	-S-	379	567	251	375
	10	480	718	-S-	-S-	375	561	-S-	-S-	360	538	239	357
	11	468	700	-S-	-S-	362	542	-S-	-S-	340	508	226	338
	12	456	681	-S-	-S-	349	522	-S-	-S-	319	477	213	318
	13	442	662	-S-	-S-	334	500	-S-	-S-	298	446	199	298
	14	429	641	-S-	-S-	320	478	-S-	-S-	277	414	186	278
	15	414	620	-S-	-S-	305	456	-S-	-S-	256	382	172	257
	16	400	598	-S-	-S-	289	433	-S-	-S-	235	351	159	237
	17	384	575	-S-	-S-	274	410	-S-	-S-	215	321	145	218
	18	369	552	-S-	-S-	258	387	-S-	-S-	195	292	133	198
	19	353	529	-S-	-S-	243	364	-S-	-S-	176	264	120	180
	20	338	505	-S-	-S-	228	341	-S-	-S-	159	238	109	163
	21	322	481	-S-	-S-	213	318	-S-	-S-	144	216	98.7	148
	22	306	458	-S-	-S-	198	296	-S-	-S-	132	197	90.0	135
	23	290	434	-S-	-S-	184	275	-S-	-S-	120	180	82.3	123
	24	275	411	-S-	-S-	170	254	-S-	-S-	111	165	75.6	113
	25	259	388	-S-	-S-	157	235	-S-	-S-	102	152	69.7	104
	26	244	366	-S-	-S-	145	217	-S-	-S-	94.2	141	64.4	96.4
	27	230	344	-S-	-S-	134	201	-S-	-S-	87.3	131	59.7	89.4
	28	215	322	-S-	-S-	125	187	-S-	-S-	81.2	121	55.5	83.1
	29	201	301	-S-	-S-	117	174	-S-	-S-	75.7	113	51.8	77.5
	30	188	282	-S-	-S-	109	163	-S-	-S-	70.7	106	48.4	72.4
	32	166	248	-S-	-S-	95.7	143	-S-	-S-	62.2	93.0	42.5	63.6
	34	147	219	-S-	-S-	84.8	127	-S-	-S-	55.1	82.4	37.7	56.3
	36	131	196	-S-	-S-	75.6	113	-S-	-S-	49.1	73.5	33.6	50.3
	38	117	176	-S-	-S-	67.9	102	-S-	-S-	44.1	66.0	30.2	45.1
	40	106	158	-S-	-S-	61.2	91.6	-S-	-S-	39.8	59.5	27.2	40.7

Properties

	Pipe 12 Std. 40S	Pipe 12 Std. 10S	Pipe 10 Std. 40S	Pipe 10 Std. 10S	Pipe 8 Std. 80S	Pipe 8 Std. 40S
A_g, in.^{2}	14.6	7.14	12.0	5.51	12.8	8.40
I, in.^{4}	283	142	163	78.0	106	72.6
r, in.	4.40	4.46	3.69	3.76	2.88	2.94

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

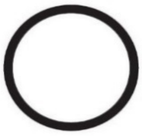
-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

Version 1.0 03/04/2018

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 8-PIPE 6

Shape		Pipe 8				Pipe 6							
		Std. 10S ^{c2}		Std. 5S ^{c2}		Std. 80S		Std. 40S		Std. 10S ^{c2}		Std. 5S ^{c2}	
t_{design}, in.		0.148		0.109		0.432		0.280		0.134		0.109	
lb/ft		13.7		10.1		29.1		19.4		9.48		7.74	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	-S-	-S-	-S-	-S-	311	465	206	309	-S-	-S-	-S-	-S-
	6	-S-	-S-	-S-	-S-	262	393	176	263	-S-	-S-	-S-	-S-
	7	-S-	-S-	-S-	-S-	247	369	166	248	-S-	-S-	-S-	-S-
	8	-S-	-S-	-S-	-S-	230	344	155	232	-S-	-S-	-S-	-S-
	9	-S-	-S-	-S-	-S-	213	318	144	215	-S-	-S-	-S-	-S-
	10	-S-	-S-	-S-	-S-	194	291	132	197	-S-	-S-	-S-	-S-
	11	-S-	-S-	-S-	-S-	176	264	120	180	-S-	-S-	-S-	-S-
	12	-S-	-S-	-S-	-S-	158	237	108	162	-S-	-S-	-S-	-S-
	13	-S-	-S-	-S-	-S-	141	211	96.9	145	-S-	-S-	-S-	-S-
	14	-S-	-S-	-S-	-S-	124	186	85.8	128	-S-	-S-	-S-	-S-
	15	-S-	-S-	-S-	-S-	108	162	75.4	113	-S-	-S-	-S-	-S-
	16	-S-	-S-	-S-	-S-	95.3	143	66.3	99.2	-S-	-S-	-S-	-S-
	17	-S-	-S-	-S-	-S-	84.5	126	58.7	87.8	-S-	-S-	-S-	-S-
	18	-S-	-S-	-S-	-S-	75.3	113	52.4	78.4	-S-	-S-	-S-	-S-
	19	-S-	-S-	-S-	-S-	67.6	101	47.0	70.3	-S-	-S-	-S-	-S-
	20	-S-	-S-	-S-	-S-	61.0	91.3	42.4	63.5	-S-	-S-	-S-	-S-
	21	-S-	-S-	-S-	-S-	55.4	82.8	38.5	57.6	-S-	-S-	-S-	-S-
	22	-S-	-S-	-S-	-S-	50.4	75.4	35.1	52.5	-S-	-S-	-S-	-S-
	23	-S-	-S-	-S-	-S-	46.1	69.0	32.1	48.0	-S-	-S-	-S-	-S-
	24	-S-	-S-	-S-	-S-	42.4	63.4	29.5	44.1	-S-	-S-	-S-	-S-
	25	-S-	-S-	-S-	-S-	39.1	58.4	27.2	40.6	-S-	-S-	-S-	-S-
	26	-S-	-S-	-S-	-S-	36.1	54.0	25.1	37.6	-S-	-S-	-S-	-S-
	27	-S-	-S-	-S-	-S-	33.5	50.1	23.3	34.8	-S-	-S-	-S-	-S-
	28	-S-	-S-	-S-	-S-	31.1	46.6	21.6	32.4	-S-	-S-	-S-	-S-
	29	-S-	-S-	-S-	-S-	29.0	43.4	20.2	30.2	-S-	-S-	-S-	-S-
	30	-S-	-S-	-S-	-S-	27.1	40.6	18.9	28.2	-S-	-S-	-S-	-S-
	32	-S-	-S-	-S-	-S-	23.8	35.7	16.6	24.8	-S-	-S-	-S-	-S-
	34	-S-	-S-	-S-	-S-	21.1	31.6	14.7	22.0	-S-	-S-	-S-	-S-
	36	-S-	-S-	-S-	-S-	18.8	28.2	13.1	19.6	-S-	-S-	-S-	-S-
	38	-S-	-S-	-S-	-S-					-S-	-S-	-S-	-S-
	40	-S-	-S-	-S-	-S-								

Properties

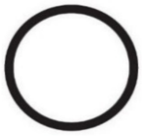
	Pipe 8 Std. 10S	Pipe 8 Std. 5S	Pipe 6 Std. 80S	Pipe 6 Std. 40S	Pipe 6 Std. 10S	Pipe 6 Std. 5S
A_g, in.^{2}	3.94	2.92	8.41	5.59	2.73	2.23
I, in.^{4}	35.5	26.5	40.6	28.2	14.4	11.9
r, in.	3.00	3.01	2.20	2.25	2.30	2.31

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.



PIPE 5-PIPE 4

Table 5-7 (continued)

Available Strength in Axial Compression, kips

Pipe

F_y = 65 ksi

Shape		Pipe 5								Pipe 4			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S [c2]		Std. 80S		Std. 40S	
t_{design}, in.		0.375		0.258		0.134		0.109		0.337		0.237	
lb/ft		21.2		14.9		7.93		6.48		15.3		11.0	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	226	338	159	238	84.2	126	-S-	-S-	163	244	117	175
	6	177	265	126	188	67.5	101	-S-	-S-	112	168	81.9	122
	7	163	243	116	173	62.3	93.2	-S-	-S-	98.1	147	71.9	108
	8	147	220	105	157	56.8	85.0	-S-	-S-	84.0	126	62.0	92.7
	9	131	196	93.9	141	51.2	76.6	-S-	-S-	70.4	105	52.3	78.3
	10	116	173	83.1	124	45.5	68.1	-S-	-S-	57.9	86.7	43.3	64.8
	11	100	150	72.5	108	40.0	59.9	-S-	-S-	47.9	71.6	35.8	53.6
	12	86.0	129	62.4	93.4	34.7	52.0	-S-	-S-	40.2	60.2	30.1	45.0
	13	73.4	110	53.4	79.8	29.8	44.6	-S-	-S-	34.3	51.3	25.6	38.4
	14	63.3	94.7	46.0	68.8	25.7	38.5	-S-	-S-	29.6	44.2	22.1	33.1
	15	55.1	82.5	40.1	60.0	22.4	33.5	-S-	-S-	25.7	38.5	19.3	28.8
	16	48.5	72.5	35.2	52.7	19.7	29.5	-S-	-S-	22.6	33.9	16.9	25.3
	17	42.9	64.2	31.2	46.7	17.4	26.1	-S-	-S-	20.0	30.0	15.0	22.4
	18	38.3	57.3	27.8	41.6	15.6	23.3	-S-	-S-	17.9	26.7	13.4	20.0
	19	34.4	51.4	25.0	37.4	14.0	20.9	-S-	-S-	16.0	24.0	12.0	18.0
	20	31.0	46.4	22.5	33.7	12.6	18.9	-S-	-S-	14.5	21.7	10.8	16.2
	21	28.1	42.1	20.4	30.6	11.4	17.1	-S-	-S-	13.1	19.7	9.83	14.7
	22	25.6	38.3	18.6	27.9	10.4	15.6	-S-	-S-	12.0	17.9	8.96	13.4
	23	23.4	35.1	17.0	25.5	9.53	14.3	-S-	-S-	11.0	16.4	8.19	12.3
	24	21.5	32.2	15.7	23.4	8.75	13.1	-S-	-S-	10.1	15.0	7.53	11.3
	25	19.8	29.7	14.4	21.6	8.06	12.1	-S-	-S-			6.94	10.4
	26	18.4	27.5	13.3	20.0	7.46	11.2	-S-	-S-				
	27	17.0	25.5	12.4	18.5	6.91	10.3	-S-	-S-				
	28	15.8	23.7	11.5	17.2	6.43	9.62	-S-	-S-				
	29	14.8	22.1	10.7	16.0	5.99	8.97	-S-	-S-				
	30	13.8	20.6	10.0	15.0	5.60	8.38	-S-	-S-				
	32					4.92	7.36	-S-	-S-				
	34												
	36												
	38												
	40												

Properties

	Pipe 5 Std. 80S	Pipe 5 Std. 40S	Pipe 5 Std. 10S	Pipe 5 Std. 5S	Pipe 4 Std. 80S	Pipe 4 Std. 40S
A_g, in.^{2}	6.11	4.30	2.28	1.87	4.41	3.17
I, in.^{4}	20.6	15.1	8.41	6.94	9.61	7.23
r, in.	1.84	1.87	1.92	1.93	1.48	1.51

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

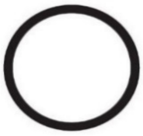
[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 4-PIPE 3½

Shape		Pipe 4				Pipe 3½							
		Std. 10S		Std. 5S [c2]		Std. 80S		Std. 40S		Std. 10S		Std. 5S [c2]	
t_{design}, in.		0.120		0.083		0.318		0.226		0.120		0.083	
lb/ft		5.73		3.99		12.8		9.29		5.07		3.54	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	60.9	91.2	-S-	-S-	136	203	99.0	148	53.9	80.7	-S-	-S-
	6	43.4	64.9	-S-	-S-	84.5	126	62.8	94.0	34.9	52.2	-S-	-S-
	7	38.4	57.4	-S-	-S-	71.1	106	53.3	79.8	29.8	44.6	-S-	-S-
	8	33.3	49.8	-S-	-S-	58.4	87.3	44.1	66.0	24.9	37.2	-S-	-S-
	9	28.4	42.5	-S-	-S-	46.8	69.9	35.6	53.3	20.3	30.3	-S-	-S-
	10	23.7	35.5	-S-	-S-	37.9	56.7	28.9	43.2	16.4	24.6	-S-	-S-
	11	19.6	29.4	-S-	-S-	31.3	46.8	23.8	35.7	13.6	20.3	-S-	-S-
	12	16.5	24.7	-S-	-S-	26.3	39.3	20.0	30.0	11.4	17.1	-S-	-S-
	13	14.1	21.0	-S-	-S-	22.4	33.5	17.1	25.5	9.72	14.5	-S-	-S-
	14	12.1	18.1	-S-	-S-	19.3	28.9	14.7	22.0	8.38	12.5	-S-	-S-
	15	10.6	15.8	-S-	-S-	16.8	25.2	12.8	19.2	7.30	10.9	-S-	-S-
	16	9.29	13.9	-S-	-S-	14.8	22.1	11.3	16.9	6.42	9.60	-S-	-S-
	17	8.23	12.3	-S-	-S-	13.1	19.6	10.0	14.9	5.69	8.51	-S-	-S-
	18	7.34	11.0	-S-	-S-	11.7	17.5	8.91	13.3	5.07	7.59	-S-	-S-
	19	6.59	9.85	-S-	-S-	10.5	15.7	7.99	12.0	4.55	6.81	-S-	-S-
	20	5.94	8.89	-S-	-S-	9.47	14.2	7.21	10.8	4.11	6.15	-S-	-S-
	21	5.39	8.06	-S-	-S-	8.59	12.8	6.54	9.79	3.73	5.57	-S-	-S-
	22	4.91	7.35	-S-	-S-			5.96	8.92	3.40	5.08	-S-	-S-
	23	4.49	6.72	-S-	-S-							-S-	-S-
	24	4.13	6.17	-S-	-S-								
	25	3.80	5.69	-S-	-S-								
	26			-S-	-S-								
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

	Pipe 4 Std. 10S	Pipe 4 Std. 5S	Pipe 3½ Std. 80S	Pipe 3½ Std. 40S	Pipe 3½ Std. 10S	Pipe 3½ Std. 5S
A_g, in.^{2}	1.65	1.15	3.68	2.68	1.46	1.02
I, in.^{4}	3.96	2.81	6.28	4.79	2.76	1.96
r, in.	1.55	1.56	1.31	1.34	1.37	1.39

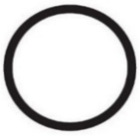
ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



PIPE 3-PIPE 2½

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe

F_y = 65 ksi

Shape		Pipe 3								Pipe 2½			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.300		0.216		0.120		0.083		0.276		0.203	
lb/ft		10.5		7.73		4.42		3.09		7.82		5.91	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	112	167	82.4	123	46.9	70.2	32.9	49.2	83.5	125	63.2	94.5
	6	58.9	88.1	44.9	67.2	26.6	39.8	18.8	28.2	32.3	48.3	25.5	38.2
	7	46.7	69.9	36.1	54.0	21.7	32.4	15.4	23.1	23.8	35.6	18.8	28.2
	8	36.1	54.1	28.1	42.1	17.1	25.6	12.2	18.3	18.2	27.2	14.4	21.6
	9	28.5	42.7	22.2	33.2	13.5	20.3	9.66	14.4	14.4	21.5	11.4	17.1
	10	23.1	34.6	18.0	26.9	11.0	16.4	7.82	11.7	11.6	17.4	9.24	13.8
	11	19.1	28.6	14.9	22.2	9.06	13.6	6.47	9.67	9.62	14.4	7.63	11.4
	12	16.1	24.0	12.5	18.7	7.62	11.4	5.43	8.13	8.09	12.1	6.41	9.59
	13	13.7	20.5	10.6	15.9	6.49	9.71	4.63	6.92	6.89	10.3	5.46	8.18
	14	11.8	17.7	9.18	13.7	5.60	8.37	3.99	5.97	5.94	8.89	4.71	7.05
	15	10.3	15.4	8.00	12.0	4.87	7.29	3.48	5.20	5.18	7.74	4.10	6.14
	16	9.03	13.5	7.03	10.5	4.28	6.41	3.06	4.57				
	17	8.00	12.0	6.23	9.31	3.79	5.68	2.71	4.05				
	18	7.14	10.7	5.55	8.31	3.38	5.06	2.41	3.61				
	19			4.98	7.46	3.04	4.54	2.17	3.24				
	20					2.74	4.10	1.96	2.93				
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	32												
	34												
	36												
	38												
	40												

Properties

A_g, in.^{2}	3.02	2.23	1.27	0.891	2.26	1.71
I, in.^{4}	3.89	3.02	1.82	1.30	1.94	1.54
r, in.	1.13	1.16	1.20	1.21	0.927	0.949

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

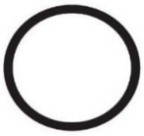
Note: Heavy line indicates KL/r equal to or greater than 200.

F_y = 65 ksi

Table 5-7 (continued)

Available Strength in Axial Compression, kips

Pipe



PIPE 2½-PIPE 2

Shape		Pipe 2½				Pipe 2							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.120		0.083		0.218		0.154		0.109		0.065	
lb/ft		3.60		2.52		5.12		3.73		2.69		1.64	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r	0	38.4	57.5	26.9	40.3	54.7	81.8	39.9	59.7	28.7	43.0	17.5	26.1
	1	37.5	56.1	26.3	39.4	52.6	78.7	38.5	57.5	27.7	41.5	16.9	25.3
	2	34.9	52.3	24.5	36.7	46.9	70.1	34.5	51.6	25.0	37.4	15.3	22.8
	3	31.0	46.4	21.9	32.7	38.7	57.9	28.7	43.0	21.0	31.4	12.9	19.3
	4	26.3	39.3	18.6	27.8	29.6	44.2	22.2	33.3	16.4	24.5	10.2	15.2
	5	21.2	31.7	15.1	22.6	20.9	31.3	16.0	24.0	12.0	17.9	7.51	11.2
	6	16.3	24.4	11.7	17.5	14.5	21.8	11.2	16.7	8.38	12.5	5.28	7.91
	7	12.1	18.2	8.74	13.1	10.7	16.0	8.21	12.3	6.15	9.21	3.88	5.81
	8	9.30	13.9	6.69	10.0	8.18	12.2	6.28	9.40	4.71	7.05	2.97	4.45
	9	7.35	11.0	5.29	7.91	6.46	9.67	4.96	7.43	3.72	5.57	2.35	3.51
	10	5.95	8.91	4.28	6.41	5.23	7.83	4.02	6.02	3.02	4.51	1.90	2.85
	11	4.92	7.36	3.54	5.30	4.33	6.47	3.32	4.97	2.49	3.73	1.57	2.35
	12	4.13	6.18	2.98	4.45	3.64	5.44	2.79	4.18	2.09	3.13	1.32	1.98
	13	3.52	5.27	2.54	3.79			2.38	3.56	1.78	2.67	1.13	1.68
	14	3.04	4.54	2.19	3.27								
	15	2.65	3.96	1.90	2.85								
	16	2.33	3.48	1.67	2.50								
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.04	0.729	1.48	1.08	0.778	0.473
I, in.^{4}	0.993	0.714	0.874	0.670	0.503	0.317
r, in.	0.977	0.990	0.768	0.788	0.804	0.819

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r equal to or greater than 200.

PIPE 1½-PIPE 1¼

Table 5-7 (continued)

Available Strength in Axial Compression, kips

Pipe

F_y = 65 ksi

Shape		Pipe 1½								Pipe 1¼			
		Std. 80S		Std. 40S		Std. 10S		Std. 5S		Std. 80S		Std. 40S	
t_{design}, in.		0.200		0.145		0.109		0.065		0.191		0.140	
lb/ft		3.70		2.77		2.13		1.30		3.06		2.32	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	39.5	59.1	29.5	44.1	22.6	33.9	13.8	20.7	32.5	48.7	24.7	37.0
	1	37.1	55.6	27.8	41.6	21.4	32.0	13.1	19.6	30.0	44.8	22.9	34.2
	2	30.8	46.1	23.4	34.9	18.1	27.0	11.2	16.7	23.4	35.0	18.1	27.1
	3	22.6	33.9	17.4	26.1	13.7	20.4	8.53	12.8	15.5	23.2	12.3	18.4
	4	14.7	21.9	11.6	17.3	9.21	13.8	5.85	8.76	9.07	13.6	7.31	10.9
	5	9.39	14.1	7.44	11.1	5.93	8.87	3.79	5.67	5.80	8.68	4.68	7.00
	6	6.52	9.76	5.17	7.73	4.12	6.16	2.63	3.94	4.03	6.03	3.25	4.86
	7	4.79	7.17	3.80	5.68	3.03	4.53	1.93	2.89	2.96	4.43	2.39	3.57
	8	3.67	5.49	2.91	4.35	2.32	3.46	1.48	2.21	2.27	3.39	1.83	2.73
	9	2.90	4.34	2.30	3.43	1.83	2.74	1.17	1.75				
	10	2.35	3.51	1.86	2.78	1.48	2.22	0.947	1.42				
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

A_g, in.^{2}	1.07	0.799	0.613	0.375	0.881	0.669
I, in.^{4}	0.391	0.310	0.247	0.158	0.242	0.195
r, in.	0.605	0.623	0.635	0.649	0.524	0.540

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

[c2] Shape is slender for compression with F_y = 65 ksi.

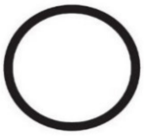
-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-7 (continued)
Available Strength in Axial Compression, kips
Pipe



PIPE 1¼-PIPE 1

Shape		Pipe 1¼				Pipe 1							
		Std. 10S		Std. 5S		Std. 80S		Std. 40S		Std. 10S		Std. 5S	
t_{design}, in.		0.109		0.065		0.179		0.133		0.109		0.065	
lb/ft		1.84		1.13		2.22		1.71		1.43		0.885	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, *r*	0	19.6	29.3	12.0	18.0	23.7	35.5	18.3	27.4	15.3	22.9	9.45	14.1
	1	18.2	27.2	11.2	16.8	20.7	31.0	16.1	24.1	13.6	20.3	8.43	12.6
	2	14.5	21.7	9.06	13.6	13.8	20.6	11.0	16.5	9.39	14.0	5.98	8.95
	3	9.97	14.9	6.35	9.51	7.12	10.7	5.89	8.80	5.11	7.65	3.38	5.05
	4	6.00	8.97	3.90	5.84	4.01	5.99	3.31	4.95	2.88	4.30	1.90	2.84
	5	3.84	5.74	2.50	3.73	2.56	3.83	2.12	3.17	1.84	2.75	1.22	1.82
	6	2.67	3.99	1.73	2.59	1.78	2.66	1.47	2.20	1.28	1.91	0.844	1.26
	7	1.96	2.93	1.27	1.91			1.08	1.62	0.939	1.40	0.620	0.928
	8	1.50	2.24	0.975	1.46								
	9	1.18	1.77	0.770	1.15								
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												

Properties

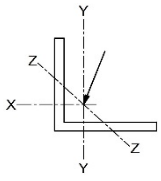
A_g, in.^{2}	0.531	0.326	0.642	0.496	0.415	0.256
I, in.^{4}	0.160	0.104	0.107	0.088	0.077	0.051
r, in.	0.549	0.565	0.408	0.422	0.430	0.445

ASD	LRFD
Ω_c = 1.76	φ_c = 0.85

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates *KL*/*r* equal to or greater than 200.



L8-L6

Table 5-8
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L8×8×										L6×6×	
		¾[c2]		⅝[c2]		½[c2]		⅜[c2]		¼[c2]		¾	
lb/ft		39.7		33.3		26.9		20.3		13.7		29.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	329	494
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	323	486
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	308	463
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	284	426
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	253	381
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	219	329
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	183	275
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	148	222
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	116	174
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	91.7	138
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	74.3	112
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	61.4	92.3
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	51.6	77.5
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	43.9	66.1
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	37.9	57.0
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	33.0	49.6
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	29.0	43.6
	17	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	25.7	38.6
	18	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	22.9	34.5
	19	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	20.6	30.9
	20	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	21	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	22	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	23	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	24	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	25	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
	26	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-		
Properties													
A_g, in.^{2}		11.4		9.61		7.75		5.86		3.94		8.44	
r_z, in.		1.58		1.58		1.59		1.60		1.61		1.18	

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

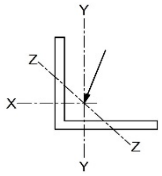
Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

F_y = 65 ksi

Table 5-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)



L6-L5

Shape		L6×6×								L5×5×			
		⅝^{c2}		½^{c2}		⅜^{c2}		¼^{c2}		¾		⅝	
lb/ft		24.7		19.9		15.1		10.2		24.1		20.3	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	270	406	228	343
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	264	396	223	335
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	245	369	207	312
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	218	327	184	277
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	184	276	156	235
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	148	223	126	190
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	114	171	97.3	146
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	84.4	127	72.4	109
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	64.6	97.1	55.5	83.4
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	51.1	76.7	43.8	65.9
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	41.4	62.2	35.5	53.4
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	34.2	51.4	29.3	44.1
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	28.7	43.2	24.6	37.0
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	24.5	36.8	21.0	31.6
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	21.1	31.7	18.1	27.2
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	18.4	27.6	15.8	23.7
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	16.2	24.3	13.9	20.8
	17	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	18	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	19	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	20							-S-	-S-				
	21												
	22												
	23												
	24												
	25												
	26												

Properties

A_g, in.^{2}	7.11	5.75	4.36	2.94	6.94	5.86
r_z, in.	1.18	1.18	1.19	1.21	0.971	0.979

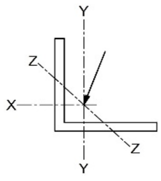
ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



L5-L4

Table 5-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L5×5×								L4×4×			
		½ ^{c2}		⅜ ^{c2}		$^{5}/_{16}$ ^{c2}		¼ ^{c2}		½		⅜ ^{c2}	
lb/ft		16.5		12.5		10.5		8.45		13.0		9.92	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	146	219	-S-	-S-
	1	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	141	211	-S-	-S-
	2	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	126	189	-S-	-S-
	3	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	104	157	-S-	-S-
	4	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	80.5	121	-S-	-S-
	5	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	57.6	86.6	-S-	-S-
	6	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	40.2	60.4	-S-	-S-
	7	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	29.5	44.3	-S-	-S-
	8	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	22.6	33.9	-S-	-S-
	9	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	17.8	26.8	-S-	-S-
	10	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	14.5	21.7	-S-	-S-
	11	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	11.9	18.0	-S-	-S-
	12	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	10.0	15.1	-S-	-S-
	13	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-	8.55	12.9	-S-	-S-
	14	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	15	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	16	-S-	-S-	-S-	-S-	-S-	-S-	-S-	-S-				
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

A_g, in.^{2}	4.75	3.61	3.03	2.44	3.75	2.86
r_z, in.	0.988	0.989	0.993	1.00	0.781	0.787

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

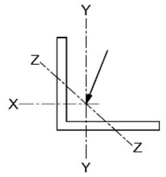
^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)
Available Strength in Axial Compression, kips
Concentrically Loaded Equal Angles (Welded)



L4-L3

Shape		L4×4×		L3½×3½×				L3×3×					
		¼ ^{c2}		⅜ ^{c2}		¼ ^{c2}		½		⅜		¼ ^{c2}	
lb/ft		6.72		8.62		5.85		9.54		7.32		4.99	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	-S-	-S-	107	161	82.1	123	-S-	-S-
	1	-S-	-S-	-S-	-S-	-S-	-S-	100	151	76.9	116	-S-	-S-
	2	-S-	-S-	-S-	-S-	-S-	-S-	82.1	123	63.1	94.9	-S-	-S-
	3	-S-	-S-	-S-	-S-	-S-	-S-	59.0	88.6	45.4	68.3	-S-	-S-
	4	-S-	-S-	-S-	-S-	-S-	-S-	37.2	55.9	28.7	43.2	-S-	-S-
	5	-S-	-S-	-S-	-S-	-S-	-S-	23.8	35.8	18.4	27.6	-S-	-S-
	6	-S-	-S-	-S-	-S-	-S-	-S-	16.5	24.8	12.8	19.2	-S-	-S-
	7	-S-	-S-	-S-	-S-	-S-	-S-	12.1	18.2	9.38	14.1	-S-	-S-
	8	-S-	-S-	-S-	-S-	-S-	-S-	9.29	14.0	7.18	10.8	-S-	-S-
	9	-S-	-S-	-S-	-S-	-S-	-S-	7.34	11.0	5.67	8.53	-S-	-S-
	10	-S-	-S-	-S-	-S-	-S-	-S-						
	11	-S-	-S-	-S-	-S-	-S-	-S-						
	12	-S-	-S-										
	13	-S-	-S-										
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

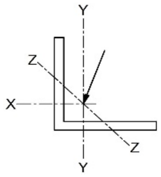
A_g, in.^{2}	1.94	2.48	1.69	2.75	2.11	1.44
r_z, in.	0.796	0.690	0.693	0.585	0.587	0.589

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.



L3-L2

Table 5-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

	Shape	L3×3×		L2½×2½×						L2×2×			
		3⁄16 ^{c2}		⅜		¼ ^{c2}		3⁄16 ^{c2}		⅜		¼	
	lb/ft	3.78		6.01		4.12		3.13		4.71		3.25	
	Design	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, KL (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	67.3	101	-S-	-S-	-S-	-S-	52.9	79.6	36.5	54.9
	1	-S-	-S-	61.2	92.0	-S-	-S-	-S-	-S-	45.6	68.5	31.5	47.3
	2	-S-	-S-	46.0	69.2	-S-	-S-	-S-	-S-	29.1	43.7	20.2	30.4
	3	-S-	-S-	28.6	43.0	-S-	-S-	-S-	-S-	14.5	21.7	10.1	15.2
	4	-S-	-S-	16.3	24.5	-S-	-S-	-S-	-S-	8.13	12.2	5.69	8.56
	5	-S-	-S-	10.4	15.7	-S-	-S-	-S-	-S-	5.20	7.82	3.64	5.48
	6	-S-	-S-	7.23	10.9	-S-	-S-	-S-	-S-	3.61	5.43	2.53	3.80
	7	-S-	-S-	5.31	7.99	-S-	-S-	-S-	-S-				
	8	-S-	-S-	4.07	6.11	-S-	-S-	-S-	-S-				
	9	-S-	-S-										
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

A_g, in.^{2}	1.09	1.73	1.19	0.902	1.36	0.938
r_z, in.	0.597	0.488	0.491	0.495	0.389	0.392

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

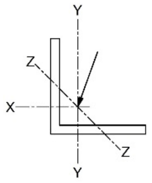
Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)

Available Strength in
Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)



L2-L1¼

Shape		L2×2×				L1½×1½×						L1¼×1¼×	
		3/16 ^{c2}		1/8 ^{c2}		1/4		3/16		1/8		1/4	
lb/ft		2.48		1.68		2.38		1.83		1.25		1.95	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	-S-	-S-	-S-	-S-	26.8	40.2	20.5	30.8	14.0	21.0	21.9	32.9
	1	-S-	-S-	-S-	-S-	20.6	30.9	15.8	23.7	10.8	16.2	14.9	22.4
	2	-S-	-S-	-S-	-S-	9.33	14.0	7.20	10.8	5.00	7.52	5.25	7.89
	3	-S-	-S-	-S-	-S-	4.15	6.23	3.20	4.81	2.22	3.34	2.33	3.51
	4	-S-	-S-	-S-	-S-	2.33	3.51	1.80	2.70	1.25	1.88	1.31	1.97
	5	-S-	-S-	-S-	-S-								
	6	-S-	-S-	-S-	-S-								
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												
Properties													
A_g, in.^{2}		0.715		0.484		0.688		0.527		0.359		0.563	
r_z, in.		0.392		0.398		0.293		0.294		0.297		0.243	

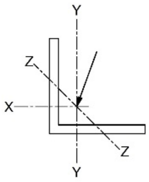
ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

^{c2} Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version



L1¼-L¾

Table 5-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)

F_y = 65 ksi

Shape		L1¼×1¼×				L1×1×						L¾×¾×	
		3/16		⅛ [c2]		¼		3/16		⅛		⅛	
lb/ft		1.50		1.0		1.52		1.18		0.813		0.596	
Design		P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$	P_n/Ω_c	$\varphi_c P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	16.9	25.4	-S-	-S-	17.0	25.6	13.2	19.9	9.11	13.7	6.69	10.1
	1	11.5	17.3	-S-	-S-	9.45	14.2	7.25	10.9	5.02	7.54	2.32	3.48
	2	4.05	6.09	-S-	-S-	2.66	4.00	2.02	3.04	1.41	2.11	0.579	0.871
	3	1.80	2.70	-S-	-S-	1.18	1.78	0.899	1.4	0.625	0.939		
	4	1.01	1.52	-S-	-S-								
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												
	22												
	23												
	24												
	25												
	26												

Properties

A_g, in.^{2}	0.434	0.297	0.438	0.340	0.234	0.172
r_z, in.	0.243	0.245	0.196	0.194	0.195	0.146

ASD	LRFD
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

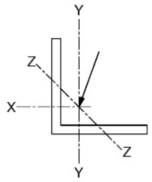
Note: Heavy line indicates KL/r_z equal to or greater than 200.

F_y = 65 ksi

Table 5-8 (continued)

Available Strength in Axial Compression, kips

Concentrically Loaded Equal Angles (Welded)



L1½

Shape		L½×½× ⅛	
lb/ft		0.379	
Design		P_n/Ω_c ASD	$\varphi_c P_n$ LRFD
Effective length, *KL* (ft), with respect to least radius of gyration, r_z	0	4.24	6.38
	1	0.658	0.988
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		

Properties

A_g, in.^{2}	0.109
r_z, in.	0.098
ASD	**LRFD**
Ω_c = 1.67	φ_c = 0.90

[c2] Shape is slender for compression with F_y = 65 ksi.

-S- Slender cross-section (outside scope of DG27).

Note: Heavy line indicates KL/r_z equal to or greater than 200.

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version

STRUCTURAL STAINLESS STEEL DESIGN TABLES

IN ACCORDANCE WITH AISC DG27: STRUCTURAL STAINLESS STEEL

This publication presents design data derived in accordance with the American Institute of Steel Construction's Design Guide 27 *Structural Stainless Steel*. The data is presented in an equivalent set of tables to those in the AISC *Steel Construction Manual* for carbon steel sections. Tables cover dimensions and properties, design data for flexural members and design data for compression members. Two strength levels are covered – 30 ksi which corresponds to austenitic stainless steels and 65 ksi which corresponds to duplex stainless steels.

The following structural sections are included in this publication:

- W- and S-shapes
- C- and MC-shapes
- Equal angles
- Rectangular hollow structural sections (HSS)
- Square HSS
- Circular HSS.

Section ranges listed cover sections that are readily available at the time of printing.

SCI Ref: P420

SCI
Silwood Park, Ascot, Berkshire. SL5 7QN UK
T: +44 (0)1344 636525
F: +44 (0)1344 636570
E: reception@steel-sci.com
www.steel-sci.com

Version 1.0 03/04/2018
Always refer to www.steel-stainless.org/usdesigntables for the latest version